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Basic standards of aptitude of equipment used in the treatment of water for human consumption in buildings

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BACKGROUND

This Standard has been prepared by the Technical Committee AEN/CTN 149 SC-1 “Water Treatment”, whose Secretary’s Office carries out the Isabel II Canal.

INTRODUCTION

Royal Decree 140/2003 by which the sanitary standards regarding the quality of water for human consumption are established, establishes the following concepts in its article 10: purification treatment of water for human consumption:

10.3. Purification treatment processes shall not transmit to the water substances or properties that contaminate or degrade its quality and involve the non-fulfilment of the requirements specified in appendix I and a risk to the health of the population supplied, nor shall they cause,

directly or indirectly, the contamination or impairment of the surface or ground water intended for the production of water for human consumption.

10.4. Treatment units in buildings may not transmit to the water substances, germs or undesirable or health-damaging properties and shall meet the provisions of article 14. The marketing of these units shall be subject to their prior approval.

The European Standards regarding water treatment equipment, developed by CEN, TC-164, WG-13, specify the quality requirements in reference to the operation of the equipment but do not incorporate any test to determine that their use does not transmit to the water substances, germs or undesirable or health-damaging properties.

This AEN/CTN-149 committee Standard describes the basic aptitude standards of the water treatment equipment in buildings as indicated in articles 10.3 and 10.4 of RD 140/2003 and other supplementary legal texts that require it.

For the preparation of this standard, tests have been performed on equipment by an authorized laboratory to verify compliance with the requirements of sections 5 and 6 of this Standard.

1. OBJECT AND FIELD OF APPLICATION

This Standard establishes the standards to determine whether a water treatment unit in buildings can be used without transmitting to the water for human consumption substances, microorganisms or undesirable or health-damaging properties.

This Standard does not consider the operative specifications of the water treatment units, since these are indicated in the Standards developed by CEN, TC-164, WG-13 (See Appendix D).

2. STANDARDS FOR CONSULTATION

This standard incorporates provisions from other publications for reference purposes, with or without date. These legal references are quoted in the appropriate parts of the text of the standard and legal appendices, and are listed below. Subsequent revisions or amendments to any of the publications referenced with date are only applied to this standard when they are incorporated by revision or amendment. For undated references, the latest edition of the publication in question is applied (including amendments).

In appendix D and the bibliography appendix, both informative, other legal references are quoted.

UNE EN 545 “Tubes, coupling and accessories in ductile cast iron and their joints for water pipes. Requirements and test methods”.

UNE EN 1057 “Copper and copper alloys. Round copper pipes, with no welding, for water and gas in sanitary and heating applications”.

UNE EN 1452-1 “Pipe systems in plastic materials for water conduction. Unplasticized polyvinyl chloride (PVC – U). Part 1: Generalities”.

UNE EN 1452-2 “Pipe systems in plastic materials for water conduction. Unplasticized polyvinyl chloride (PVC – U). Part 2: Pipes”.

UNE EN 1452-3 “Pipe systems in plastic materials for water conduction. Unplasticized polyvinyl chloride (PVC – U). Part 3: Accessories”.

UNE EN 12201-1 “Piping systems in plastic material for water conduction. Polyethylene (PE). Part 1: Generalities”.

UNE EN 12201-2 “Piping systems in plastic material for water conduction. Polyethylene (PE). Part 2: Pipes”.

UNE EN 12201-3 “Piping systems in plastic material for water conduction. Polyethylene (PE). Part 3: Accessories”.

UNE EN 12201-4 “Piping systems in plastic material for water conduction. Polyethylene (PE). Part 4: Valves”.

UNE EN 15161 “Water-conditioning units in buildings: installation, operation, maintenance and repair”.

UNE EN ISO 15874-1 “Piping systems in plastic materials for hot and cold water installations, Polypropylene (PP). Part 1: Generalities”.

UNE EN ISO 15874-2 “Piping systems in plastic materials for hot and cold water installations, Polypropylene (PP). Part 2: Pipes”.

UNE EN ISO 15874-3 “Piping systems in plastic materials for hot and cold water installations, Polypropylene (PP). Part 3: Accessories”.

UNE EN ISO 15875-1 “Piping systems in plastic materials for hot and cold water installations, Reticulated polypropylene (PP-X). Part 1: Generalities”.

UNE EN ISO 15875-2 “Piping systems in plastic materials for hot and cold water installations, Reticulated polypropylene (PP-X). Part 2: Pipes”.

UNE EN ISO 15875-3 “Piping systems in plastic materials for hot and cold water installations, Reticulated polypropylene (PP-X). Part 3: Accessories”.

UNE EN ISO 15876-1 “Piping systems in plastic materials for hot and cold water installations, Polybutylene (PB). Part 1: Generalities”.

UNE EN ISO 15876-2 “Piping systems in plastic materials for hot and cold water installations, Polybutylene (PB). Part 2: Pipes”.

UNE EN ISO 15876-3 “Piping systems in plastic materials for hot and cold water installations, Polybutylene (PB). Part 3: Accessories”.

UNE EN ISO 15877-1 “Pipe systems in plastic materials for water conduction. Chlorinated polyvinyl chloride (PVC – C). Part 1: Generalities”.

UNE EN ISO 15877-2 “Pipe systems in plastic materials for water conduction. Chlorinated polyvinyl chloride (PVC – C). Part 2: Pipes”.

UNE EN ISO 15877-3 “Pipe systems in plastic materials for water conduction. Chlorinated polyvinyl chloride (PVC – C). Part 3: Accessories”.

UNE 19047 “Welded and galvanized steel pipes for internal hot and cold water installations”.

UNE 19049-1 “Stainless steel pipes for internal hot and cold water installations”. Part 1: Pipes”

UNE EN 12499 “Internal cathode protection of metal structures”

UNE EN ISO 21003: Multilayer piping systems for hot and cold water installations in buildings.

3. TERMS AND DEFINITIONS

For the purposes of this standard, the following terms and definitions are applied:

3.1. Water for human consumption:

- a) All water, either in its original state or after treatment, used to drink, cook, prepare food, for personal hygiene and other domestic uses, whatever its origin and regardless of whether it is supplied to the consumer via public or private distribution networks, tanks, or public or private deposits.
- b) All water used in the food industry for purposes of manufacture, treatment, conservation or marketing of products or substances intended for human consumption, and that used in the cleaning of surfaces, objects and materials that may come into contact with food.
- c) All water supplied for human consumption as part of a commercial or public activity, regardless of the mean daily volume of water supplied.

3.2. Water treatment unit in buildings: Any element or accessory installed after the connection or stopcock or at the input to the internal installation or in the tap of the consumer, with the purpose of altering or optimizing the quality of water for human consumption. These units include those without permanent connection to the mains but with the same purpose.

3.3. Equivalent volume: Total useful volume of the container vessel.

3.4. Accumulated volume: Total volume of water contained in the accumulator tank.

3.5. Type or performance test: Verification test of the design performed to check the correct function of the unit and which is repeated when there is a change in design.

3.6. Manufacturer: Company that manufactures or imports the water-conditioning device.

3.7. Entry Point Unit (PDE): Device installed at the head of the general installation of the interior of the building.

3.8. Point of Use Unit (PDU): Device installed at the end of the line coinciding with the point of use of the treated water which may or may not incorporate an accumulator tank.

3.9. Point of Use Unit Not Connected to the Mains (PDU-NC): Device with no need for connection to the general installation of the interior of the building in order to function.

3.10. Regenerative unit: Device that has to undergo a regeneration process in order to recover its original performance.

3.11. Regeneration process: Part of the operative cycle of the device during which all the operations necessary to re-establish the ionic exchange capacity of a resin bed are carried out (applicable to regenerative units).

3.12. Non-regenerative unit: Device that does not have to undergo a regeneration process in order to recover its original performance.

3.13. Container vessel: Vessel through which the water to be treated flows and which contains the material medium of the treatment and the necessary devices for the distribution and collection of the hydraulic flows.

3.14. Accumulator tank: Container tank of the treated water.

3.15. Cyclic volume: Volume of water correctly treated by a regenerative unit between two consecutive regenerations.

4. GENERAL REQUIREMENTS

The specific treatment units used in buildings, either themselves or through the installation practices used, shall not transmit to water for human consumption substances or properties that contaminate or reduce its quality and involve the non-fulfilment of the requirements specified in current legislation (1).

For the assessment of the aptitude of a unit, the documentation provided by its manufacturer will be checked (see 4.1) and the materials used in its construction will be verified. In the cases established in point 4.2., laboratory tests that fulfil the methods and characteristics required by current legislation will be performed (1).

For the assessment of the aptitude of ranges of equipment whose components are totally identical and which only differ in size, only two units representative of the range shall be validated.

4.1. Documentation of the unit

Units shall have the following documentation:

4.1.1. Documentation for aptitude assessment

For the purposes of this Standard, units shall have a documentation which includes:

- Breakdown of parts
- Manufacturer's certificate for each component in contact with water indicating its main chemical composition.
- Concentration of impurities according to Appendix A in the case of metals.
- Documentation proving fulfilment of specified regulations in the case of plastic materials according to Appendix B, and/or certifications of approval systems of recognized national and international prestige according to the standards of the relevant health authority, regarding construction products and materials in contact with water for human consumption (2).

In the absence of any of these certificates, the standards established in point 4.2 would be applied.

4.1.2. Documentation for the user

Units shall also have documentation for the user, which shall include at least:

- Operating limits of the unit, including the composition of the water to be treated, flows, temperature and maximum and minimum pressures.
- Commissioning instructions, maintenance instructions and instructions for return to service after prolonged periods of stoppage.

- Alterations, by reduction or addition, that the treatment may cause in the composition of the water treated.
- Necessary maintenance, the required frequency of change of consumables and the need and method of carrying out periodic cleaning and disinfection.
- Additionally, the manufacturer shall expressly indicate in its documentation the procedure in those matters that may be of relevance to the health of the consumer, for example, frequency of change of cartridges, consumable elements, etc., all this in accordance with the indications of the UNE-EN 15161 standard in this respect.

(1) "At the time of drafting of this standard, the legislation in force is Royal Decree 140/2003"

(2) "Desalination guide: technical and sanitary aspects in the production of water for human consumption".

Reports, studies and research 2009. Ministry of Health and Social Policy. Chapter 7 – Substances and Materials. Section: Other standards of assessment on materials in contact with water.

4.2. Materials used in the construction of the unit

When verified in accordance with the test method specified in section 5.2, units must not transmit to water substances or microorganisms in concentrations above those indicated in sections 6.1 and 6.2.

The unit must not incorporate any material in contact with water that appears in Appendix C (unauthorized materials and products).

No additional test shall be performed when all the materials used in the construction of the unit which come into contact with the water:

- Are certified by the manufacturer and meet the requirements specified in Appendix A (metallic materials) or B (plastic materials) or have the certifications of approval systems of recognized national or international prestige according to the standards of the relevant health authority regarding construction products and materials in contact with water for human consumption (2).

Otherwise, the unit must pass the tests defined in point 5.

4.3. Labelling

The labelling of the unit, specified in its corresponding standard (see Appendix D), shall also indicate that it is in accordance with this Standard, UNE 149101.

5. TYPE TEST (or performance test)

Units shall be tested in accordance with the specifications of the following sections, the reference and function of each of the samples indicated in the tests being described in Appendix E.

5.1. Test conditions

The manufacturer shall supply the units fully prepared for operation. If there are any consumable or regenerative materials, these shall be at the beginning of their useful life or cycle.

The test water shall come from the public distribution network that meets the requirements of current legislation with regard to parameters and parametric values of water for human consumption (3), and also the following specifications:

- Temperature: From 5 to 30 °C
- Chlorine: Its presence will be checked in order to ensure that it is water that, from its origin, has been previously disinfected.

In the documentation of the unit, it shall be verified that the supply water fulfils the limits of use. If necessary, the necessary supplementary analyses shall be carried out.

The temperature in the test area shall be kept between 21 and 25°C.

- (3) "At the time of creation of the standard, these requirements are contained in Appendix 1 or RD 140/2003.

5.2. Test procedure

The hydraulic connection circuit of the input to the unit shall be in accordance with figure 1

- a. Main section valve
- b. Test unit connection or filling valve
- c. Sample taking reference no. 1,2
Sample taking reference no. 3 (emptying without opening valve a).
- d. Bleeding tap.
- e. Anti-return valve

Volume between X and Y > 2,000 ml

Figure 1

Before assembly, the circuit elements shall be suitably disinfected according to the material used. Assembly shall also be carried out in such a way as not to introduce microorganisms or foreign bodies into the system.

The unit shall be connected to the hydraulic circuit (Figure 1), including the PDU's not connected to the mains, and shall be commissioned in accordance with specifications of the manufacturer.

If chemicals are used for the operation of the unit (for example, salt in descalers), these products shall be supplied by the manufacturer and shall fulfil current legislation regarding substances for the treatment of water intended for the production of water for human consumption (4).

For the purpose of equating the methods of testing the units to their daily usage, the operating times and flow rates shown below have been established; all this in order to consider that the units being tested are in a state representative of their normal operation.

The following tests are defined:

Regenerative PDE Units:

For 3 days, a daily volume of 1,000 litres of water, or 5 equivalent volumes (whichever is greater) distributed throughout the day, will be passed through the unit, using the flow recommended by the manufacturer for its correct functioning. In units that supply a cyclic volume of less than 4,000 litres a day, a volume of water equivalent to a quarter of the maximum cyclic volume will be passed through the unit. On terminating the last day's consumption, a sample of water will be taken at the input (reference sample 1) for chemical and microbiological control and it will be verified whether it complies with the parametric values of **Appendix I of RD 140/2003 (R. Postigo) (3)** for all the parameters specified in section 6, tables 1,3 and 4.

(4) "At the time of creation of this standard, the legislation in force is the Ministerial Order SAS/1915/2009

The water will then be left to stand on the inside of the unit for 24 hours.

After 24 hours, the following samples of water will be taken for chemical and microbiological control:

- Sample of water at the input to the unit without opening the outlet of water from the same (reference sample 3), in accordance with 5.4.
- Sample of water at the outlet from the unit after 0.5 equivalent volumes have passed through (sample "A").
- Sample of water at the input to the unit after 10 equivalent volumes have passed through (reference sample 2).
- Sample of water at the outlet from the unit after 10 equivalent volumes have passed through (sample "B").

If, during water consumption before the first sampling at the outlet from the unit (sample "A") or during the sampling itself, the unit begins some automatic process as a result of its own operation (for example, a flushing or a resin regeneration), the test is not valid and must be repeated (verify beforehand in the technical documentation the work conditions necessary to avoid this automatic process occurring during the first sampling).

If, during water consumption before the second sampling at the outlet from the unit (sample "B"), the unit begins some automatic process as a result of its own operation (for example, a flushing or a resin regeneration), the water consumption shall be interrupted during the process and restarted once it is over. If the automatic process occurs during the sampling itself, the sample shall be discarded and the sampler shall wait until the automatic process is over. 2 more equivalent volumes of water will then be allowed to pass through, after which the sample will be taken again.

Non-regenerative PDE Units:

For 3 days, a daily volume of 1,000 litres of water, or 5 equivalent volumes (whichever is greater) distributed throughout the day, will be passed through the unit, using the flow recommended by the manufacturer for its correct functioning. On terminating the last day's consumption, a sample of water will be taken at the input (reference sample 1) for chemical and microbiological control and it will be verified whether it complies with the parametric values of **Appendix I of RD 140/2003 (R. Postigo) (3)** for all the parameters specified in section 6, tables 1,3 and 4.

The water will then be left to stand on the inside of the unit for 24 hours.

After 24 hours, the following samples of water will be taken for chemical and microbiological control:

- Sample of water at the input to the unit without opening the outlet of water from the same (reference sample 3), in accordance with 5.4.
- Sample of water at the outlet from the unit after 0.5 equivalent volumes have passed through (sample "A").
- Sample of water at the input to the unit after 10 equivalent volumes have passed through (reference sample 2).
- Sample of water at the outlet from the unit after 10 equivalent volumes have passed through (sample "B").

PDU Units connected to the mains with accumulation:

For 3 days, a daily volume of 2 accumulated volumes distributed throughout the day will be passed through the unit. On terminating the last day's consumption, a sample of water will be taken at the input (reference sample 1) for chemical and microbiological control and it will be verified whether it complies with the parametric values of **Appendix I of RD 140/2003 (R. Postigo) (3)** for all the parameters specified in section 6, tables 1,3 and 4.

The water will then be left to stand on the inside of the unit for 24 hours.

After 24 hours, the following samples of water will be taken for chemical and microbiological control:

- Sample of water at the input to the unit without opening the outlet of water from the same (reference sample 3), in accordance with 5.4.
- Sample of water at the outlet from the unit after turning on the tap of treated water from the same and after 0.5 accumulated volumes have passed through (sample "C").
- Sample of water at the input to the unit after 2 accumulated volumes have passed through (reference sample 2).

PDU Units connected to the mains without accumulation:

For 3 days, the maximum flow indicated by the manufacturer will be passed through the unit in SIX 10 minute intervals distributed throughout the day. On terminating the last day's consumption, a sample of water will be taken at the input (reference sample 1) for chemical and microbiological control and it will be verified whether it complies with the parametric values of **Appendix I of RD 140/2003 (R. Postigo) (3)** for all the parameters specified in section 6, tables 1,3 and 4.

The water will then be left to stand on the inside of the unit for 24 hours.

After 24 hours, the following samples of water will be taken for chemical and microbiological control:

- Sample of water at the input to the unit without opening the outlet of water from the same (reference sample 3), in accordance with 5.4.
- Sample of water at the outlet from the unit immediately after turning on the tap of treated water (sample "D").
- Sample of water at the input to the unit after 2 equivalent volumes have passed through (reference sample 2).

PDU Units not connected to the mains:

For 3 days, a daily volume of mains water of 2 equivalent volumes will be passed through the unit distributed throughout the day. On terminating the last day's consumption, a sample of water will be taken at the input (reference sample 1) for chemical and microbiological control and it will be verified whether it complies with the parametric values of **Appendix I of RD 140/2003 (R. Postigo) (3)** for all the parameters specified in section 6, tables 1,3 and 4.

The water will then be left to stand on the inside of the unit for 24 hours.

After 24 hours, the following samples of water will be taken for chemical and microbiological control:

- Sample of water at the input to the unit without opening the outlet of water from the same (reference sample 3), in accordance with 5.4.
- Sample of water at the outlet from the unit (sample "E").

- Sample of water at the input to the unit after 2 accumulated volumes have passed through (reference sample 2).

5.3 Recommended sample volumes

The following table shows the recommended volumes of water for each sample:

Sample no. 1	5000ml
Sample no. 2	2000ml
Sample no. 3	1000ml
Sample A	3000ml
Sample B	2000ml
Sample C	5000ml
Sample D	5000ml
Sample E	5000ml

Note: When necessary a large enough number of units to ensure sufficient sampling volumes for testing will be tested simultaneously and connected to the same water supply. The sample for analysis will be composed of an equal part from each of the units. In this case, the reference sample 1 is considered the same for all the units tested simultaneously.

5.3. Analysis and sampling methods

Sampling, suitable containers and chemical and microbiological analysis shall be validated and recognized methods for the analysis of water for human consumption. Volumes shall be those recommended in section 5.3 or those necessary for the laboratory to perform the tests. Analysis of free and combined chlorine must be carried out on site.

For the taking of sample no. 3, new inputs of mains water will be avoided by keeping the input valve “a” closed and, if necessary, opening the bleeding tap “d” (Figure 1).

6. ASSESSMENT OF RESULTS

In the water samples taken, the following parameters will be determined:

- Reference sample 1: Mains water sample used for the test the complies with the parametric values of **Appendix 1 of the RD for the parameters indicated in tables 1,3 and 4 (R.Postigo) (3)**. If it fails to comply, the test will be repeated.
- Reference sample 2: Chemical parameters table 2; residual free chlorine and residual combined chlorine (analysis to be performed on site), table 3. If no chlorine is detected, the test will be repeated.
- Reference sample 3: Microbiology, table 4. If the presence of any microbiological parameter is detected (excluding indicator parameters) is detected, the test will be repeated.
- Sample “A”: The parameters indicated in tables 1 and 4.
- Sample “B”: The parameters indicated in tables 2,3 and 4.
- Sample “C”, “D” and “E”: The parameters indicated in tables 1,2,3 and 4.

6.1. Chemical parameter test

The increase in the concentration **of the parameters specified in Table 1** between the water supplied (reference sample 1) and the treated water at the outlet from the unit (respective samples A, C, D or E) must not exceed the following values:

TABLE 1 – Chemical parameters I (Sample 1, A, C, D, E)

Parameter	Maximum increase in relation to water supply
Antimony	2.5 µg/L
Arsenic	5.0 µg/L
Benzene	0.5 µg/L
Benzopyrene	0.005 µg/L
Boron	0.5 mg/L
Bromate	5.0 µg/L
Cadmium	2.5 µg/L
Cyanide	25 µg/L
Copper	1.0 mg/L
Chrome	25 µg/L
1.2-Dichloroethane	1.5 µg/L
Fluoride	0.75 mg/L
Aromatic Polycyclic Hydrocarbons (APH)	0.05 µg/L
Mercury	0.5 µg/L
Nickel	10.0 µg/L
Nitrate	10 mg/L
Nitrites	0.25 mg/L
Lead	5.0 µg/L
Selenium	5.0 µg/L
Acrylamide	0.05 µg/L

Epichlorohydrin	0.05 µg/L
Vinyl chloride	0.25 µg/L
Trihalomethanes	50 µg/L
Trichloroethane + Trichloroethene	5 µg/L

The maximum values admissible in the treated water will be as follows:

TABLE 2 – Chemical parameters II (Samples 2, B, C, D and E)

Parameter	Parametric value	Observations
Aluminium	200 µg/L	
Ammonia	0.5 mg/L	
Chloride	250 mg/L	(1)
Colour	15 mg/L Pt/Co	
Conductivity	2500 µS/cm	
Iron	200 µg/L	
Manganese	50 µg/L	
Odour	3 at 25 °C	
Oxidizability	5 mg O ₂ /L	
pH	6.5 – 9.5	

Taste	3 at 25 °C	
Sodium	200 µg/L	(2)
Sulphate	250 µg/L	(3)
Turbidity	5 UNF	

- (1) If the unit, due to its operating characteristics, increases the chlorine concentration in the treated water (B,C,D and E) in relation to reference sample no. 2, the conditions of use must appear in the documentation.
- (2) If the unit, due to its operating characteristics, increases the sodium concentration in the treated water (B,C,D and E) in relation to reference sample no. 2, the conditions of use must appear in the documentation.
- (3) If the unit, due to its operating characteristics, increases the sulphate concentration in the treated water (B,C,D and E) in relation to reference sample no. 2, the conditions of use must appear in the documentation.

TABLE 3 – Chlorine concentration (Samples 1,2, B, C, D or E)

Parameter	Parametric value	Observations
Residual combined chlorine	Presence	(1)
Residual free chlorine	Presence	(1)

- (1) In the event of no free or combined chlorine being detected in the treated water (samples B,C,D and E), it shall be verified whether the documentation of the unit includes the necessary standards of periodic cleaning and disinfection to maintain the microbiological quality parameters of the treated water.

Note: Due to the variability of the chlorine concentration in the mains water, no minimum parametric value is established.

6.2. Microbiological parameter test

The maximum admissible values in the treated water will be as follows:

TABLE 4 – Microbiological parameters (Samples 1, 3 and A,B,C,D or E)

Microbiological parameters	
Escherichia coli	0 UFC in 100 ml
Enterococcus	0 UFC in 100 ml
Clostridium perfringens (including spores)	0 UFC in 100 ml
Indicator parameters	
Coliform bacteria	0 UFC in 100 ml (5)
Colony count at 22 °C	No abnormal changes in relation to sample no. 3

- (5) If the presence of coliform bacteria is detected in sample no. 3, the value obtained must not present any abnormal changes in relation to those obtained in said sample.

APPENDIX A (LEGAL) – Composition of metallic materials in contact with water for human consumption.

This appendix establishes the main chemical compositions and maximum concentrations of impurities of the materials shown below:

1. COPPER ALLOYS

1.1. Copper-zinc-lead alloys

Component	Concentration	Impurity	Maximum conc.
Copper	55-63%	Arsenic	0.02%
Zinc	Rest	Antimony	0.02%
Lead	<2.2%	Cadmium	0.02%
		Nickel	0.2%

1.2. Copper-zinc-lead-arsenic alloys

Component	Concentration	Impurity	Maximum conc.
Copper	61-63%	Antimony	0.02%
Zinc	Rest	Cadmium	0.02%
Lead	<2.2%	Nickel	0.2%
Arsenic	<0.15%		

1.3. Copper-tin-zinc-lead-lead alloys

Component	Concentration	Impurity	Maximum conc.
Copper	Rest	Arsenic	0.03%
Zinc	<6.5%	Antimony	0.1%
Lead	<3.0%	Cadmium	0.02%
Tin	3.9 – 6.0%	Nickel	0.6%

2. COPPER

2.1. Copper

Component	Concentration	Impurity	Maximum conc.
Copper	<99.9%	Arsenic	0.02%
Phosphorous	<0.04%	Antimony	0.02%
		Cadmium	0.02%
		Nickel	0.02%

2.2. Copper-tin pipes and accessories

Component	Concentration	Impurity	Maximum conc.
Copper + tin	<99.9%	Arsenic	0.01%
		Antimony	0.01%
		Cadmium	0.01%
		Nickel	0.01%

3. GALVANIZED STEEL

Component	Concentration	Impurity	Maximum conc.
Zinc	Rest	Arsenic	0.02%
Lead	<0.5%	Antimony	0.01%
		Cadmium	0.01%

4. CARBON STEEL

Component	Concentration	Impurity	Maximum conc.
Steel	Rest	Arsenic	0.02%
Carbon	<2.1%	Antimony	0.02%
Chrome	<1.0%	Cadmium	0.02%
Nickel	<0.5%	Lead	0.02%
Molybdenum	<1.0%		

5. CAST IRON

Component	Concentration	Impurity	Maximum conc.
Steel	Rest	Arsenic	0.02%
Chrome	<1.0%	Antimony	0.02%
Nickel	<0.5%	Cadmium	0.02%
Molybdenum	<1.0%	Lead	0.02%

6. STAINLESS STEEL

Component	Concentration	Impurity	Maximum conc.
Steel	Rest	Arsenic	0.02%
Carbon	<0.8%	Antimony	0.02%
Nickel	<30.0%	Cadmium	0.02%
Chrome	16.0 to 27.0%		
Molybdenum	<7.0%		

The requirements to be met by this type of materials are indicated in this Appendix.

PLASTIC MATERIALS

Materials to be found on the list of substances permitted for the manufacture of plastic materials and objects intended to come into contact with food and in which certain test conditions are regulated. Plastic materials must comply with current regulations with regard to the list of substances permitted for the manufacture of materials established by the relevant authority (see bibliography as reference at the time of creation of this standard).

APPENDIX C (LEGAL) – Materials and products not authorized to come into contact with water for human consumption.

This Appendix establishes the materials and products not authorized to come into contact with water for human consumption.

METALS

- 1.- Copper pipes that do not comply with the UNE EN 1057 Standard
- 2.- Galvanized steel pipes that do not comply with the UNE EN 19047 Standard
- 3.- Carbon steel pipes and tanks without sufficient protection against internal corrosion with linings and possible internal cathode protection (in accordance with UNE EN 12499)
- 4.- Cast iron pipes and tanks without sufficient protection against internal corrosion with linings and possible internal cathode protection (in accordance with UNE EN 12499)
- 5.- Cast iron accessories that do not comply with the UNE EN 545 Standard
- 6.- Stainless steel pipes that do not comply with the UNE EN 19049-1 Standard
- 7.- Aluminium pipes
- 8.- Pipes and accessories whose composition includes lead except for those described in Appendix A and with the maximum concentrations indicated.

PLASTICS AND ELASTOMERS

- 1.- Unplasticized polyvinyl chloride (PVC) pipes that do not comply with the UNE EN 1452 Standard
- 2.- Chlorinated polyvinyl chloride (PVC-C) pipes that do not comply with the UNE EN ISO 14877 Standard
- 3.- Polyethylene (PE) pipes that do not comply with the UNE EN 12201 Standard
- 4.- Reticulated polyethylene (PE-X) pipes that do not comply with the UNE EN ISO 15875 Standard
- 5.- Polybutylene (PB) pipes that do not comply with the UNE EN ISO 15876 Standard
- 6.- Polypropylene (PP) pipes that do not comply with the UNE EN ISO 15874 Standard

7.- Multilayer pipes that do not comply with the UNE EN ISO 21003 Standard

APPENDIX D (INFORMATIVE) – Standards with functional specifications regarding water treatment units developed by CEN, TC-164, WG-13

This Appendix establishes the standards with functional specifications regarding water treatment units developed by the CEN, TC-164, WG-13 committees

UNE-EN 13443

Water-conditioning unit in buildings. Mechanical filters. Part 1: Particles with sizes of between 80 µm and 150 µm. Operation, safety and testing requirements.

UNE-EN 13443

Water-conditioning unit in buildings. Mechanical filters. Part 1: Particles with sizes of between 1 µm and 80 µm. Operation, safety and testing requirements.

UNE-EN 14095

Water-conditioning unit in buildings. Electrolytic treatment systems with aluminium anodes. Operation, safety and testing requirements.

UNE-EN 14652

Water-conditioning unit in buildings. Membrane separation devices. Operation, safety and testing requirements.

UNE-EN 14743

Water-conditioning unit in buildings. Descalers. Operation, safety and testing requirements.

UNE-EN 14812

Water-conditioning unit in buildings. Chemical dispensing systems. Preset dispensing systems. Operation, safety and testing requirements.

UNE-EN 14897

Water-conditioning unit in buildings. Devices using low pressure mercury ultraviolet radiators. Operation, safety and testing requirements.

UNE-EN 14898

Water-conditioning unit in buildings. Active medium filters. Operation, safety and testing requirements.

UNE-EN 15161

Water-conditioning unit in buildings. Installation, operation, maintenance and repair.

UNE-EN 15219

Water-conditioning unit in buildings. Nitrate-removing devices. Performance, safety and testing requirements.

APPENDIX E (INFORMATIVE) – Reference and function of each sample

This Appendix defines and clarifies the types of sample used to carry out the different types of test defined in point 5.

- **Reference sample No. 1:** Corresponds to the mains water that supplies the unit.
- **Reference sample No. 2:** Corresponds to the mains water supplying the unit once the test has been performed. Its function is to ensure that throughout the operation phase of the unit being tested, the latter has received chlorinated water with the same quality and composition as the sample No. 1 taken before the test. It also serves as a reference for the values specified in Table No. 2.
- **Reference sample No. 3:** The function of this sample is to find out the normal evolution of the parameters analysed in the water supply, in the conduction, during the standing time in the same conditions as the unit tested. The sample corresponds to the volume of water contained in the X-Y section (Figure 1). Therefore, when taking this sample, new inputs of mains water will be prevented by keeping the input valve “a” closed and, if necessary, opening the bleeding tap “d”, in order to facilitate the emptying of the X-Y section.
- **Sample A:** The function of this sample is to find out the quality of the water that has remained in the unit when it stops.
- **Sample B:** The function of this sample is to find out the quality of the water after the unit has stopped and is once again operating.
- **Sample C:** The function of this sample is to find out the quality of the water after the unit has stopped in units with accumulator tank.
- **Sample D:** The function of this sample is to find out the quality of the water after the unit has stopped in units without accumulator tank.

- **Sample E:** The function of this sample is to find out the quality of the water after the unit has stopped in units without mains connection that contain water in an accumulator vessel.
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3. ROYAL DECREE 103/2009, of 6 February, which amends Royal Decree 866/2008, of 23 May, which approves the list of substances permitted for the manufacture of plastic objects and materials intended to come into contact with food and regulates certain test conditions.
4. ROYAL DECREE 314/2006, of 17 March, which approves the Technical Building Code.
5. (EC) Regulation no. 1907/2006 of the European Parliament and the Council, of 18 December 2006, regarding the registration, assessment, authorization and restriction of chemical substances and preparations (REACH), by which the European Agency for Chemical Substances and Preparations is created, the 1999/45/EC Directive is amended, and the (EEC) Regulation no. 793/93 of the Council and (EC) Regulation no. 1488/94 of the Commission, the 76/769/EEC Directive of the Council and the 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC Directives of the Commission are repealed.
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