



SLOVENSKI STANDARD
SIST EN 997:2004
01-maj-2004

BUXca Yý U.
SIST EN 997:2000

WC školjke in WC naprave z integriranim sifonom

WC pans and WC suites with integral trap

WC-Becken und WC-Anlagen mit angeformtem Geruchverschluss

Cuvettes de WC et cuvettes à réservoir attachant à siphon intégré

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Ta slovenski standard je istoveten z: EN 997:2003

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ICS:

91.140.70

SIST EN 997:2004

en

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English version

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Cuvettes de WC et cuvettes à réservoir attenant à siphon
intégré

WC-Becken und WC-Anlagen mit angeformtem
Geruchverschluss

This European Standard was approved by CEN on 2 July 2003.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 997:2003) has been prepared by Technical Committee CEN /TC 163 "Sanitary appliances", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by March 2004, and conflicting national standards shall be withdrawn at the latest by June 2005.

This document supersedes EN 997:1999.

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

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

This standard is one of a series of standards for sanitary appliances. Supporting standards are those for flushing devices and connecting dimensions.

NOTE: Noise level has not been considered in the present amendment. Noise level will be considered as soon as a European test method is available.¹

Annexes A, B, C, D, E and F are normative.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

¹ Presently, a test method is under elaboration by CEN/TC 126 "Acoustic properties of building products and of buildings"

1 Scope

This standard specifies constructional and performance requirements together with test methods for close-coupled suites, one-piece and independent WC pans with integral trap used for personal hygiene manufactured from vitreous china or stainless steel.

This standard does not apply to squatting toilettes, WC pans without integral trap, flushing cisterns as separate appliances.

Flushing cisterns are covered by other standards and the reference to cisterns in this standard is related only to the definition and requirements of flushing volume.

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).

AS 1172-1:1993, *Water closets of 6/3 L capacity - Pans.*

BS 1212-1:1990, *Float operated valves. Specification for piston type float operated valves (copper alloy body) (excluding floats).*

BS 1212-2:1990, *Float operated valves. Specification for diaphragm type float operated valves (copper alloy body) (excluding floats).*

BS 1212-3:1990, *Float operated valves. Specification for diaphragm type float operated valves (plastics bodied) for cold water services only (excluding floats).*

BS 1212-4:1991, *Float operated valves. Specification for compact type float operated valves for WC flushing cisterns (including floats).*

NOTE These normative references refer to products of class 2 only.

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1 pedestal WC pan

floor-mounted WC pan that has an integral base



3.2 wall-hung WC pan

WC pan cantilevered clear of the floor



3.3 wash-out WC pan

WC pan in which excrement falls first into a shallow water filled bowl, before being removed by the flushing water



**3.4
wash-down WC pan**

WC pan in which excrement falls directly into the trap before being removed by the flushing water



**3.5
siphonic WC pan**

WC pan in which excrement is removed by siphonage induced by the flushing water



**3.6
close-coupled suite**

combination of a WC pan and flushing cistern directly coupled into a functional unit



**3.7
one-piece WC pan**

WC pan manufactured with an integral flushing cistern



**3.8
independent WC pan**

WC pan suitable for the connection with a flushing cistern or a pressure flush valve



**3.9
valve-type flushing cistern**

cistern with integral valve outlet device for storage and discharge of a defined volume of flushing water for removal of excrement from a WC pan



**3.10
pressure flush valve**

valve directly connected to the water supply which delivers a pre-determined volume of flushing water for removal of excrement from a WC pan



**3.11
valveless type flushing cistern**

cistern with outlet actuated by siphonic action which delivers a defined volume of flushing water for removal of excrement from a WC pan



**3.12
WC suite**

WC pan combined with either a flushing cistern with integral warning pipe connection – or a device deemed to be a no less effective device – and inlet/outlet devices, or a pressure flush valve, with WC and flushing device installed as a functioning unit

**3.13
flush volume**

volume of water discharged from the flushing device during a flush cycle

**3.14
after-flush volume**

remaining flush water volume after the last of four test specimens have left the outlet of the bowl

3.15 water trap

water seal that prevents backflow of foul odour from a drain

3.16 fluid contaminant

liquid to be removed by flushing action

3.17 residual fluid contaminant

liquid waste left behind in the WC bowl after completion of a flush

3.18 solid test media

media used to represent faecal matter

3.19 inlet valve

valve that controls and shuts off the flow of water into a cistern, usually by an arm connected to a float

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3.20 flushing device

device fitted to a cistern to provide controlled measured volume(s) of water to a WC pan or suite for flushing

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NOTE A flushing device can be a siphon, drop valve, flap valve or pressurised cistern etc. For the purposes of this specification, the flushing device includes the activator (i.e. handle, button, linkages etc.) and all seals, pistons, or other integral components.

3.21 dual-flush

flushing cisterns with two modes of operation, one delivering a larger volume than the other, in which:

- the larger (full) flush option is not greater than 6 l; and
- the smaller (reduced) flush option is not greater than two-thirds the volume of the larger flush

**3.22
warning level**

level of spillover of a vertically mounted warning pipe connection or the invert of a horizontally mounted warning pipe connection, or the level at which an equally effective (warning) device would operate

**3.23
short-term leak test**

leak test consisting of a 15 min wait after flushing then positioning paper designed to change colour when wet, under the flushing device for 10 min. A leak is defined as being visible discharge of water amounting to more than three separate drops

**3.24
long-term leak test**

long term leak test: Leak test consisting of a 2 h wait after flushing then positioning paper designed to change colour when wet, under the outlet for 15 min. A leak is defined as being visible discharge of water amounting to more than three separate drops

NOTE Drawings are diagrammatic only.

4 Classification

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WC pans and suites are classified as described below:

- Class 1:** WC pans and suites designed for use with and tested using a nominal flush volume of either 4 l, 5 l, 6 l, 7 l or 9 l (see clause 5).
- Class 2:** WC suites designed for use with a pressure flushing valve or a flushing cistern incorporating some other flushing device, and tested as described in clause 6, using a maximum flushing volume of 6 l, or a dual-flush combining a maximum flush of 6 l and a reduced flush no greater than two-thirds of the maximum flush volume (see clause 6).

5 Functional requirements and test methods for class 1 products

5.1 Depth of water seal

When tested in accordance with 5.8.1, the depth of the water seal shall be not less than 50 mm.

5.2 Flushing requirements

5.2.1 General

Table 1 correlates the flushing requirements to the WC pan type and flushing volume.

Table 1 — Flushing requirements

| Type of WC pan | Wash of bowl (5.2.2) | Flushing of toilet paper (5.2.3) | Flushing of 50 plastic balls (5.2.4) | Over-splashing (5.2.5) | After-flush volume (5.2.6) |
|----------------|----------------------|----------------------------------|--------------------------------------|------------------------|----------------------------|
| 9 | X | X | X | X | |
| 7 | X | X | X | X | |
| 6 | X | X | | X | X |
| 5 | X | X | | X | X |
| 4 | X | X | X | X | |

The efficiency of flushing is simulated by the following requirements.

5.2.2 Wash of bowl

When tested in accordance with 5.8.2.3, the arithmetic average of any unflushed area below the rim and above the surface of the water in the trap shall not be more than 50 cm² after five flushing operations.

5.2.3 Flushing of toilet paper

When tested in accordance with 5.8.2.4, 12 sheets of toilet paper shall be flushed out of the WC pan a minimum of 4 times out of five tests.

5.2.4 Flushing of fifty small plastic balls

When tested in accordance with 5.8.2.5, after five tests, each with 50 balls, a minimum of 85 % of the balls shall be flushed out of the WC pan. <https://standards.iteh.ai/catalog/standards/sist/0bb791f2-b0f0-4d2e-80b2-83b378821b90/sist-en-997-2004>

5.2.5 Over-splashing

When tested in accordance with 5.8.2.6, flushing water shall not splash beyond the rim of the bowl and wet the floor. Only a few small drops are permissible.

5.2.6 After-flush volume

When tested in accordance with 5.8.2.7, an after-flush volume of 2.5 l or 2.8 l as appropriate is required.

5.3 Water absorption

When tested in accordance with 5.8.3, the arithmetic average for water absorption of glazed ceramic WC pans shall not exceed 0,5 % by mass.

5.4 Static load

When tested in accordance with 5.8.4, wall-hung and non-ceramic WC pans and suites shall withstand a force of (4.00 ± 0.05) kN without showing any evidence of cracking or permanent deformation.

Experience has shown that pedestal ceramic WC pans and suites comply with this requirement.

5.5 Leak tightness

When close-coupled suites comprising a flushing cistern and a WC pan supplied together by the manufacturer as a unit are tested in accordance with 5.8.5, there shall be no leakage between the WC pan and the flushing cistern.

5.6 Valve reliability

When tested in accordance with 5.8.6, the flush of the outlet shall not show leakage greater than three drops within 15 min.

5.7 Durability of class 1 products

Class 1 products conforming with the requirements of 5.2 to 5.6 are deemed to be durable.

5.8 Test methods

5.8.1 Depth of water seal

Install the WC pan in accordance with 5.8.2.2. Flush the WC pan and measure the height from the invert of the trappage back plate to the surface of the water.

5.8.2 Flushing tests

5.8.2.1 Apparatus

Independent WC pans are to be tested with one or both of the following separate flushing devices with test flushing volumes in accordance with Table 2 and annex C as indicated by the manufacturer:

Valve-type flushing cistern Type A (see annex A)

Pressure flush valve Type C (see annex B)

For close-coupled suites and one-piece WC pans see Table 3 and annex C.

5.8.2.2 Preparation to test

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Independent WC pans

Install the pedestal or wall-hung WC pan to be tested on a firm flat horizontal or vertical surface as appropriate. Connect a flushing device in accordance with annex A or B.

Close-coupled suites and one-piece WC pans

Install the suite or the one-piece WC pan on a firm flat horizontal or vertical surface as appropriate using the flushing device provided and specified by the manufacturer. The flushing volume shall be verified for the type of the WC pan (see Table 4).

5.8.2.3 Sawdust test

5.8.2.3.1 Test material

20 g of fine dry wooden sawdust.

5.8.2.3.2 Test method

Moisten the complete inner surface of the WC pan below the flushing rim and above the surface of the water in the trap. Immediately afterwards, sprinkle that sawdust as completely and evenly as possible over the moistened surface. Flush the WC pan and measure any unwashed area. Repeat this procedure 5 times.

5.8.2.4 Toilet paper test

5.8.2.4.1 Test material

Toilet paper with a saturation time of (15 ± 10) s verified by the basket method (see annex D). Individual sheets shall have a size approximately 140 mm x 100 mm. The mass per unit surface of the toilet paper shall be (30 ± 10) g/m².

5.8.2.4.2 Test method

Individually loosely crumple 12 sheets of toilet paper and drop them separately one after the other into the WC pan within a time of 14 s to 18 s. Operate the flushing mechanism within 2 s of the last sheet being dropped into the WC pan. Check for and remove any paper not flushed out of the bowl and the trap. Repeat this test 5 times.

5.8.2.5 Fifty plastic balls test

5.8.2.5.1 Test material

50 balls of non-absorbent material, each having a mass of $(3,7 \pm 0,1)$ g and a diameter of $(20 \pm 0,1)$ mm²).

5.8.2.5.2 Test method

For each flushing operation place the 50 balls into the WC pan and flush the WC pan. Check for and remove any balls left in the WC pan. Repeat this test 5 times.

5.8.2.6 Over-splashing test

5.8.2.6.1 Test material

Paper of a type which shows surface change when wet.

5.8.2.6.2 Test method

Lay the paper around the WC pan to be tested projecting 200 mm beyond the plan of the bowl projected onto the floor. Flush the WC pan and record evidence of water on the paper. The test shall be made with the flushing volume which the WC pan will be approved for.

5.8.2.7 After-flush volume test

5.8.2.7.1 Test rig

A test rig in accordance with annex C.

NOTE Other test rigs can be used if the deviation of the after-flush volume related to 6 l is not more than $\pm 0,1$ l using a reference WC pan.

5.8.2.7.2 Test material

Four test specimens prepared in accordance with annex E.

²⁾ Suitable balls are available from Fa. Gebauer GmbH, Kugelfabrik, P.O. Box 425, 36004 Fulda, Germany or CIMAP, Avenue Paul Adam 21 – 25 75017 Paris, France. This information is given for the convenience of users of this standard and does not constitute an endorsement by CEN of these products.