



BSI Standards Publication

Electric appliances connected to the water mains — Avoidance of backsiphonage and failure of hose-sets

National foreword

This British Standard is the UK implementation of EN 61770:2009+A12:2022. It is derived from IEC 61770:2009, incorporating amendment 1:2015. It supersedes BS EN 61770:2009+A1:2019, which will be withdrawn on 10 June 2025.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A11 is indicated by A11 A11.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by A1 A1.

Where a common modification has been introduced by amendment, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC amendment A1 are indicated by C1 C1, and the modifications introduced in CENELEC corrigenda June 2023 are indicated by C2 C2.

The UK participation in its preparation was entrusted to Technical Committee CPL/61, Safety of household and similar electrical appliances.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2009.

Amendments/corrigenda issued since publication

Date	Text affected
30 June 2011	Incorporation of CENELEC corrigendum March 2011: Addition of Annex ZB
31 July 2018	Implementation of CENELEC amendment A11:2018
31 August 2019	Implementation of IEC amendment 1:2015 with CENELEC endorsement A1:2019
30 November 2022	Implementation of CENELEC amendment A12:2022
29 February 2024	Implementation of CENELEC corrigendum June 2023

English Version

Electric appliances connected to the water mains –
Avoidance of backsiphonage and failure of hose-sets
(IEC 61770:2008)

Appareils électriques raccordés au réseau
d'alimentation en eau – Exigences pour éviter le
retour d'eau par siphonnage et la défaillance des
ensembles de raccordement(CEI 61770:2008)

Elektrische Geräte zum Anschluss an die
Wasserversorgungsanlage – Vermeidung
von Rücksaugung und des Versagens von
Schlauchsätzen(IEC 61770:2008)

This European Standard was approved by CENELEC on 2009-04-22. CENELEC 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 Central Secretariat or to any CENELEC member.

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

European foreword

The text of document (61/3647/FDIS), future edition 2 of IEC 61770, prepared by IEC TC 61, Safety of household and similar electrical appliances, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61770 on 2009-04-22.

This European Standard supersedes EN 61770:1999 + A1:2004 + A2:2006 + corrigendum August 2007.

The principal changes in EN 61770:2009 as compared with EN 61770:1999 are as follows (minor changes are not listed):

- normative references are updated;
- some notes have been converted to normative text (3.10, 5.2, 6.3, 7.2 and Annex A);
- the type of petroleum spirit has been specified (9.3).

The following dates were fixed:

- | | | |
|--|-------|------------|
| — latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2010-05-01 |
| — latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2012-05-01 |

NOTE The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard 61770:2008 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A11

This document (EN 61770:2009/A11:2018) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances" in collaboration with CEN/TC 164 "Water Supply".

It was generated to overcome occurring uncertainties in checking the appliances since extension of the scope for all EN 60335-2 parts having the necessity to be connected to the water mains.

Significant changes are the adoption of the EN 1717 approach of evaluating the risk categories and providing provisions / backflow prevention devices to realise prevention against the evaluated risks and to offer a choice of relevant backflow prevention devices which are already described by separate EN-Standards but with easing the requirements at points, where definitions which are not safety-relevant for the use in Electrical Appliances connected to the water mains prohibit industrialised realisation. Examples are requirements regarding size, stability and markings which are well-grounded for the use in house installation, but not for the realisation inside an electric appliance.

The following dates are fixed:

- latest date by which this document has to be implemented at (dop) 2018-11-18
national level by publication of an identical national standard
or by endorsement
- latest date by which the national standards conflicting with (dow) 2021-05-18
this document have to be withdrawn

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

This amendment supplements or modifies the corresponding clauses of EN 61770:2009.

There are no special national conditions causing a deviation from this amendment.

There are no national deviations from this amendment.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 61770:2008 are prefixed "Z".

Foreword to amendment A1

This document (EN 61770:2009/A1:2019) consists of the text of IEC 61770:2008/A1:2015 prepared by IEC/TC 61 "Safety of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at (dop) 2020-01-26
national level by publication of an identical national standard
or by endorsement
- latest date by which the national standards conflicting with (dow) 2022-07-26
this document have to be withdrawn

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Endorsement notice

The text of the International Standard IEC 61770:2008/A1:2015 was approved by CENELEC as a European Standard with agreed common modifications.

Foreword to amendment A12

This document (EN 61770:2009/A12:2022) has been prepared by CLC/TC 61 “Safety of household and similar electrical appliances” in collaboration with CEN/TC 164 “water supply”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-12-10
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2025-06-10

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Annex ZA (normative)

Analysis method for determining the necessary protection device to prevent backsiphonage

ZA.1 General

- Ascertain of the fluid categories which are used in the appliance.
- Ascertain which are the installation characteristics for the protection device to be taken into account in accordance with ZA.3.
- Determine the maximum fault level. The result determines if the Situation at the point of protection is $p = \text{atm}$ or $p > \text{atm}$.
- Consider which are the protection devices to be used by referring to the protection matrix according to ZA.4 (Table ZA.1).
- Verify if the drainage systems are fitted with an air break to drain in accordance with ZA.5 (Figure ZA.1).

ZA.2 Determination of fluid categories which are or might be in contact with potable water

In normal use fluids which are or may be in contact with **potable water** are classified in 5 categories as defined below.

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

ZA.2.1 Category 1

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

ZA.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 may have undergone a change in taste, odour, colour or a temperature change (heating or cooling).

ZA.2.3 Category 3

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

NOTE ZA1 The border between category 3 and category 4 (The referenced document is OECD Guideline 423) is in principle $LD_{50} = 200 \text{ mg/kg body weight}$. LD_{50} is the quantity of substances or mixture which, given on one intake through oral and parenteral path, brings about within 15 days (the required time to take into account potential delayed effect) the death of 50 out of 100 treated animals.

ZA.2.4 Category 4

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

ZA.2.5 Category 5

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

ZA.3 Determination of installation characteristics - Pressure

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

Determine the **maximum water level**.

Define whether the **protection point** or, failing this, the point of connection of the appliance to the **potable water** network is subjected to atmospheric pressure ($p = atm$) or to a pressure exceeding atmospheric pressure ($p > atm$).

$p = atm$ applies if the **protection point** or, failing this point, the point of connection of the appliance to the **potable water** network is located above the maximum water level;

$p > atm$ applies if the **protection point** or, failing this point, the point of connection of the appliance to the **potable water** network is located below this **maximum water level**.

ZA.4 Matrix of the protection devices appropriate to fluid categories

The suitability of each protection device is indicated in the following matrix, Table ZA.1.

Table ZA.1 — Matrix of the protection devices appropriate to fluid categories

Protection device to prevent backflow (backsiphonage and back pressure)	Category of fluids				
	1	2	3	4	5
Air gap AA	—	●	●	●	●
Air gap AB with overflow non-circular	—	●	●	●	●
Air gap AD with injector	—	●	●	●	●
Air gap AF with overflow circular	—	●	●	●	
Air gap AG with minimum circular overflow	—	●	●		
Pipe interrupter without moving parts	—	○	○	○	○
Pipe interrupter with moving parts	—	○	○	○	
Backflow preventer with reduced pressure zone	—	●	●	●	
Dynamic air inlet device	—	○	○		
Combination of protection devices	—	●	○		
Non controllable anti-pollution double check valve	—	●	○*		
Anti-pollution check valve	—	●			
Anti-vacuum valve	—	○	○		
General remarks: ● Covers the risk ○ Covers the risk only if $p = atm$ ○* Covers the risk only with a risk assessment to the concentration of the used harmful substances — Protection not required					

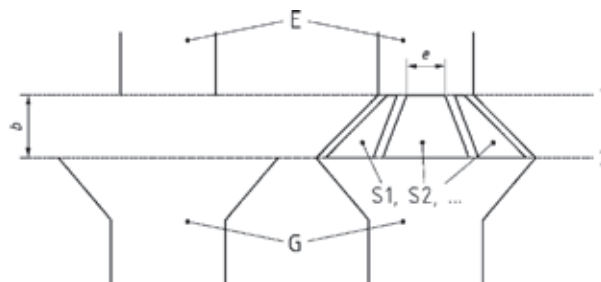
ZA.5 Air break to drain

A12 All appliances connected to a **potable water** network and including a water draining device have to be provided with an air break before its discharge to the drainage system or all relevant information regarding the connection to the drainage system shall be provided in the documentation and the installation manual. Otherwise the fluid in the apparatus has to be considered as fluid category 5. **A12**

The air breaks to drain shall be realised by a full disconnection or by air inlets.

Requirements on air breaks to drain:

- $b \geq G$;
- $b \geq 20 \text{ mm}$;
- $G \geq E$ and drain shall be capable to take the full flow of the discharge $S_1 + S_2 + \dots \geq \frac{b \times 2 \pi G}{3}$
- $e \geq 4 \text{ mm}$.



Key

1	Outlet evacuation
2	Spillover level
E	Evacuation, bore E
G	Drain, bore G
S1, S2	Air inlets cross-sections for air passage
e	smallest dimension for calculation of a cross-section

Figure ZA.1 — Air break to drain

Annex ZB

(informative)

Guide table for determining the fluid category from which protection is required

Table ZB.1 — Fluid categories

1	Water intended for human consumption	Category
1.1	High pressure potable water	1
1.2	Stagnant water ^a	2
1.3	Chilled water	2
1.4	Sanitary hot water	2
1.5	Steam (in contact with foods, free of additives)	2
1.6	Conditioned water ^b	2
2	Water with additives or in contact with liquid or solid elements other than those of category 1	Category
2.1	Softened water not intended for human consumption	3 / 4 ^c
2.2	Water + anti-corrosion not intended for human consumption	3 / 4 ^c
2.3	Water + anti-freeze	3 / 4 ^c
2.4	Water + algacide	3 / 4 ^c
2.5	Potable water + liquid foodstuffs (fruit juice, coffee, non-alcoholics, soups)	2
2.6	Potable water + solid foods	2
2.7	Potable water + alcoholic drinks	2
2.8	Water + washing products	3 / 4 ^c
2.9	Water + surfactants	3 / 4 ^c
2.10	Water + disinfectants not intended for human consumption	3 / 4 ^c
2.11	Water + detergents	3 / 4 ^c
2.12	Water + refrigerants	3 / 4 ^c
3	Potable water for other uses	Category
3.1	Food cooking water	2
3.2	Washing water for fruit, vegetables (catering system)	3 / 5d
3.3	Prewashing and washing water for dishes, cooking utensils	5
3.4	Rinsing water for dishes, cooking utensils	3
3.5	Central heating water without additives	3
3.6	Sewer, waste	5
3.7	Body washing water	5
3.8	Toilet cistern water	3
3.9	WC water	5
3.10	Swimming pool water	5
3.11	Cloth washing water	5
3.12	Sterile water	2
3.13	Demineralized water	2
a  Some elements may increase the risk (temperature / materials). Water in the connection arrangement under normal conditions is not to be considered as stagnant.  b Conditioned water inside buildings (excluding equipment). c The border between category 3 and category 4 see ZA.2.3. d Category 5 for prewashing and washing water. Category 3 for rinsing water.		

Annex ZC
(normative)

**Normative references to international publications
with their corresponding European publications**

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
 IEC 60730-2-8	-	Automatic Electrical controls for household and similar use – Part 2–8: Particular requirements for electrically operated water valves, including mechanical requirements	EN IEC 60730-2-8	2020 

Annex ZD
(informative)

A–deviations

A–deviations: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC national member.

This European Standard does not fall under any Directive of the EU.

In the relevant CEN-CENELEC countries, these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

Clause	Deviation
4.Z1 – All materials coming into contact with water intended for human consumption...	United Kingdom (The England and Wales Water Supply (Water Fittings) Regulations 1999, the Northern Ireland Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 and the Scotland Water Supply (Water Fittings) (Scotland) Byelaws 2014). The following additional requirement applies: All non-metallic materials coming into contact with potable water intended for domestic purposes or human consumption shall be verified against appropriate parts of BS6920 or other national specification of an EEA state which provides an equivalent level of protection or performance. Where the fluids downstream of the backflow prevention device is not intended to be potable, used for domestic purposes or for human consumption, only the materials upstream of and those within the backflow prevention device are required to be verified.
4.2 – Suitable backflow prevention devices shall...	United Kingdom (The England and Wales Water Supply (Water Fittings) Regulations 1999, the Northern Ireland Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 and the Scotland Water Supply (Water Fittings) (Scotland) Byelaws 2014). The following additional requirement applies: The backflow prevention device or arrangement used shall be appropriate to highest applicable fluid category to which the fitting is subject downstream. The selection of the backflow prevention device or arrangement shall be in accordance with Schedule 1 of the above regulations and byelaws and the "Regulator's Specification for the Prevention of Backflow"
5.4 – Tests on backflow prevention devices – Backflow prevention devices are tested...	United Kingdom (The England and Wales Water Supply (Water Fittings) Regulations 1999, the Northern Ireland Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 and the Scotland Water Supply (Water Fittings) (Scotland) Byelaws 2014). The following additional requirement applies: All tests on backflow prevention devices shall be carried out in accordance with the appropriate requirements of the "Regulator's Specification for the Prevention of Backflow" test code sheets or to a British Standard or other national specification of an EEA state which provides an equivalent level of protection or performance

	(also see clause 6).
6 – Air gaps, 7 – Pipe interrupters, and 8 – Dynamic backflow preventers...	United Kingdom (The England and Wales Water Supply (Water Fittings) Regulations 1999, the Northern Ireland Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 and the Scotland Water Supply (Water Fittings) (Scotland) Byelaws 2014). The devices and arrangements specified within these clauses do not provide an equivalent level of protection or performance with UK national regulations and the following additional requirement applies: The backflow prevention device or arrangement shall be in accordance with the appropriate requirements of the “Regulator’s Specification for the Prevention of Backflow” or to a British Standard or other national specification of an EEA state which provides an equivalent level of protection or performance.
Annex ZA – Analysis method for determining the necessary protection device to prevent... and Annex ZB Guide table for determining the fluid category from...	United Kingdom (The England and Wales Water Supply (Water Fittings) Regulations 1999, the Northern Ireland Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 and the Scotland Water Supply (Water Fittings) (Scotland) Byelaws 2014). The following additional requirement applies: The assessment of fluids shall be in accordance with Schedules 1 and 2 to the above regulations and byelaws and the “Regulator’s Specification for the Prevention of Backflow”. The backflow prevention device or arrangement used shall be appropriate to highest applicable fluid category to which the fitting is subject downstream.
4 – General requirements... and 9 – Hose-sets...	United Kingdom (The England and Wales Water Supply (Water Fittings) Regulations 1999, the Northern Ireland Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 and the Scotland Water Supply (Water Fittings) (Scotland) Byelaws 2014). The following additional requirement applies: Systems incorporating non-metallic materials subject to pressurised hot water shall be resistant to the heating and cooling stresses e.g. thermal endurance. Suitability shall be verified against the Regulator’s Specification for thermal endurance or to a British Standard or other national specification of an EEA state which provides an equivalent level of protection or performance. Hoses or other non-metallic materials intended to be installed where light is present shall not transmit more than 0.2% of the visible light falling on it. Suitability shall be verified against the Regulator’s Specification for opacity or to a British Standard or other national specification of an EEA state which provides an equivalent level of protection or performance.

A12

Annex ZE
(Informative)

Example of an Air Gap AB

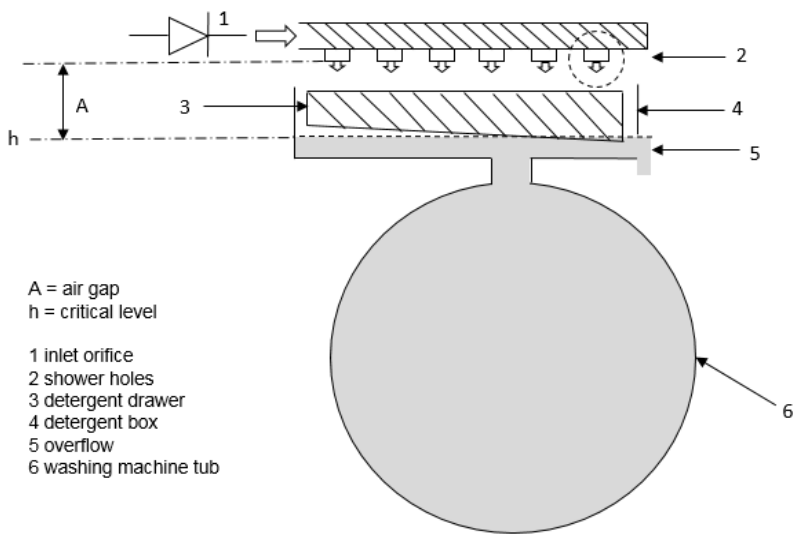


Figure ZE: Example of air gap AB

A12

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Electric appliances connected to the water mains - Avoidance of backsiphonage and failure of hose-sets

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61770 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

A12 This European Amendment A12 supplements or modifies the corresponding clauses of EN 61770:2009 +A11:2018+A1:2019. **A12**

C2 This Corrigendum modifies the corresponding clauses of the standards below:

– EN 61770:2009/A12:2022. **C2**

The text of this standard is based on the following documents:

FDIS	Report on voting
61/3647/FDIS	61/3687/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

NOTE 1 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in [Clause 3](#). When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 2 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this standard be adopted for implementation nationally not earlier than 12 months nor later than 36 months from the date of its publication.

1 Scope

A11 This European Standard specifies requirements for appliances for household and similar purposes to prevent the backflow of non-potable water into the water mains. It also specifies requirements for hose sets used for connecting such appliances to the water mains that supply water at a pressure not exceeding 1 MPa.

NOTE 1 Examples of similar purposes are the installation of appliances in canteens, restaurants, launderettes and communal flats.

NOTE 2 The connection of the appliance to the water mains may be temporary or permanent.

NOTE 3 When reference is made to the water mains, water supplied from a cistern or similar system is also included.

This standard does not apply to

- a) appliances used for dry cleaning;
- b) appliances for medical purposes;
- c) appliances intended for industrial purposes;
- d) water heaters that are an integral part of the water supply system;
- e) water coolers that are an integral part of the water supply system;
- f) backflow prevention devices for general purposes. **A11**

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.

IEC 60730-2-8, *Automatic electrical controls for household and similar use — Part 2: Particular requirements for electrically operated water valves, including mechanical requirements*

3 Terms and definitions

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

3.1

potable water

water which is obtained directly from the potable water mains and remains in a closed system up to the **backflow prevention device**

3.2

non-potable water

water which leaves the closed system after having passed the **backflow prevention device**

3.3

backflow prevention device

means to prevent contamination of **potable water** by backflow of *non-potable water*

Note 1 to entry: **A11** Text deleted **A11**