SLOVENSKI STANDARD
oSIST prEN 1717:2023

01-julij-2023

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 water intended for human consumption in potable water installations and general requirements for 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 destinée à la consommation humaine dans les installations d'eau potable et exigences générales applicables aux dispositifs de protection contre la pollution par retour

Ta slovenski standard je istoveten z: **prEN 1717**

ICS:

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

oSIST prEN 1717:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 1717

June 2023

ICS 13.060.20; 91.140.60

Will supersede EN 1717:2000

English Version

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

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

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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 164.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 1717:2023) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

The UK Matrix of the protection units appropriate to fluid categories (Table 2) and the determination of fluid categories (5.2) differs to that detailed within the body of this document. The British Standard version of EN 1717 therefore contains an A deviation to cover the limited technical deviations to ensure compliance with the Water Supply (fittings) Regulations 1999.

This document supersedes EN 1717:2000.

The main changes compared to the previous edition are listed below:

a) the scope has been made more precise, extended and revised;

b) terms and definitions have been amended;

c) all Figures have been updated and re-drawn;

d) Table 2 has been updated;

e) Clause “Air break to drain” has been revised;

f) Annex A and Annex B have been completely revised;

g) Annex C has been revised and provides application examples.

Introduction

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

1) this document 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.

Annex A, Annex B and Annex C of this document are informative.

1 Scope

This document specifies a methodology for protecting potable water in potable water installations within and outside buildings but within premises from the risk of pollution by backflow of non-potable water and gives recommendations on the design, risk analysis, backflow prevention devices and their installation methods.

This methodology is also intended to be used outside premises for all potable water systems connected to a potable water distribution system up to and including the point of use.

The product standards for the specific backflow prevention devices or arrangements are intended to be used in conjunction with this document. In the absence of a product standard, this document is intended to be used as a reference to draw up a specification for the development of new devices or arrangements.

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.

EN 806 (all parts), *Specification for installations inside buildings conveying water for human consumption*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
air break to drain
vertical air gap realised by air inlets or full disconnection between the lowest point of the outlet and the spillover level of the atmospheric drain overflow

3.2
air gap
permanent atmospheric separation between the upstream fluid supply and the downstream fluid

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

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

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

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

3.7
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)

3.8
domestic use
intended use of applications and appliances that are common for a potable water installation in a household environment

Note 1 to entry: The same use of these appliances and applications in e.g. flats, hotels, schools, offices and collective residences (student and nurse accommodations or similar) is considered to be domestic use (see also 6.2)

3.9
downstream
side to which fluid flows under normal conditions

3.10
potable water system
water system located downstream of the delivery point specified by the water supply authorities or regulations

Note 1 to entry: In DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2020 on the quality of water intended for human consumption the potable water system is denominated as “domestic distribution system”.

3.11
family of protection
general identification of a backflow protection device principle

3.12
fluid
all substances which can be deformed by small forces

Note 1 to entry: Fluids are divided into liquids and gases.

3.13 Different liquid levels

3.13.1
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 level

3.13.2
maximum level
highest water level reached above the spillover level under positive pressure fault conditions with all outlets closed but with the overflow open

3.13.3
spillover level
level at which water will start to overflow the receiving vessel with all outlets closed

3.14
LD_{50}
calculated value, based on OECD 423 test method, of 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 consider potential delayed effects) the death of 50 out of 100 treated animals

Note 1 to entry: One should realize that the LD_{50}-test method is used only as a tool for selecting appropriate family and types of backflow preventers. The LD_{50}-method is not sufficient for conducting a full toxicological evaluation.

3.15
non-domestic use
every application not covered by definition 3.8

3.16
overflow
means for discharging naturally excess fluid from an appliance when it has reached a specified level

3.17
point of use
point where water is drawn by the user either directly or by connecting an apparatus

3.18
pollution of potable water
reduction in aesthetic (turbidity, odour and taste), chemical or biological quality of potable water due to raising its temperature or the introduction of contaminating substances

3.19
protection point
location in a hydraulic circuit where a protection unit is installed

3.20
protection unit
device or a device in combination with other hydraulic components which constitutes the protection against backflow

3.21
type of protection
identified operating principle applied to a protection device belonging to a given family

3.22
upstream
side from which fluid flows under normal conditions

3.23
potable water
water intended for human consumption (according to DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2020 on the quality of water intended for human consumption) including hot water, wholesome water and abbreviated to PWC (potable water cold) and PWH (potable water hot)

4 Pollution of potable water: general observations

4.1 General

This clause is to be used when undertaking the risk analysis for determining the protection to be used to prevent the pollution by backflow of the potable water network and potable water installations.

The following conditions can give raise to pollution of the potable water.

4.2 Backflow of non-potable water

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

4.3 Cross-connection

The quality of the potable water distributed can be impaired by a cross-connection, this can be an actual or potential physical connection between a potable water supply and any other non-potable water system.

4.4 External influences

Potable water cisterns, pipes and protection units shall be protected from external pollution (see the EN 806 series).

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.) other 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.

4.5 Materials

The quality of the potable water distributed can be impaired by the use of inappropriate materials.

4.6 Stagnation

Stagnation (e.g. as a result of interruptions to operation and disconnection, see the EN 806 series) 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.

4.7 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. For proper maintenance see EN 806-5.

5 Analysis method of the pollution risks and choice of protection

5.1 General remarks

Pollution 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) back pressure: originated in a non-potable water system in which the pressure exceeds the pressure in the potable water system;

c) back growth: pollution in the potable water system as a result of back growth of microorganisms;

d) stagnation, see 4.6.

5.2 Determination of fluid categories

5.2.1 General

Fluids which could be in contact with potable water are classified in five categories as defined below.

5.2.2 Category 1

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

5.2.3 Category 2

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

5.2.4 Category 3

Fluid representing a slight human health hazard due to the presence of one or more harmful substances of low acute toxicity to be determined by the LD_{50}-method > 200 mg/kg, see 3.14 [1].

5.2.5 Category 4

Fluid presenting a significant human health hazard due to the presence of one or more toxic or very toxic substances of high acute toxicity to be determined by the LD_{50}-method ≤ 200 mg/kg, see 3.14. or one or more carcinogenic mutagenic and reprotoxic (CMR) substances.

5.2.6 Category 5

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

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[1] The border between fluid category 3 and 4 is in principle LD_{50} = 200 mg/kg body weight, in accordance with OECD 423, December 17, 2001.
When the outcome of the calculation method indicates that a dose equal or less than 200 mg/kg body weight of a fluid is deadly for at least 50 % of the animals, than the fluid is classified into category 4. When the calculation indicates that a dose of more than 200 mg/kg is required the fluid is to be regarded as less harmful and the fluid is classified into category 3.
Remark: In 2002 the original LD_{50}-test, OECD 401 (8), has been deleted from the OECD guidelines.
The LD_{50}-test method in this standard is just used as a means for selecting appropriate backflow preventers. It is not intended as a replacement for undertaking a full toxicological evaluation of the health risk.

5.2.7 Mixture of fluids

Mixing fluids of different categories will classify the mixture as the highest fluid category (independent of the ratio) of the mixed fluids.

5.3 Determination of the installation characteristics

5.3.1 General

The analysis of an existing or projected installation provides information about its characteristics and the fluid categories.

That information shall then be used to determine an appropriate protection unit to prevent pollution of the potable water supply or installation.

The analysis is done as described in the following clauses.

The result of this analysis is fixed by a cross in the appropriate field of the installation matrix (see Table 1).

5.3.2 Pressure

Locate the point(s) within the potable water system that need to be protected against pollution.

Determine whether downstream of the protection point 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 is subject to backsiphonage only (see Figure 1);

— the situation will be P > atm if the protection point is subject to backsiphonage and back pressure see Figure 2).

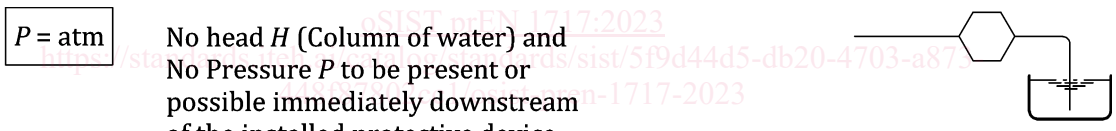


Figure 1 — Pressure equal atmosphere

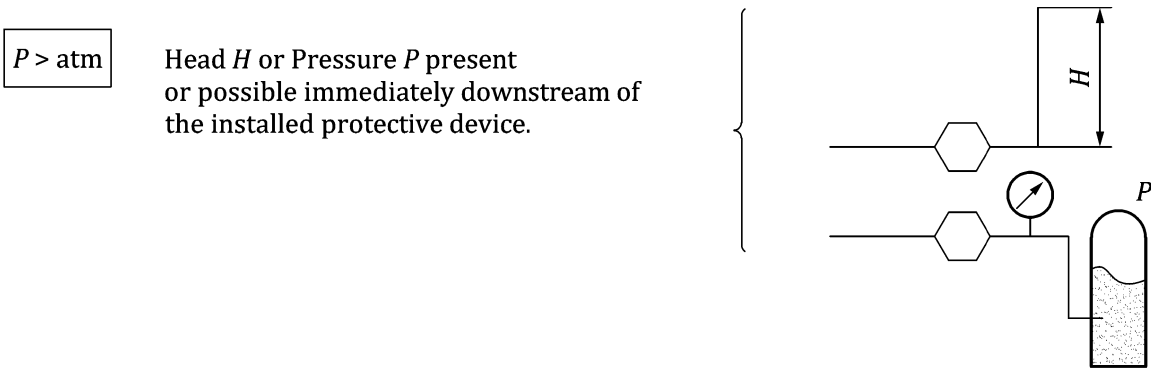


Figure 2 — Pressure bigger atmosphere

5.3.3 Connections

All connections are considered permanent.

5.3.4 Risk attenuation

The principle of risk attenuation is accepted only for certain facilities for domestic use listed in Clause 6.2 and in conformity with Table 3.

5.4 Separation by single or double walls

5.4.1 General

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 pressurized gaseous fluid or an inert porous material (open cells);

— containing a fluid of category 2 or 3.

5.4.2 Rules

5.4.2.1 With respect to pollution prevention

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

When the fluid from which potable water shall be protected against pollution is of category 4 or 5, a single wall is not sufficient. A double wall with a safety medium in between (liquid or gas) is considered to be able to separate the potable water from the second fluid.

5.4.2.2 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.

5.4.3 Leakage test on double-wall-separation

Separation by a double-wall with a safety medium in between shall be constructed such that any leakage from one of the walls shall be routed to the outside of the appliance to give a visual leakage detection or that the leakage initiates a visible and/or acoustic signal.

The leakage test, conducted on a test sample is as follows:

1) drill a (2 ± 0,1) mm hole through the partition wall in contact with the fluid the potable water needs to be protected against. For the position the most critical location in the double-wall is selected. (normally the furthest point from the connections);

2) subject the hole in this side of the separation wall with a pressure of (50 ± 5) kPa and maintain that pressure;

3) verify if a leakage detection is established within (300 ± 5) s after applying the pressure, e.g. by:

   — observing that fluid emerges to the outside of the double wall construction in the atmosphere;

   — a visual alarm is initiated;

— an acoustic alarm signal is initiated.

5.5 Air break to drain

If apparatus is connected to a drainage system, which does not have an air break to drain that satisfies the requirements given in Clause 8, the fluid in the apparatus shall be considered as fluid category 5.

5.6 Installation matrix

Table 1 — Installation matrix

Downstream pressure of protection device	Category of fluid			
	2	3	4	5
P = atm (backsiphonage)				
P > atm (Backpressure)				

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 during the analysis, if the integrated backflow prevention arrangement satisfies the risk determined during the analysis, then no further backflow prevention arrangement is necessary for the apparatus.

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

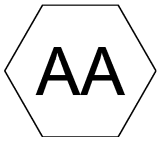
When the protection unit is represented by a symbol it shall be a hexagon shape containing the letter of the protection family and the letter of the type of protection in this family.

All materials coming into contact with water intended for human consumption shall present no health risk nor cause any change to the water in terms of quality, appearances, smell or taste.

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

Regular inspection and maintenance of the protection units shall be carried out in accordance with the EN 806 series and the applicable product standards.

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