Draft Sri Lanka Standard
WC PANS AND WC SUITES WITH INTEGRAL TRAP

SLS XXXX: 202x

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CONTENTS

	FOREWORD	4
1	SCOPE	5
2	REFERENCES	5
3	DEFINITIONS	5
4	PRODUCT DESCRIPTION	8
5	PRODUCT CLASSIFICATION	9
6	REQUIREMENTS	13
	6.1 Material Requirements	
	6.2 Dimensional requirements	14
	6.3 Functional Requirements	
	6.4. Dangerous substances	
7	MARKING	14
8	SAMPLING	14
9	COMPLIANCE OF A LOT	

TABLES

TABLE 1	Flushing Characteristics	16
TABLE 2	Sub-types of independent WC pans	20
TABLE 3	Sub-types of close-coupled suites and one-piece WC pans	21
TABLE D.1	Scale of sampling	41
TABLE AA.1	Correlation between independent WC sub-type and flush pipe to be used	46
TABLE AA.2	Test volumes of the test flushing cistern	47
TABLE AB.1	Test pressure flush valve	54

FIGURES

FIGURE 1	Few examples of WC pans with integral traps and WC suites.	11
FIGURE 2	Critical dimensions of the WC pans	13
FIGURE 3	Reference planes of Independent WC pans	14
FIGURE 4	WC pans with integral traps	15
FIGURE 5	Demarcation of wetting area.	17
FIGURE 6	Maximum, critical and overflow level.	19
FIGURE7	Safety margin dimensions	19
FIGURE A.1	Placement of specimen in case of wash-out WC	27
FIGURE A.2	Load test	28
FIGURE B.1	Directing device	37
FIGURE AA.1	Valve-type test flushing cistern	44
FIGURE AA.2	Detail X	45
FIGURE AA.3	Flush pipes for valve-type test flushing cistern	46
FIGURE AA.4	Test device to measure the impact force	49
FIGURE AA.5	Splash guard	50

FIGURE AB.1	Test rig	53
FIGURE AB.2	Test pressure flush valve	54
FIGURE AB.3	Test device to measure the impact force	55
FIGURE AC.1	Test rig for independent WC pan and flushing cistern	56
FIGURE AC.2	Test rig for independent WC pan and pressure flush valve	56
FIGURE AC.3	Test rig for one-piece WC pans, close-coupled suites and WC suites	57
FIGURE AD.1	Basket	58
FIGURE AD.2	Placing the basket	58
FIGURE AE.1	Measuring template	59
FIGURE AE.2	Tie position of test specimen	60
FIGURE AE.3	Verifying position of test specimen	61
FIGURE AE.4	How to roll the tubular bandage over the test specimen	61
FIGURE AE.5	Protected test specimen with tubular bandage	61
FIGURE AE.5	Template to check the final configuration of the test specimen	61
FIGURE AF.1	Drawing of the flush pipe type B	63
FIGURE AF.2	Drawing of the flush pipe type C	64
FIGURE AF.3	Drawing of horizontal pipe of the flush pipe type C	65
FIGURE AF.4	Drawing of the outlet valve	66

APPENDICES

A	TEST METHODS FOR TYPE 1 PRODUCTS	25
B	TEST METHODS FOR TYPE 2 PRODUCTS	32
C	SPECIFICATION FOR STAINLESS STEEL	40
D	SAMPLING AND CRITERIA FOR CONFORMITY	41
AA(normative)	VALVE-TYPE TEST FLUSHING CISTERN	44
AB(normative)	TEST RIG FOR TEST PRESSURE FLUSH VALVE	53
AC(normative)	TEST RIG FOR AFTER-FLUSH VOLUME TEST	56
AD(normative)	BASKET METHOD	58
AE(normative)	PREPARATION OF TEST SPECIMENS	59
AF(normative)	EXAMPLES OF FLUSH PIPES AND OUTLET VALVES FOR TEST FLUSHING CISTERNS	63

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FOREWORD

This standard was approved by the Sectoral Committee on Building and Construction Materials and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2021-XX-XX.

This document supersedes SLS 792:1987

In Sri Lanka, WC Pans and WC Suites with Integral Trap are manufactured from vitrified ceramics and stainless steel.

This document has been prepared in response to request made by National Water Supply & Drainage Board as a part of their national programme on water conservation and introduction of quality water fittings to the market by regulation measures which implement under the directive and guidance of Public Utility Commission of Sri Lanka and Ministry of Water Supply.

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

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or an analysis, shall be rounded off in accordance with SLS 102. The number of significant figures retained in the rounded off value shall be the same as that of the specified value in this standard.

In the preparation of this standard the assistance derived from the publications of the European Committee for Standardization (CEN) is gratefully acknowledged.

1. SCOPE

This Standard specifies constructional and performance characteristics together with test methods for close-coupled suites, one-piece and independent WC pans with integral trap used for personal hygiene manufactured from vitrified glazed ceramics or stainless steel.

This Standard does not apply to squatting toilets, WC pans without integral trap or flushing cisterns as separate appliances.

In the case of independent WC pans, the associated flushing cisterns and pressure valves are covered by other standards and the reference to cisterns in this standard is related only to the definition and requirements of flushing volume.

In the case of close-coupled suites and one-piece WCs, this standard also specifies design, performance characteristics and the test methods for designated flushing cisterns with flushing mechanisms, inlet valves and overflows. For these products, this standard covers flushing cisterns designed to be connected to drinking water installations inside buildings.

2.REFERENCES

AS 1172-1	- Water closets (WC) – part 1
BS 3402	- Specification for quality of vitreous china sanitary appliances
EN 997	- WC pans and WC suites with integral trap
EN 13618	- Flexible hose assemblies in drinking water installations- Functional requirements and test methods
SLS 102	- Rules for rounding off numerical values
SLS 229	- Specification for sanitary appliances (vitreous china)
SLS ASTM A240M	- Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
SLS EN 14055	- WC and urinal flushing cisterns
SLS EN 33	-WC pans and WC suites. Connecting dimensions

3. DEFINITIONS

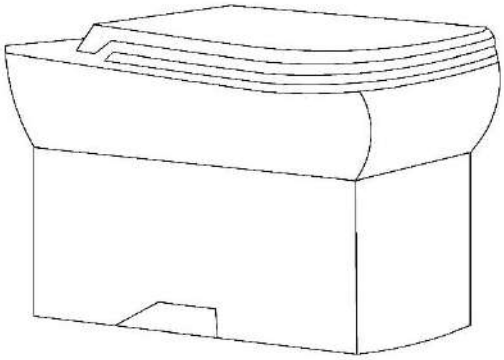
For the purpose of this standard, the following definitions shall apply:

3.1 adjustable residual water level: Residual water level in a cistern, after (uninterrupted) flushing, which can be altered by adjusting the outlet mechanism.

3.2 after-flush volume: Volume of flush water remaining after the last test specimen has left the outlet of the bowl.

3.3 baby WC pan: WC pan with a front edge below 260 mm high.

3.4 back-to-wall WC pan: Pedestal WC pan whose back is in contact with the wall.



3.5 children WC pan: WC pan with a front edge between 300 mm and 380 mm high.

3.6 close-coupled suite: Combination of a WC pan and flushing cistern directly coupled into a functional unit.

3.7 critical water level: Highest water level in any part of the appliance, 2 s after the supply is cut-off.

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

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

3.9 flush pipe: Connecting pipe between a flushing cistern's outlet and a WC's inlet.

3.10 flush rate: Volume of water flowing out of a flushing cistern as a function of time.

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

3.12 glazed ceramic: Ceramic material for sanitary appliances with all visible surfaces glazed when installed.

3.13 impact force: Force of the flushing water at the outlet of the flush pipe.

3.14 independent WC pan: WC pan suitable for the connection with a flushing cistern or a pressure flush valve.

3.15 inlet valve: Valve that controls and shuts off the flow of water into a flushing cistern, usually by an arm connected to a float.

3.16 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.

NOTE: *A leak is defined as being visible discharge of water amounting to more than three separate drops.*

3.17 maximum water level: Highest water level reached after flow stabilization, in the event of continuous supply, as a result of malfunction of the inlet valve.

3.18 meniscus level: Level resulting from surface tension of water during overflowing.

3.19 nominal flush volume: Volume of water indicated, when a flushing cistern is filled to the nominal water level.

3.20 nominal water level : Water level when a cistern is filled to the nominal flush volume, e.g. 4 1, 5 1, 6 1, 7 1 or 9 1.

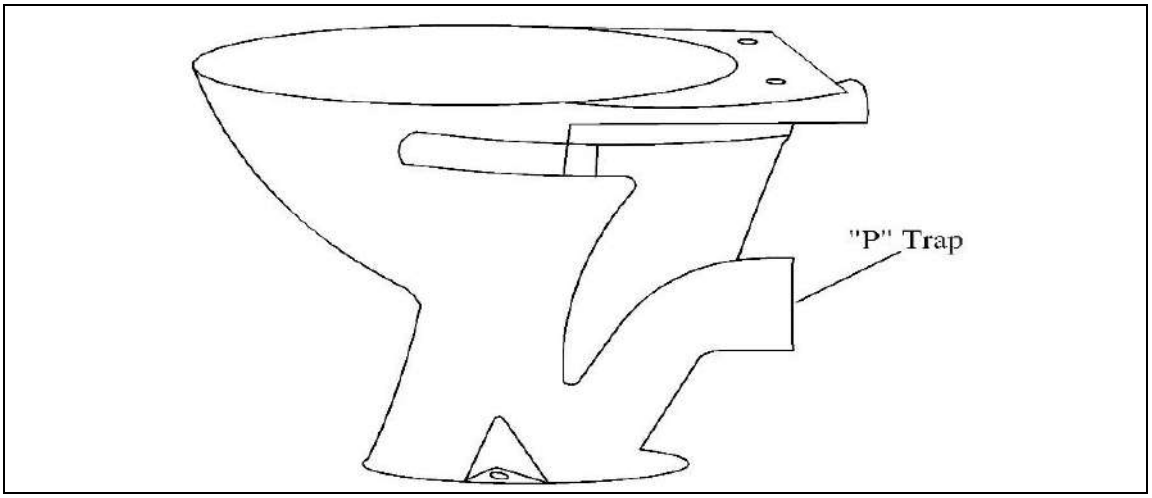
3.21 one-piece WC pan: WC pan manufactured with an integral flushing cistern.

3.22 outlet valve: Mechanism for opening and closing the outlet orifice of the flushing cistern.

3.23 overflow : Device enabling release of excess water from a flushing cistern when water reaches a pre-determined level.

3.24 overflow level : Water level corresponding to the upper edge of the overflow or to the lower edge of the overflow notch.

3.25 "P" trap: The "P" trap pan has the shape of the trap in as letter P. The outlet of the pan goes out through the wall at the horizontal or angled slightly down.



3.26 pedestal WC pan: Floor-mounted WC pan that has an integral foot.

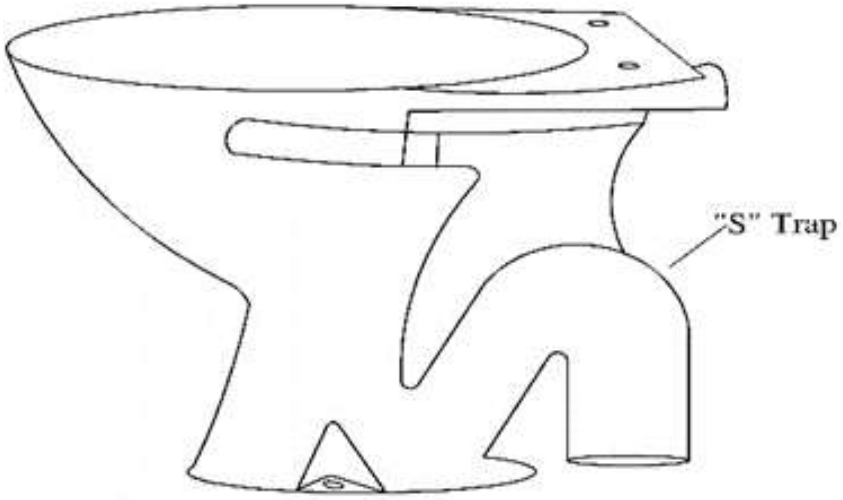
3.27 pressure flush valve: Valve directly connected to the water supply which delivers a pre-determined volume of flushing water for the removal of excrement from a WC pan.

3.28 product type: Set of representative performance levels or classes of a construction product, in relation to its essential characteristics, produced using a given combination of raw materials or other elements in a specific production process.

NOTE : *The definition is taken from Regulation (EU) No. 305/2011.*

3.29 residual water level : Water level, after a full flush is completed.

3.30 "S" trap: The "S" trap pan has the shape of the letter “S”. The outlet of the pan faces directly to the floor.

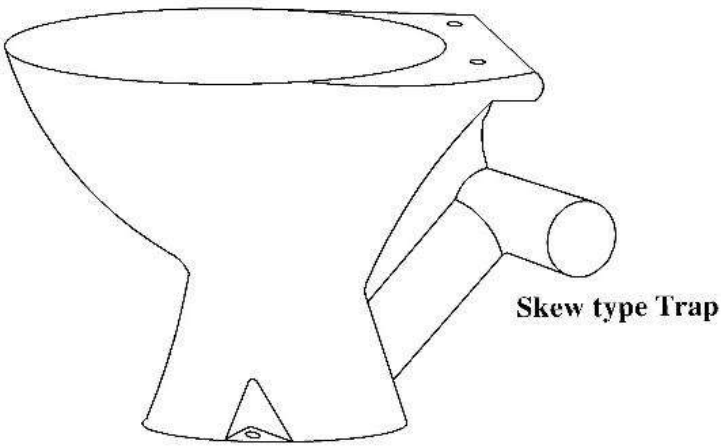


3.31 safety margin - dimension *c:* Distance between the nominal water level determined by the manufacturer, and the overflow level.

3.32 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.

NOTE: *A leak is defined as being visible discharge of water amounting to more than three separate drops.*

3.33 “skew type” Trap: The "skew type" pan has the outlet going out to the left or right of the pan at an approximate right angle.

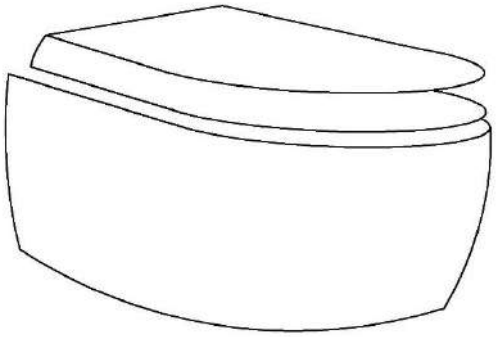


3.34 siphonic WC pan: WC pan in which excrement is removed by siphonage induced by the flushing water.

3.35 test height: Distance between the seat of the flushing device and the horizontal axis of the flush pipe.

3.36 valve-type flushing cistern: Cistern with integral valve outlet device for the storage and discharge of a defined volume(s) of flushing water for the removal of excrement from a WC pan.

3.37 wall-hung WC pan: WC pan cantilevered clear of the floor.



3.38 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.

3.39 wash-down WC pan: WC pan in which excrement falls directly into the trap before being removed by the flushing water.

3.40 wash-out WC pan: WC pan in which excrement falls first into a shallow water filled bowl, before being removed by the flushing water.

3.41 water trap: Water seal that prevents backflow of foul odour from a drain.

3.42 WC pan : Bowl-shaped appliance for reception and flushing away of human solid and liquid excrement.

3.43 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.

4. PRODUCT DESCRIPTION

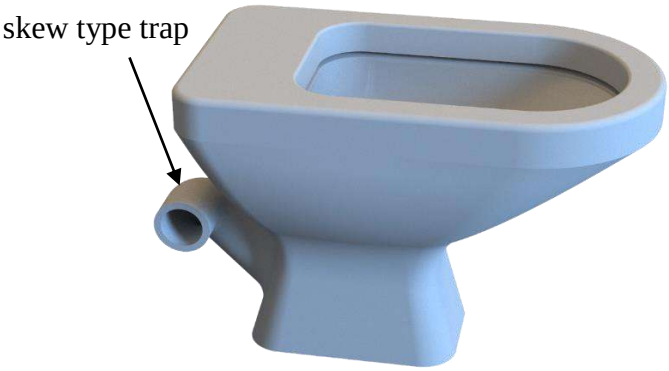
The WC pan may be a type of wash down or siphonic. The WC pan is essentially integral trap and the trap may single or double. The shape of the trap may be “P” type or “S” type. The trap opening may be straight or skew. The independent WC pan may be constructed as pedestal mounting unit or wall-hung unit.

The WC suite is a WC pan with integral flushing cistern. The WC pan may be as described under independent WC pan. The WC suite may be as an exposed unit or concealed unit.

a.Pedestal WC pan with "S" type integral trap of straight port

b.Pedestal WC pan with "P" type integral trap of straight port

c.Pedestal WC pan with "P" type integral trap of skewed port



d.WC suite

FIGURE 1 – Few examples of WC pans with integral traps and WC suites.

5. PRODUCT CLASSIFICATION

WC pans and WC suites are classified as described below.

Type 1: WC pans and WC suites designed for use with and tested using a nominal full flush volume of either 4 l, 5 l, 6 l, 7 l or 9 l and in case of a reduced flush not less than those in accordance with Table 2 and Table 3. The requirements of type 1 are given in **6.3.1**.

Type 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 **6.3.2**, using a maximum flushing volume of 6 l, or a dual-flush combining a maximum flush of 6 l and a reduced flush not greater than two-thirds of the maximum flush volume. The requirements of type 2 are given in **6.3.2**

6. REQUIREMENTS

6.1 Material Requirements

6.1.1 *Specification for glazed* Vitrified *Ceramics*

Material and Manufacturing quality of the products shall be conformed to the SLS **229**.

6.1.2 *Specification for Stainless steel*

Material and Manufacturing quality of the WC Pans and WC suites shall be as given in Appendix **C**

6.2 Dimensional requirements

6.2.1 *General*

The dimensions of the WC pans and WC suites, shall be fixed by the manufacturer in order to conform the quality parameters and performance.

All dimensions of service connection to external components such as flush pipe and soil waste pipe shall be conformed to the **SLS EN 33**.

The work spacing of the WC pans and WC suites for dismantling and assembling their parts shall be adequate to work safely and easily.

6.2.2 *Connecting dimensions*

This standard specifies the connecting dimensions of WC pans and WC suites, regardless of the materials used for their manufacture. This does not apply to siphonic action WC pans and WC suites.

NOTE 1:

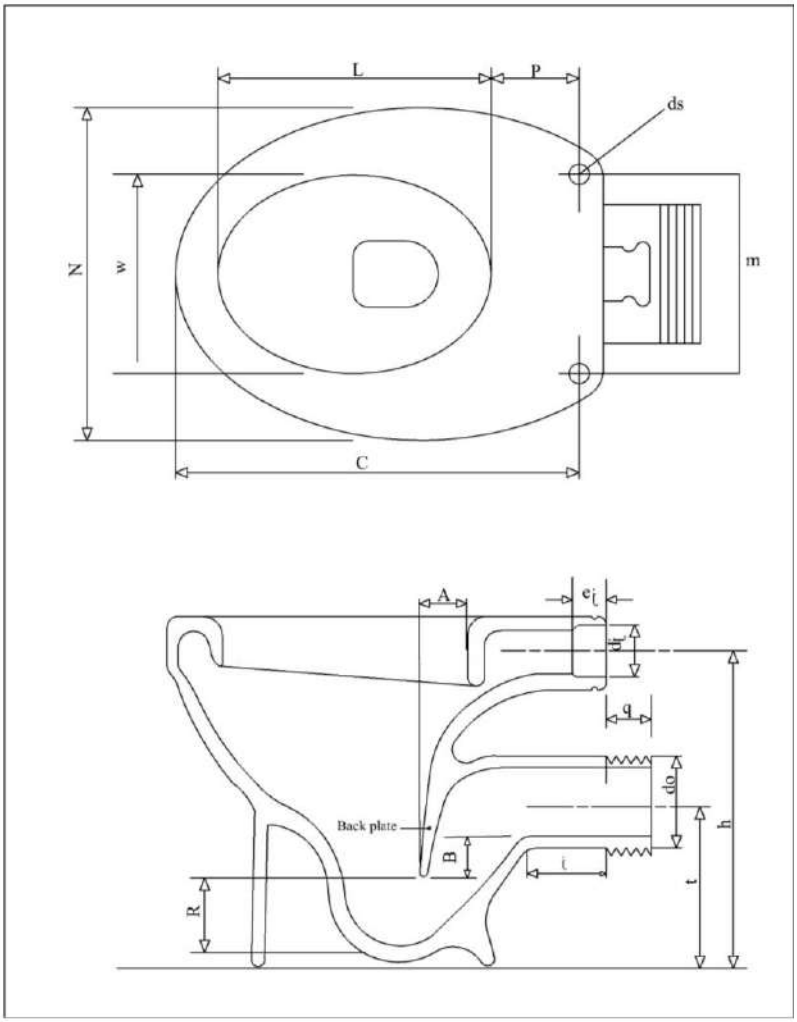
Other Connecting dimensions are permitted, e.g. special designs of WC pans, if the manufacturer supplies or recommends the appropriate fittings.

NOTE 2:

The shape of the appliance in the figures is for illustration only; it in no way prejudices the final shape of the appliance, which is left to the initiative of the manufacturer.

6.2.2.1 *Inlet of WC pans with independent water supply*

The critical dimensions of the WC pans are shown in Figure **2** and their values and tolerances shall comply with the dimensions given in **SLS EN 33**.



di	Internal Diameter of Inlet	A	Distance between a vertical line from tip of back plate to inside face of flush rim at back
de	Internal Diameter of outlet	B	Depth of water seal
ei	Depth of Inlet socket	C	Length from seat bolt hole to front of Pan
h	Height of centre line of inlet from floor level	W	Width of opening
i	Length of straight part of outlet glazed and without	L	Length of opening
m	Dimension between centres of seat bolt holes	N	Width of Pan
ds	Diameter of seat bolt holes	P	Distance from entre or seat bolt holes to inside face of flush rim at back
q	Distance between vertical plane of outlet opening and inlet opening	R	Clearance below tip of back plate
t	Height of centre line of outlet from floor level		

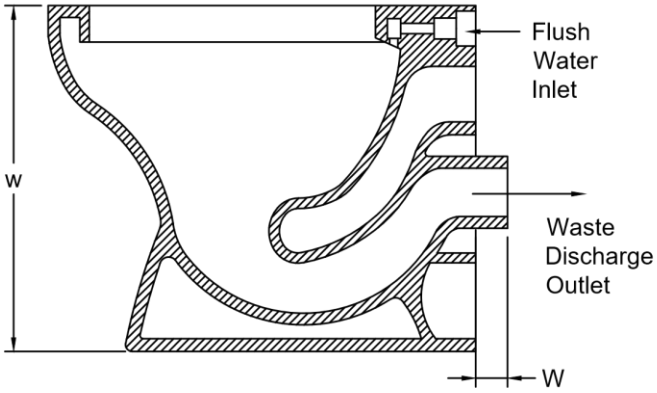
FIGURE 2 – Critical dimensions of the WC pans

6.2.3 *Reference planes of WC pans and WC suites*

6.2.3.1 *WC pans:*

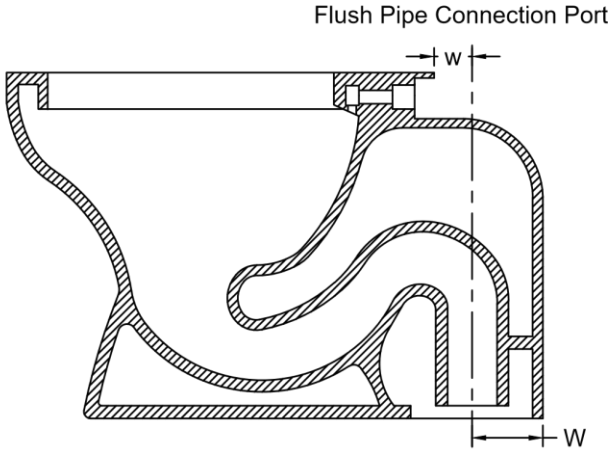
Manufacturer shall specify all the values for the dimension “w” shown in Figure **3**. The values given by the manufacturer shall conform to the **SLS EN 33**.

Foot mounted Wash-down- WC Pan "P" – Trap

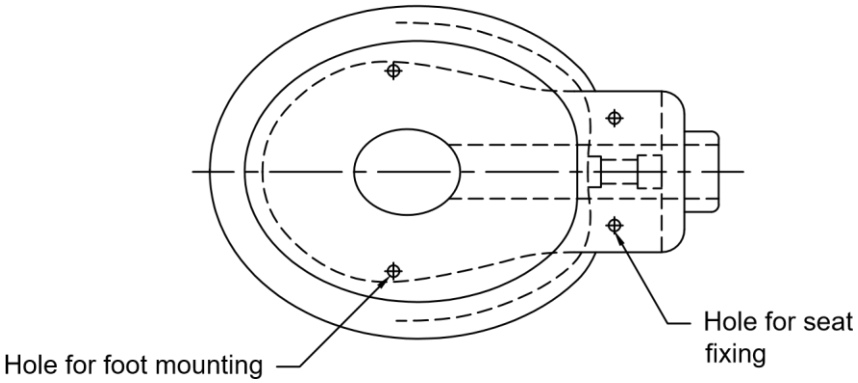


Elevation

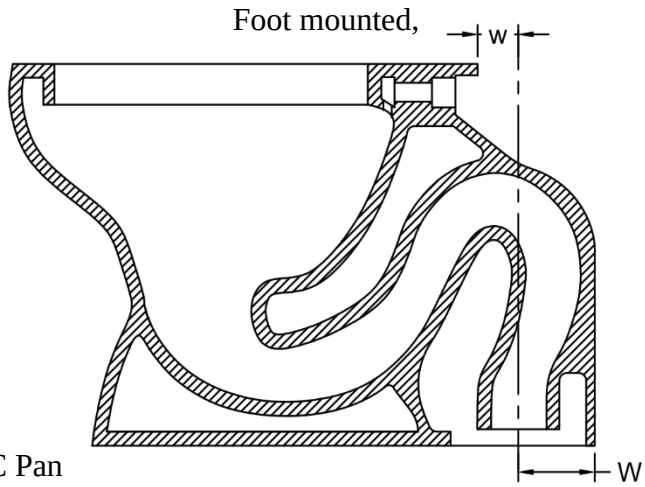
Foot mounted Wash-down WC Pan - "S" - Trap



Elevation



Foot mounted,



Siphonic WC Pan

FIGURE 3—Reference planes of Independent WC pans

6.3 Functional Requirements

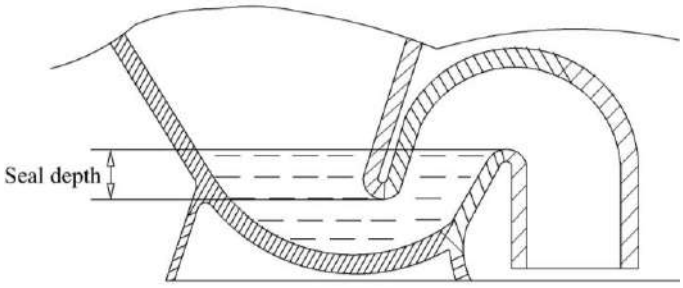
6.3.1 *Functional requirements for Type 1 Products*

6.3.1.1.*Depth of water seal*

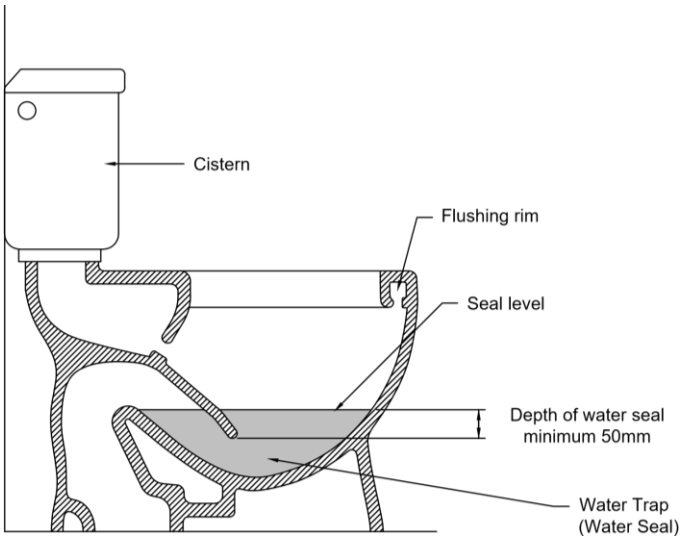
When tested in accordance with **A.1,** the depth of water seal shall be not less than 50 mm.

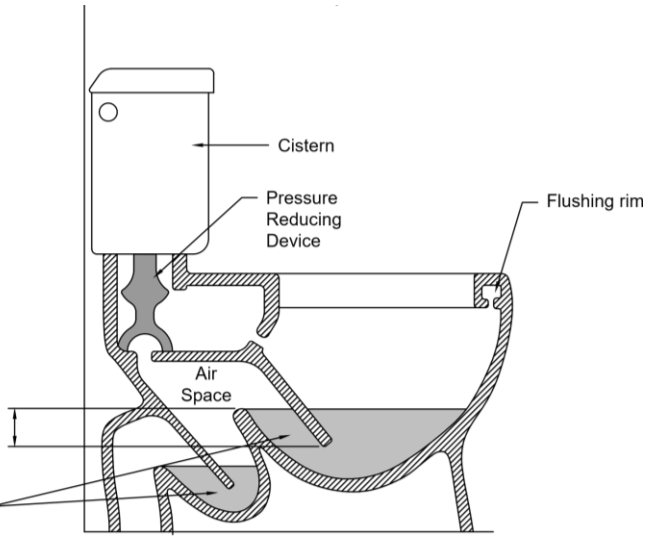
NOTE:

In case of WC pan with integral double traps, test shall be carried out only for the trap placed with first trappage partition plate in the waste receiving port of the bowl.



(a)Typical Water Seal





(b)Single Trap **(c) Double Trap**

FIGURE 4—WC pans with integral traps.

6.3.1.2 *Flushing Characteristics*

6.3.1.2.1 General

Table 1 correlates the flushing Characteristics to the WC Pan sub-type and flushing volume.

TABLE 1: Flushing Characteristics

Sub -type of WC pan in accordance with Table **2** and Table **3**	Wash of bowl **(6.3.1.2.2)**	Flushing of toilet paper **(6.3.1.2.3)**	Flushing of 50 plastic balls **(6.3.1.2.4)**	Over-splashing **(6.3.1.2.5)**	After-flush Volume **(6.3.1.2.6)**
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	

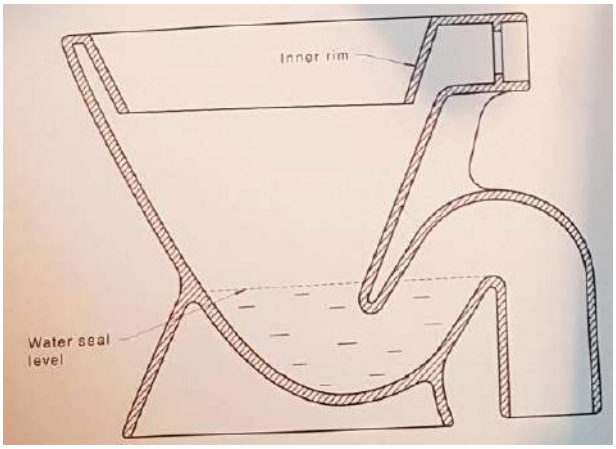
The efficiency of flushing is demonstrated by the following characteristics

6.3.1.2.2 *Wash of bowl*

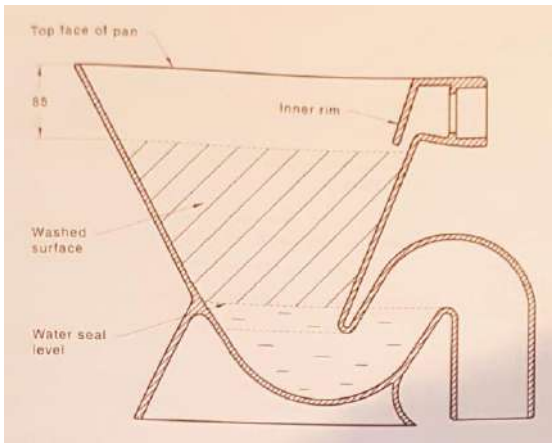
When tested in accordance with **A.2,** the arithmetic average of any unflushed area below the rim and above the surface of the water in the trap shall not be more than 50 cm^2 after five flushing operations.

In case of rimless WCs, the surface to be tested is the area between the water surface and a horizontal line 85mm below the top edge of the bowl. (See Figure **5** for demarcation of wetting area)

Typical Water Seal



Typical Pan with inner rim



Typical Pan without a rim

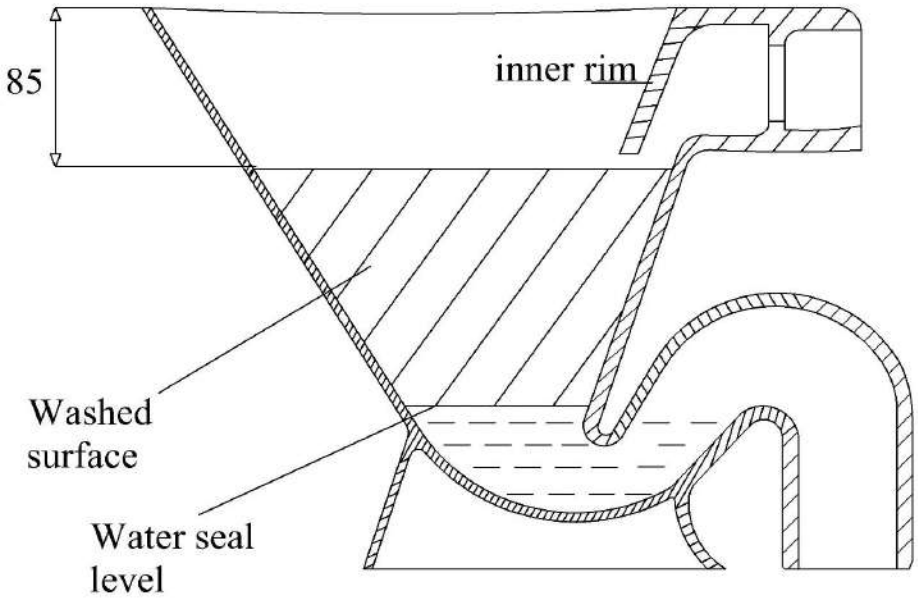


FIGURE 5— Demarcation of wetting area.

6.3.1.2.3 *Flushing of toilet paper*

When tested in accordance with **A.2.4**, 12 sheets of toilet paper shall be flushed out of the WC pan a minimum of 4 times out of five tests.

For baby WC pans,6 sheets of toilet paper shall be flushed out of the WC pan a minimum of 4 times out of five tests.

6.3.1.2.4 *Flushing of fifty small plastic balls*

When tested in accordance with Appendix **A.2.5**, after five tests, each with 50 balls, a minimum of 85 % of the balls shall be flushed out of the WC pan.

6.3.1.2.*5* *Over splashing*

When tested in accordance with Appendix **A.2.6**, flushing water shall not splash beyond the rim of the bowl and wet the floor. Maximum of five small drops, not more than a drop per 100 cm^2 are permissible.

6.3.1.2.6 *After -flush volume*

When tested in accordance with Appendix **A.2.7**, an After -flush volume of 2.5 l or 2.8 l as appropriate is required.

6.3.1.3 *Static load*

When tested in accordance with Appendix **A.3**, ceramic 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 characteristic.

6.3.1.5 ***Additional*** **characteristics of flushing cisterns for close-coupled suites and one-piece WCs.**

6.3.1.5.1 *General*

If close-coupled suites and one-piece WCs comprising a flushing cistern and a WC pan supplied or specified by the manufacturer as a unit, the following characteristics shall be fulfilled.

6.3.1.5.2 *Inlet valve of the flushing cistern*

Flushing cisterns shall have an inlet valve complying with SLSXXXX which is under preparation (= EN 14124 -Inlet valves for flushing cisterns with internal overflow)

6.3.1.5.3 *Supply piping*

All materials of supply piping which could be in contact with drinking water shall not be danger to health. They shall not change the taste, aroma or visual appearance of the drinking water. The use of elastomeric flexible supply hoses complying with EN 13618 is permissible inside the assembly.

6.3.1.5.4 *Flush volume(s) of the flushing cistern*

The flush volume(s) for one-piece and close-coupled flushing cisterns supplied with a WC pan shall conform to the value(s) specified by the manufacturer according to Table **3**, when measured as described in **A.4.1**

Flushing cisterns or their components shall be marked to allow the correct volume(s) of flush to be achieved.

6.3.1.5.5 *Leak-tightness between flushing cistern and bowl*

When tested in accordance with **A.4.2,** there shall be no leakage between the WC pan and the flushing cistern.

6.3.1.5.6 *Outlet valve leak-tightness*

When tested in accordance with **A.4.3,** the outlet shall not show any leakage greater than three drops within 15 min.

6.3.1.5.7 *Outlet valve reliability*

When tested in accordance with A.4.4, the outlet mechanism functions shall be ensured.

The flushing device shall not show any failure or permanent distortion of any component including linkages that prevents normal operation of the mechanism.

The outlet of the flushing device shall not show leakage greater than three drops within 15 min.

6.3.1.5.8 *Overflow*

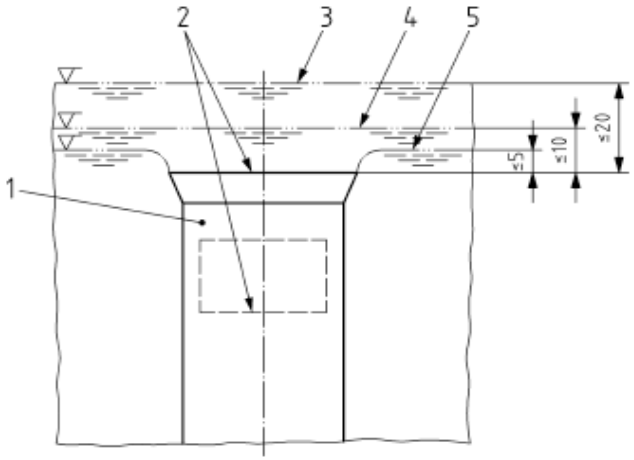
When tested as described in A.4.5, the overflow shall meet the requirements specified below (see Figure 6):

a) the distance between the maximum water level and the overflow level shall be ≤ 20 mm;

b) the distance between the critical water level and the overflow level shall be ≤ 10 mm;

c) the distance between the meniscus level and the overflow level shall be ≤ 5 mm.

Dimensions in millimetres

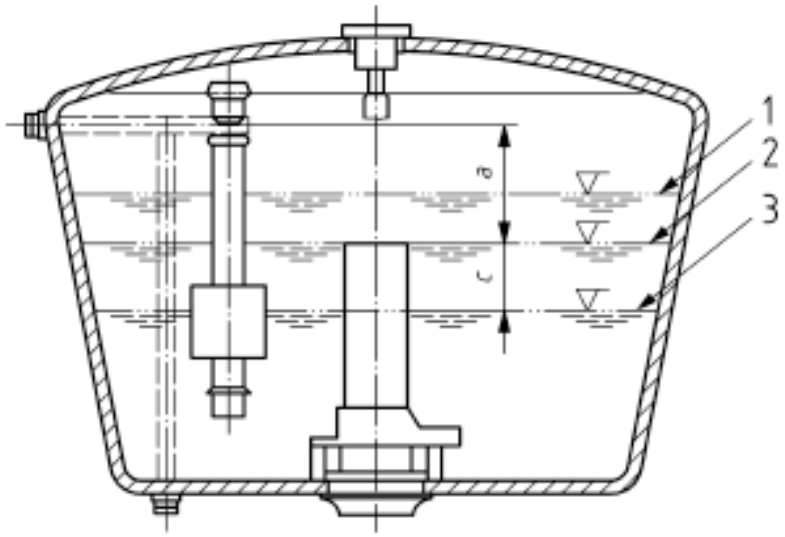


Key
1.overflow pipe
2 overflow level
3 maximum water level
4 critical water level
5 meniscus level

FIGURE 6— Maximum, critical and overflow level.

6.3.1.5.9 *Safety margin – dimension "c"*

When tested as described in **A.4.6**, dimension "c" (see Figure **7**) corresponding to the distance between the overflowing level and the maximum nominal water level indicated by the manufacturer shall be ≥ 20 mm.



Key
1 maximum water level
2 overflow level
3 maximum nominal water level
a distance between overflow level and the point of the air inlet orifice of the inlet valve
c safety margin

FIGURE 7 — Safety margin dimensions

6.3.1.5.10 *Safety margin — dimension "a"*

When tested as described in **A.4.7**, the dimension "a" (see Figure 7) between the overflow level and the lowest point of the air inlet orifice of the inlet valve shall be 20 mm minimum as required in EN 1717, to prevent backflow. In the case of an adjustable overflow, the adjustment shall provide a dimension "a" of 20 mm minimum.

6.3.1.6 ***Durability***

Type 1 products conforming to the requirements of **6.3.1.2** to **6.3.1.4** and **6.3.1.5.5** to **6.3.1.5.10** are deemed to be durable.

6.3.1.7 ***Sub-types of independent WC pans, close-coupled suites and one-piece WCs***

6.3.1.7.1 *Nominal flush volume*

Sub-type and test volume for a full flush shall be defined by the manufacturer.

Baby WC pans belong to sub-type 5 or sub-type 4.

The nominal flush volume of independent WC pans shall correspond to one of the sub-types given in Table **2**.

Table 2 — Sub-types of independent WC pans

Sub-type **(1)**	**Nominal flush volume** ***l*** **(2)**	**Test flush volume** ***l*** **(3)**
9	9	$9^{0}_{-0.1}$
7	7	$7^{0}_{-0.1}$
6	6	$6^{0}_{-0.1}$
5	5	$5^{0}_{-0.5}$
4	4	$4^{0}_{-0.1}$

The nominal flush volume of close-coupled suites and one-piece WC pans shall correspond to one of the sub-types given in Table **3**.

TABLE 3 — Sub-types of close-coupled suites and one-piece WC pans

Sub-type (1)	Nominal flush volume l (2)	Test flush volume l (3)	Reduced flush volume l (4)
9	9	$9^{0}_{-1.4}$	Maximum 2/3 of the Nominal flush volume as specified by the manufacturer
7	7	$7^{+0.5}_{-0.5}$	
6	6	$6^{+0.4}_{-0.5}$	
5	5	$5^{+0.4}_{-0.5}$	
4	4	$4^{+1.0}_{-0.5}$	

6.3.1.7.2 ***Flushing devices***

Independent WC pans shall be designed to be flushed by one or both of the following separate flushing devices:

Valve-type cistern Type A (for calibration see Appendix **AA**)
Pressure flush valve Type C (for calibration see Appendix **AB**)

6.3.1.7.3 ***Verification of sub-types***

1)Connect the flushing cistern to a water supply of (0.2 ± 0.1) MPa and adjust the flush volume in accordance with the manufacturer's instructions.

2)Flush the flushing cistern 3 times and measure the flush volume to an accuracy of ± 0.1 l. The water supply shall be closed during the flushing operation.

3)The WC pan shall be classified on the arithmetic average resulting from three flushing operations referring to Table **2** or Table **3**.

4)The flushing tests in accordance with this standard shall be carried out on the basis of the WC pan sub-type (see Table **1**).

6.3.2 ***Functional requirements for Type 2 products***

6.3.2.1 Inlet valve

Either the first inlet valve or, in the event of this failing, all four of the remaining inlet valves shall comply with BS 1212-2, BS 1212-3, or BS 1212-4 subject to the amendments listed below:

- The water hardness during tests shall not exceed the range of (230 ± 20) ppm of calcium carbonate ($CaC0_3$) during the course of the test.
- The supply pressure for the endurance test described in Parts 3 and 4 shall be (0.15 ± 0.01) MPa.
- Part 2 valves shall be subject to an endurance test as described in Parts 3 and 4 using a supply pressure of (0.15 ± 0.01) MPa.
- The endurance test shall be undertaken for 200 000 cycles and if the first inlet valve fails the test, the four valves subsequently tested shall all satisfy the requirements.

6.3.2.2 Backflow prevention

When tested in accordance with the backflow prevention requirements of BS 1212-3:1990 or BS 1212-4:2016, Clauses 15 or 17 respectively there shall be no evidence of backflow.

6.3.2.3 Marking of flushing cistern

Every flushing cistern, other than a pressure flushing cistern, shall be clearly marked internally with an indelible line to show the intended volume of flush, together with an indication of that volume. Discharge volume(s) shall be based on measurement from the water level in the cistern using the manufacturer's original equipment to the residual water level in the cistern on completion of a flush.

6.3.2.4 Warning pipe and overflow provision

When tested as described in **B.2**, every flushing cistern, not being a pressure flushing cistern, shall be fitted with a warning pipe connection arranged with the discharge level between 25 mm to 32 mm above the marked water level, or a no less effective device shall be provided. The top edge of any internal overflow shall be not less than 10 mm above the warning level.

6.3.2.5 Flush volume

6.3.2.5.1 Full flush

When tested as described in **B.3** with any adjustable flushing device set to deliver the maximum flush volume, the measured discharge shall on no occasion exceed 6 1.

6.3.2.5.2Reduced flush

When tested as described in **B.3** with any adjustable flushing device set to deliver a reduced flush volume, the measured discharge shall on no occasion exceed two-thirds of the full-flush volume.

6.3.2.6 Flush rate

When tested as described in **B.4**, the mean flush rate of discharge per flush shall be 1.85 1/s for the z full flush and ≥ 1.6 1/s for the reduced flush, if provided.

6.3.2.7 Physical endurance and leakage of flushing device

When tested as described in **B.5,** the flushing device shall not undergo any failure or permanent distortion of any components including linkages that prevents normal operation of the mechanism.

No more than two instances of leakage are permitted. A leak is defined as being visible discharge of water amounting to more than three separate drops. If the first flushing device fails the test, the four devices subsequently tested shall all satisfy the requirements.

6.3.2.8 Chemical endurance of flushing device

When tested as described in **B.6,** there shall be:

- no dimensional alteration of any component greater than 1 mm or 5 % whichever is the lesser;
- no weight loss of any component greater than 1 g or 5 % whichever is the lesser;
- no visible sign of physical change such that performance is impaired;
- no deterioration in performance.

The flushing device shall not leak after undergoing a 3 000 cycle physical endurance test and the long term leakage test.

6.3.2.9 Solids discharge and after-flush volume for maximum flush

When tested as described in **B.7**, for the first six flush cycles, or for a minimum of eight out of ten flush cycles, each of the four test specimens shall be completely evacuated from the WC bowl and pan's outlet. The recorded after-flush volume in each flush cycle shall be no less than 40 % of the full-flush volume.

6.3.2.10 Paper discharge for reduced-flush volume

When tested as described in **B.8**, for the first six flush cycles, or for a minimum of eight out of ten flush cycles, all six sheets of toilet paper shall be flushed out of the WC pan and outlet.

6.3.2.11 Liquid contaminant dye retention

When tested as described in **B.9**, for the first five flush cycles, or for a minimum of nine out of ten flush cycles at full-flush volume, the contaminate level shall be $\leq$ 1 %. For the first five flush cycles, or for a minimum of nine out of ten flush cycles at reduced-flush volume, when provided, the contaminate level shall be $\leq$ 6 %.

6.3.2.12 Wash of bowl

When tested as described in **B.10**, the arithmetic average of any unflushed area below the rim and above the surface of the trap shall be no greater than 50 cm^2 after five flushing operations.

6.3.2.13 Depth of water seal

When tested twice at random as described in **B.3**, the depth of water seal shall be no less than 50 mm on either occasion. If any alternative trap seal device is utilised, a no less effective comparable seal shall be in operation.

6.3.2.14 Static load of type 2 products

When tested in accordance with **A.3**, type 2 products shall meet the requirements of **6.3.1.3.**

6.3.2.15 Durability of type 2 products

Type 2 products conforming to **6.3.2.1** to **6.3.2.15** are deemed to be durable

6.4 *Dangerous substances*

Material of WC pans & Suites should not contain dangerous substances as mentioned in SLS 229.

7.MARKING

Minimum of following information shall be marked and appeared on the WC pans and WC suites covered under this standard. All information shall be marked clearly by indelible line or scripts. Marking shall not be done by indenting.

Marking on Product

i. Brand name or Trade mark of the product
ii. Code declared by manufacturer to facilitate traceability

Marking on Packaging

i. Product Standard No.;
ii. Type of WC pans and WC suites;
iii. Flush volume

NOTE :
Attention is drawn to the certification facilities offered by the Sri Lanka Standards Institution. See the inside back cover of this standard.

8. SAMPLING

Where the compliance of a lot to the requirements of this standard is to be assessed based on statistical sampling and inspection, the sampling scheme given in **D.1** of Appendix **D** shall be applicable.

In case of sample required for independent tests, it shall be taken at the option of the end-user or his/her representative, before delivery or within one week after delivery of tiles as per the scheme given in Appendix **D**.

Where compliance with this specification is to be assured based on manufacture's process control systems coupled with type testing and check tests or any other procedures, appropriate scheme of sampling and inspection shall be adopted.

9. COMPLIANCE OF A LOT

Compliance shall be in accordance with **D.3** of Appendix **D**

APPENDIX A
TEST METHODS FOR TYPE 1 PRODUCTS

A.1 Depth of water seal

Install the WC pan in accordance with **A.2.2.** Flush the WC pan and measure the height from the invert of the trappage back plate to the surface of the water.

A.2 Flushing tests

A.2.1Apparatus

Independent WC pans are to be tested with one or both of the following separate flushing devices:

Valve-type flushing cistern Type **A** (see Appendix **AA**, Figures **AA.1**, **AA.2, AA.4** and **AA.5**, Tables **AA.1** and **AA.2**)

Pressure flush valve Type **C** (see Appendix **AB**, Figures **AB.1, AB.2** and **AB.3**, Table **AB.1**)

Close-coupled suites and one-piece WC pans shall be tested with flushing cisterns provided or specified by the manufacturer.

A.2.2 Preparation to test

Independent WC pans

Use the flushing volumes in accordance with Table 2 with the full flush as indicated by the manufacturer:

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 Appendix **AA** or Appendix **AB**.

Close-coupled suites and one-piece WC pans
Use the flushing volumes in accordance with Table **3** with the full flush as indicated by the manufacturer:

Install the close-coupled suite or the one-piece WC pan on a firm flat horizontal or vertical surface as appropriate using the flushing device provided or specified by the manufacturer.

A.2.3 Sawdust test

A.2.3.1 Test material

20 g of fine dry wood sawdust.

A.2.3.2 Procedure

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 the sawdust as evenly as possible over the moistened surface. Flush the WC pan and measure any unwashed area. Repeat this procedure 5 times.

In the case of rimless WCs, the surface to be tested is the area between the water surface in the trap and a horizontal line 85 mm below the top edge of the bowl.

A.2.4 Toilet paper test

A.2.4.1 Test material

Single layer toilet paper with a saturation time of 15^{+15}_{-10} s verified by the basket method in accordance with Appendix **AD.** (see Figures **AD.1** and **AD.2**). Individual sheets shall have a size of (130 ± 10) mm x (100 ± 10) mm. The mass per unit surface of the toilet paper shall be (30 ± 10) g/m^2.

A.2.4.2 Procedure

Individually loosely crumple 12 sheets of toilet paper or 6 sheets in case of baby WCs and drop them separately one after the other into the WC pan within a time of 14 s to 18 s. Activate the full flush within 2 s of the last sheet being dropped into the WC pan. Record and remove an; paper not flushed out of the bowl and the trap. Repeat this test 5 times.

A.2.5 Fifty plastic balls test

A.2.5.1 Test material

50 balls of non-absorbent material, each having a mass of (3.7 ± 0.1) g and a diameter of (20 ± 0.1) mm.

A.2.5.2 Procedure

For each flushing operation place the 50 balls into the WC pan and flush the WC pan with a full flush. Record and remove any balls left in the WC pan. Repeat this test 5 times.

A.2.6 Over splashing test

A.2.6.1 Test material

Paper of a type which shows surface change when wet.

A.2.6.2 Procedure

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 for which the WC pan will be approved.

A.2.7 After-flush volume test

A.2.7.1 Test rig

A test rig in accordance with Appendix **AC** (see Figure **AC.1** and Figure **AC.2**).

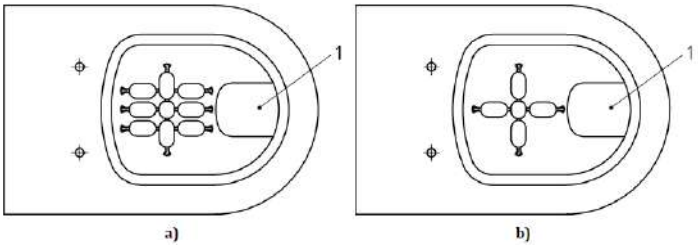
Other test rigs may be used, if the tolerance for after flush volume, related to 6 l, does not exceed ± 0.1 1 when the same WC pan is used.

A.2.7.2 Test material

Test specimens prepared in accordance with Appendix **AE** (see Figures **AE.1, AE.2, AE.3, AE.4, AE.5** and **AE.6**).

A.2.7.3 Procedure

Place four test specimens, or in case of baby WC pans two test specimens, one after the other into the WC pan and flush the WC pan. In case of wash out WC, place the four specimen as shown in Figure **A.1**.
To obtain 10 measures, repeat the test 9 times.



Key
1 water trap
a placement of the four specimen in adults' wash-out WC
b placement of the two specimen in baby wash-out WC

Figure A.1 — Placement of specimen in case of wash-out WC

The result of flushing operations when not all test specimens have been evacuated shall count as 0 l.
The test is positive, if:

a) in 8 out of 10 flushes all test specimens are evacuated and the after-flush volume is on each occasion ≥ 2.5 1, or

b) the arithmetic average of the after-flush volume of the 10 flushing operations is ≥ 2.8 1

If the WC pan does not provide results according to a) or b), repeat the procedure again for an additional 20 flushing operations.

The test is then positive, if:

c) in 16 out of 20 flushes all test specimens are evacuated and the after-flush volume is on each occasion ≥ 2.5 1, or

d) the arithmetic average of the after-flush volume of the 20 flushing operations is ≥ 2.8 1,

A.3 Load test

Wall-hung WC pans shall be fixed in accordance with the manufacturer's instructions onto a smooth surface with a layer of mortar or other facing material used for pointing between the back of the WC pan and the smooth surface.

Pedestal WC pans of non-ceramic materials shall be fixed onto a solid smooth horizontal surface in accordance with the manufacturer's instructions.

A force of (4.00 ± 0.05) kN shall be applied for a period of 1 h by means of a beam with a cross section of 100 mm × 100 mm positioned across the centre of aperture of the bowl (see Figure **A.2**).

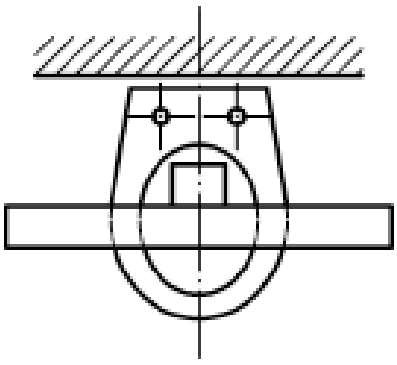


Figure A.2 — Load test

A.4 Tests for flushing cisterns of close-coupled suites and one-piece WCs

A.4.1 *Flush volume(s) for flushing cisterns of close-coupled suites and one-piece WCs*

A.4.1.1 Determination of the full-flush volume

- Install the close-coupled suite or one-piece WC on a firm flat horizontal or vertical surface as appropriate.
- In case of a close-coupled suite, fit the flushing cistern to the WC pan.
- Fill the flushing cistern via an inlet valve.
- Fill the water trap of the WC by activating the flushing mechanism.
- Fill the flushing cistern via an inlet valve to the level indicated by the manufacturer.
- Shut-off the supply.
- Operate the full flushing mechanism control and collect the water delivered.
- Measure the volume using a calibrated container.
- Perform the test three times.
- If there are differences in the volumes delivered, calculate the arithmetic mean for the three volumes.
- Repeat for all full-flush volumes.

A.4.1.2 Determination of the reduced flush volume

- Install the close-coupled suite or one-piece WC on a firm flat horizontal or vertical surface as appropriate.
- In case of a close-coupled suite, fit the flushing cistern to the WC pan.
- Fill the flushing cistern via an inlet valve.
- Fill the water trap of the WC by activating the flushing mechanism.
- Fill the flushing cistern via an inlet valve to the level indicated by the manufacturer.
- Shut off the supply.
- Operate the double-control flushing mechanism for the reduced flush volume and collect the water delivered or in case of double-action flushing mechanism stop the flush after 1.5 s whilst collecting the water delivered.
- Measure the volume using a calibrated container.
- Perform the test three times.
- If there are differences in the volumes delivered, calculate the arithmetic mean for the three volumes.
- Repeat for all reduced flush volumes.

A.4.2 *Leak tightness test of close-coupled suites*

- Install the flushing cistern on the WC pan.
- Install the close-coupled suite on a firm flat horizontal or vertical surface as appropriate.
- Fill the flushing cistern to the maximum nominal water level.
- Flush the close-coupled suite and observe the connection between the WC pan and flushing cistern for any leakage during the complete flush.

A.4.3 *Outlet valve leak tightness test*

– This test is done with the flushing cistern only. In the case of a one-piece WC, the flushing cistern shall be cut from the bowl for the verification.

– Fill the flushing cistern to the water level corresponding to the nominal flush volume indicated by the manufacturer. In the case of flushing cisterns with adjustable levels, the minimum level shall be used.

– Actuate the flushing mechanism and allow the flushing cistern to fill again.

– Leave the flushing cistern for a period of 2 h.

– Wipe the outlet orifice dry.

– Place a piece of paper under the flushing cistern.

– Leave for 15 min. Observe and record any watermarks on the paper. Not more than three drops are permitted.

A.4.4 *Outlet valve reliability test*

A.4.4.1 Test apparatus

– The test apparatus comprises:

– a flushing cistern into which the outlet valve is mounted and which shall be filled through an inlet valve or an alternative filling device to accelerate the test;

– an automatic system allowing the flushing mechanism to be activated with a controlled force in the range of 25 N to 30 N and with a velocity of 5 cm/s in a period of 0.5 s to 1 s for the duration of the test. The system shall ensure that the outlet valve is fully closed before the flushing cistern is refilled;

– a water supply with a temperature of 7 °C to 25 °C.

A.4.4.2 Procedure

One cycle is carried out as follows:

– Fill the flushing cistern to the highest indicated water level indicated by the manufacturer.
– Actuate the flush operating mechanism by means of the automatic system.
– Allow the mechanism to close again.
– Refill the flushing cistern.
– In the case of single-flush mechanism, submit the cistern to 50 000 of these cycles (category I) or 200 000 of these cycles (category II).

−the case of double-control mechanisms the test is carried out:

-either: with three reduced flushes followed by a full flush for a total of 50 000 flushes (category I) or 200 000 flushes (category II);

-or: with 37 500 reduced flushes followed by 12 500 full flushes (category I) or 150 000 reduced flushes followed by 50 000 full flushes (category II).

−Record any failure or permanent distortions of the outlet valve during and at the end of the test.
−2 h after finishing of the cycles, verify the leak-tightness in accordance with 5.7.5.3.

A.4.5 *Determination of the overflow capacity*

−Measure the overflow level in accordance with Figure 2.
−Supply the flushing cistern with a flow rate of 0,28 1/s for 60 s. In the case of a combined mechanism (filling valve + flushing mechanism), supply the combined mechanism at a pressure of 0.6 MPa (6 bar) and force the inlet valve to be open for 60 s.
−Measure the maximum water level in accordance with Figure **7**.
−Shut off the water supply.
−Measure the water level 2 s after the water supply is shut-off (critical water level).
−Measure the meniscus level after stabilization in accordance with Figure **6**.

A.4.6 *Determination of dimension c*

Fill the flushing cistern using an inlet valve to the highest water level indicated by the manufacturer.

Measure dimension c representing the safety margin (see Figure **7**) between the maximum nominal water level and the overflow level.

A.4.7 *Determination of dimension a*

Determine dimension a (see Figure **7**) representing the distance between the lowest point of the inlet valve's air inlet orifice and the overflow level using the inlet valve manufacturer's marking as specified in EN 14124.

APPENDIX B
TEST METHODS FOR TYPE 2 PRODUCTS

B.1 Inlet valve tests

B.1.1 *Apparatus*

Apparatus as specified in BS 1212-2, BS 1212-3 or BS 1212-4, subject to the additional requirements specified in **6.3.2.1**. Supply pressure requirements for pressurized cisterns shall conform to the manufacturer's recommendations.

B.1.2 *Procedure*

Subject the inlet valve to the tests as specified in BS 1212-2, BS 1212-3 or BS 1212-4 as appropriate. In testing against Clause 17 of BS 1212-2:1990, BS 1212-3:1990 or BS 1212-4:2016 (modified in **6.3.2.1**) if the first inlet valve fails, four further valves shall be tested.

B.1.3 *Expression of results*

Record whether the inlet valve complied with the requirements of BS 1212-2, BS 1212-3 or BS 12124 as modified by 6.1. For the test under Clause 17 of BS 1212-2:1990, BS 1212-3:1990 or BS 12124:2016 (as modified in **6.3.2.1**), record whether the first inlet valves, or all four of the subsequent inlet valves, met the requirements.

B.2 Warning pipe and overflow provisions

B.2.1 *Apparatus*

a) Flushing system with warning pipe connection or a device deemed to be no less effective and internal overflow, if provided, installed in accordance with the manufacturer's instructions;
b) measuring device with an accuracy of ± 0.1 mm;
c) water supply controlled by a stop valve.

B.2.2 *Procedure*

Set the flushing system level. Fill with water to the nominal static water level marked by the manufacturer. Measure the distance from the water level to the warning level, i.e. the invert of a side connection warning pipe connection or the top of a bottom connection warning pipe connection. If appropriate, measure the distance from the warning level to the top of any internal overflow.

B.2.3 *Expression of results*

Record compliance or any failure to comply with the requirements of **6.3.2.4.**

B.3 ***Flush volume and water trap seal tests***

B.3.1 *Apparatus*

a) Flushing cistern, complete with fitments including flush pipe and cover, installed in accordance with the manufacturer's instructions, on a firm, flat, vertical surface;
b) measuring vessel capable of collecting the flush volume;
c) water supply controlled by a stop valve;
d) water seal depth measuring device.

B.3.2 *Procedure*

Set the dual-flush control or setting if provided, to the full-flush volume in accordance with the manufacturer's instructions. Connect the water supply to the flushing cistern and fill to the marked water line. Operate the flushing mechanism three times, completing three flushing cycles. Fill the cistern to the water line. Shut off the water supply, unless essential for the normal operation of the flushing device.

Where a water supply is essential for the normal operation of the device, the supply should be maintained at a hydraulic pressure of (0.15 ± 0.01) MPa or the minimum required to operate the device, whichever is the greater.

Operate the flushing device and collect the water in the measuring vessel. Record the volume of water collected. Repeat the procedure a further four times.

Record the water trap seal depth on two occasions at random by measuring the height from the invert of the trappage back plate to the surface of the water.

Reset the dual-flush control or setting, if provided, to the reduced-flush volume and repeat the procedure 5 times.

B.3.3 *Expression of results*

Measure the volume of water collected in the measuring vessel after each flush cycle and record any compliance or failure so as to comply with the requirements of **6.3.2.5.** Also, record any failure of the trap seal depth to conform to the requirements of **6.3.2.13.**

B.4 Flush rate test

B.4.1 *Apparatus*

a) Flushing cistern, complete with fitments including flush pipe and cover, installed in accordance with the manufacturer's instructions on a firm, flat, vertical surface;
b) calibrated measuring container;
c) fluid level sensing devices;
d) electronic timer;
e) water supply controlled by a stop valve;
f) power supply.
B.4.2 *Procedure*

Set the dual-flush controller or setting, if provided, to the full-flush volume in accordance with the manufacturer's instructions. Connect the water supply to the flushing cistern and fill to the marked water line. Shut off the water supply, unless essential for the normal operation of the flushing device.

Where a water supply is essential for the normal operation of the device, the supply should be maintained at a hydraulic pressure of (0.15 ± 0.01) MPa or the minimum required to operate the device, whichever is the greater.

Operate the flushing device completing one flushing cycle. On completion of the flush, using the calibrated measuring container, add 0.5 1 of water to the cistern. Locate and position a fluid sensing device at the water level in the cistern. Using the calibrated measuring container add further water to the cistern equivalent to the volume of full-flush recorded in **B.3.3** less 1.0 1. Locate and position a second fluid sensing device at the water level in the cistern. Add further water to the cistern up to the marked water level for the full-flush volume. Connect the two fluid level sensing devices to the electronic timer and connect to the power supply. Operate the flushing device and on completion of the flush record the time taken to discharge the volume of water between the fluid level sensing devices as displayed on the timer. Repeat the procedure a further four times.

If the flushing device is provided with a reduced flush facility, shut off the water and power supplies and operate the flushing mechanism. Using the calibrated container, add to the cistern a volume of water equivalent to the difference between the full-flush volume and reduced-flush volume as recorded in **B.3.3**. Add a further 0.5 1. Locate and position a fluid level sensing device at the water level in the cistern. Using the calibrated measuring container add further water to the cistern until it is filled to a volume equivalent to the volume of full-flush recorded in **B.3** less 1.0 1. Locate and position a second fluid sensing device at this water level in the cistern. Add further water to the cistern, up to the marked water level for the full flush volume recorded in **B.3**. Turn on the power supply. Set the dual-flush controller or setting to the reduced-flush volume in accordance with the manufacturer's instructions. Operate the flushing device and on completion of the flush record the time taken to discharge the volume of water between the fluid level sensing devices as displayed on the timer. Repeat the procedure a further four times.

B.4.3 ***Expression of results***

From the five recorded times, at each flush volume, determine the average time and, using the following formula, calculate the mean rate of discharge using the following methods.

For the full-flush

$$\frac{\text{Volume of discharge per full flush in litres (recorded in } \mathbf{B.3}\text{) - 1.0 } l}{\text{Average time in seconds (recorded in } \mathbf{B.4}\text{)}}$$

For the reduced-flush

$$\frac{\text{Volume of discharge per reduced flush in litres (recorded in } \mathbf{B.3}) - 1.5l}{\text{Average time in seconds (recorded in } \mathbf{B.4})}$$

B.5 Physical endurance and leakage test of flushing device

B.5.1 *Apparatus*

a) Cistern, complete with fitments including flushing device, flush pipe and cover, installed in accordance with the manufacturer's instructions;
b) means of operating the flushing limiter activator automatically in accordance with the manufacturer's instructions;
c) a water supply maintained at a hydraulic pressure of (0.15 ± 0.01) MPa, or the minimum pressure required to operate the flushing device whichever is the greater; having maintained water hardness not greater than the range (230 ± 20) ppm as calcium carbonate during the course of the test;
d)paper of a type which changes colour when wet.

B.5.2 *Procedure*

Connect the water supply. For a single flush flushing device operate the flushing device and, if appropriate, allow the flushing cistern to refill. Carry out the long-term leak test. Three drops or more observed on the paper shall be considered a leak. Initiate automatic operation of the flushing device. Carry out the short-term leak test and inspect the flushing device after a further 2, 5, 10, 50, 100, 500, 1 000, 10 000 and every subsequent 10 000 cycles. If a leak is detected, the leak test interval, but not the test itself, shall restart (e.g. the short-term leak test shall be undertaken after a further 1, 2, 5, 10...cycles). Continue until 200 000 test cycles have been completed, and then subject the flushing device to the long-term leak test. If, at any point during the test, three leaks have been detected, the test terminates and four further flushing devices shall be subjected to the same test, which again terminates if three leaks have been detected for any one of the flushing devices.

For flushing devices with reduced flush option, operate the flushing device for a full-flush and, if appropriate allow the cistern to refill. Carry out the long-term leak test. Three drops or more observed on the paper shall be considered a leak. The test then continues with the sequence three reduced o flushes activated followed by a maximum flush. The flushing device shall be subject to the short-term leak test after 2, 5, 10, 50, 100, 500, 1 000, 10 000 and every subsequent 10 000 flushes (maximum and reduced flushes each counting as one flush). If a leak is detected, the leak test interval, but not the test itself, shall restart (e.g. the short-term leak test shall be undertaken after a further 1, 2, 5, 10...cycles). Continue until 200 000 test cycles have been completed, and then subject the flushing device to the long-term leak test. If at any point during the test, three leaks have been detected, the test terminates and four further flushing devices shall be subjected

to the same test, which again terminates if three leaks have been detected for any one of the flushing devices.

The flushing device shall be inspected for wear at the same frequency as the short-term leak test. If the flushing device or any of its operating linkages suffers structural failure that affects operation, the test terminates.

B.5.3 *Expression of results*

Record compliance, or any failure to comply, with the requirements of **6.3.2.7**.

NOTE:*200 000 cycles = category II flush limiter.*

B.6 Chemical endurance test of flushing device

B.6.1 ***Apparatus***

a) weighing scales having a resolution of 0.1 g and an accuracy of ± 0.05 g;
b) micrometer having a resolution of 0.1 mm and an accuracy of ± 0.05 mm;
c) test solution (100 ml of domestic chlorine-based bleaching agent, consisting of up to 5 % sodium hypochlorite (NaClO) and anionic surfactants to every 900 ml of water);
d) container.

B.6.2 ***Procedure***

Dismantle the flushing device and weigh all seals, plungers, pistons or other components that initiate and stop water discharge and measure and record the principle dimensions; e.g. external diameter and thickness. Reassemble the components and place the complete assembly in the container filled with test solution. Ensure that the assembly is covered by at least 100 mm depth of test solution. Leave for a period of (90 ±2) d. Remove from the test solution and rinse under clean water.

WARNING — Appropriate precautions should be taken when using chlorine based agents. Do not touch raw crystals or the stock solution, or allow these to come into contact with clothing or easily combustible materials.

Subject the flushing limiter to a 3 000 cycle endurance test using the long term leak test after the first and last cycles, and check for leaks.

B.6.3 ***Expression of results***

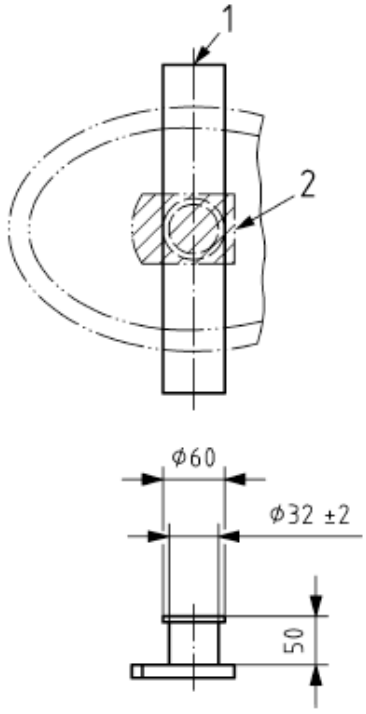
Record compliance, or any failure to comply with the requirements of **6.3.2.8**.

B.7 Solids discharge and after-flush volume for maximum flush volume test

B.7.1 ***Apparatus***

a) WC pan with associated flushing cistern and/or flushing device, or a close-coupled/one-piece suite, installed in accordance with the manufacturer's instructions on a firm, flat horizontal/vertical surface, as appropriate. The flushing device shall satisfy the requirements of this specification.

b) four test specimens prepared in accordance with Appendix **AE**;
c) measuring vessel;
d) electronic test rig with sensor for measuring the volume of water discharged after the last test specimen (b) has been discharged from the WC
(A suitable test rig is described in AS 1172.1);
e) container capable of collecting test specimens and discharge volume;
f) timing device having an accuracy of ± 0.05 s;
g) directing device (see Figure **B.1**);
h) water supply.



Key
1 Position directional device over normal outlet bore of water seal
2 Surface of water seal

FIGURE B.1 — Directing device

B.7.2 ***Procedure***

Set the dual-flush controller or setting if provided to the full-flush volume in accordance with the manufacturer's instructions. Fill any flushing cistern to the marked water level. Shut off the water supply, unless essential for the normal operation of the flushing device.
Where a water supply is essential for the normal operation of the device, maintain the supply at a hydraulic pressure of (0.15 ± 0.01) MPa or the minimum required to operate the device, whichever is the greater.
Operate the flushing device and measure the total flush volume. Using the direction device in Figure **B.1,** drop the four test specimens into the WC pan. Operate the flushing device to evacuate the test specimens and record the trailing volume. Repeat the procedure a further 5 or 9 times as appropriate (see **6.3.2.9**)

B.7.3 ***Expression of results***
Record compliance, or any failure to comply with the requirements of **6.3.2.9.**

B.8 Paper discharge for reduced-flush volume test
B.8.1 ***Apparatus***
a) WC pan with associated flushing cistern or flush valve, or a close-coupled/one-piece suite, installed in accordance with the manufacturer's instructions on a firm, flat horizontal/vertical surface as appropriate. The flushing device and cistern shall satisfy the requirements of this specification.
b) sheets of toilet tissue with a saturation time of (15 ± 10) s as verified by annex D, having an approximate size of 140 mm x 100 mm, and a mass per unit surface of (30 ± 10) g/m2;
c) water supply maintained at a hydraulic pressure of (0.15 ± 0.01) MPa or the minimum required to operate the flushing device, whichever is the greater.

B.8.2 *Procedure*
Fill any flushing cistern in accordance with the manufacturer's instructions. Operate the flushing mechanism twice, completing two flush cycles. Set the dual-flush control or setting to the reduced-flush volume in accordance with the manufacturer's instruction. Loosely crumple six individual sheets of toilet tissue and drop them separately into the WC pan within a period 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 any paper not flushed out of the bowl and the trap, and remove, if necessary. Repeat the procedure a further 5 (9) times as appropriate (see **6.3.2.10**).

B.8.3 *Expression of results*
Record compliance or failure to comply with the requirements of **6.3.2.10**.

B.9 Liquid contaminant dye retention test

B.9.1 *Apparatus*
a) WC pan with associated flushing cistern and/or flushing device, or a close-coupled/one-piece suite, all meeting the appropriate requirements of this standard, installed in accordance with the manufacturer's instructions on a firm, flat horizontal/vertical surface as appropriate. The flushing device and cistern shall satisfy the requirements of this specification;
b) liquid contaminant dye (5 g/l potassium permanganate (KMnO4)); WARNING — Potassium permanganate is an oxidant and appropriate precautions should be taken when preparing the solution.
c) calibrated spectrophotometer with prepared glass cuvettes;
d) fluid suction device;
e) water supply

B.9.2 *Procedure*
Set the dual-flush control or setting, if provided, to the full-flush volume in accordance with the manufacturer's instruction. Fill any cistern to the marked water level suitable for the WC pan. Shut off the water supply, unless essential for the normal operation of the flushing device.

NOTE: *Where a water supply is essential for the normal operation of the flushing device, maintain the supply at a hydraulic pressure of (0.15 ± 0.01) MPa or the minimum required to operate the device, whichever is the greater.*
Using the fluid suction device, remove any water from the WC's trap. Fill the WC's trap with liquid contaminant dye to the trap seal depth. Operate the flushing device. On completion of the flush, place a sample of the liquid remaining in the trap in the spectrophotometer cuvette. Measure and record the concentration of potassium permanganate in the sample. Repeat the procedure a further 4 (9) times as appropriate (see **6.3.2.11).**
Reset the dual-flush control or setting, if provided, to reduced-flush volume and repeat the procedure 5 (10) times as appropriate **(6.11**).

B.9.3 *Expression of results*
Record compliance or failure to comply with the requirements of **6.3.2.11**.

B.10 Wash of bowl

B.10.1 *Apparatus*
a) WC pan with associated flushing cistern and/or flushing device, or a close-coupled/one-piece suite, all meeting the appropriate requirements of this standard, installed in accordance with the manufacturer's instructions on a firm, flat horizontal/vertical surface as appropriate. The flushing device shall satisfy the requirements of this specification;

b) supply of fine dry wooden sawdust;
c) 2 mm sieve;
d) water supply.

B.10.2 *Procedure*
Set the dual-flush control or setting, if provided, to full-flush volume in accordance with the manufacturer's instruction. Fill any cistern to the marked water level. Shut off the water supply, unless essential for the normal operation of the flushing device.
Where a water supply is essential for the normal operation of the flushing device, the supply should be maintained at a hydraulic pressure of (0.15 ± 0.01) MPa or the minimum required to operate the device, whichever is the greater.
Moisten the complete inner surface of the WC pan below the flushing rim and above the water in the trap. Immediately afterwards, sprinkle 20 g of sieved sawdust as completely and evenly as possible over the moistened surface. Operate the flushing device and record any area of unflushed surface.
Repeat the procedure a further four times.

B.10.3 *Expression of results*
On completion of the five test procedures calculate the arithmetic average of the unflushed area between the water level in the trap and the underside of the rim. Record compliance or any failure to comply with the requirements of **6.3.2.12.**

B.11 Summary of requirements for compatibility testing of class 2 products

This clause provides further background notes on the testing and compatibility of elements of the WC suite for the purposes of this specification.

The expectation of clauses **6.3.2.1** to **6.3.2.16** and Appendix **B** is that any element of a WC suite offered for sale independently should enable other associated elements to meet the performance characteristics of class 2 of this specification when combined to form a WC suite. Nonetheless, it is clearly unreasonable for the manufacturer of an independent component of a suite to ensure that the product would satisfy the requirements, if installed with every other available other part that could make up a WC suite. Therefore, manufacturers need to complete those tests relevant to their product and ensure that when installed as part of a whole WC suite their product would be capable of fulfilling the complete set of tests. The whosoever selects the components to form a WC suite should ensure that they form a compliant suite which satisfies the all the tests in this specification.

Inlet valves shall satisfy BS 1212 as modified in **6.3.2.1.**

Flushing devices shall satisfy the requirements with regard to physical and chemical endurance. They shall also be capable of satisfying the flush volume test at full and, if appropriate, reduced-flush volumes. They should also be capable of contributing towards the other requirements when tested in combination.

Cisterns shall consist of compliant components and so satisfy warning pipe and overflow provisions and the flush volume test. They should also be capable of contributing towards the other requirements when tested in combination.

WC pans shall, for their intended flush volume, satisfy the requirements regarding solid and paper discharge, after flush volume, liquid dye contaminant retention, wash of bowl and trap seal depth.

The whole WC suite shall comprise of fully compliant components which, when installed together, satisfy all the tests. This shall include a cistern suitably marked for the intended full and, if appropriate, reduced flush volume of the WC pan.

It should be noted that when undertaking tests involving more than one component of a WC suite, components which could adversely affect the results of the whole test should not be changed without re-starting that test.

APPENDIX C
SPECIFICATION FOR STAINLESS STEEL

C.1 General

Stainless steel shall be Grade 304L, 321 or 316L stainless steel sheet complying with ASTM A240M.

C.2 Thickness

The thickness of stainless steel sheet for pans shall be not less than 1.2 mm.

C.3 Surface finish (internal and external)

Stainless steel shall be polished to at least a satin finish as a minimum.

C.4 Construction

Where welding is employed, the welding materials shall be compatible with the material to be welded. Welds shall be free of cracks and pits, and shall be ground and polished internally and externally. Any joins shall be made so that their strength is not less than that of the parent material and shall be free from crevices and folds.

APPENDIX D

SAMPLING AND CRITERIA FOR CONFORMITY

Samples shall be drawn from each lot as per the sampling scheme and shall be tested separately for ascertaining the conformity of the lot to the requirements of this specification.

D.1 Scale of Sampling

D.1.1 The number of appliances to be selected from the lot shall be in accordance with column **2** of Table **D1.** The appliances shall be selected at random. In order to ensure randomness of selection, random number tables as given in **SLS 428** shall be used.

TABLE D1 – Scale of sampling

Number of appliances in a lot (1)	Number of appliances to be selected (2)	Permissible number of defects (3)
Up to15	3	0
16 to 25	5	0
26 to 50	8	0
51 to 90	13	0
91 to 150	20	1
151 to 280	32	1
281 to 500	50	2
501 and above	80	3

NOTE
*The Table **D1** was prepared in accordance with **ISO 2859-1:1999**, General inspection level II AQL=1.5%.*

D.1.2 When the tests are required to be performed on regulatory requirement/s, the additional sub sample/s of size/s given in test method/s specified by the relevant regulation/s shall be selected as appropriate, in addition to the samples selected as per **D.1.1**.

D.2 NUMBER OF TESTS

The number of samples of close-coupled suites, one-piece and independent WC pans with integral trap to be tested/assessed shall be in accordance with **D.2.1 and/or D.2.2**

D.2.1 The number of samples for type 1 products

Each Appliance selected as in **D.1.1** shall be inspected for following *Functional* requirements as appropriate;

D.2.1.1 Depth of water seal **(***see* **6.3.1.1),**
D.2.1.2 Wash of bowl **(***see* **6.3.1.2.2),**
D.2.1.3 Flushing toilet paper**(***see* **6.3.1.2.3**)
D.2.1.4 Flushing of 50 plastic balls *(see **6.3.1.2.4)***
D.2.1.5 Over splashing*(see **6.3.1.2.5***)
D.2.1.6 After-flush volume*(see **6.3.1.2.6***)
D.2.1.7 Static load*(see* **6.3.1.3*)***
D.2.1.8 Flush volume(s) for flushing cisterns of suites *(see* **6.3.1.5.4*)***
D.2.1.9 Leak tightness between cistern and bowl*(see **6.3.1.5.5***)
D.2.1.10 Outlet valve leak tightness*(see **6.3.1.5.6)***
D.2.1.11 Outlet valve reliability*(see* **6.3.1.5.7**)
D.2.1.12 Overflow*(see **6.3.1.5.8)***
D.2.1.13 Safety margin — dimension *"c" (see* **6.3.1.5.9*)***
D.2.1.14 Safety margin - dimension *"a" (see **6.3.1.5.10)***
(*"a" Where* an outlet valve is used in several cisterns, the outlet valve need only be tested once unless there are design changes.)
D.2.1.15 Dangerous substances *(see **6.4)***

D.2.1.16 Marking requirements *(see **7)***

D.2.2 The number of samples for type 2 products

Each Appliance selected as in **D.1.1** shall be inspected for following *Functional* requirements as appropriate;

D.2.2 The number of samples for type 2 products

Each Appliance selected as in **D.1.1** shall be inspected for following *Functional* requirements as appropriate;

D.2.2.1 Inlet valve*(see* **6.3.2.1)**
D.2.2.2 Backflow prevention *(see* **6.3.2.2)**
D.2.2.3 Flushing cistern marking *(see* **6.3.2.3)**
D.2.2.4 Warning pipe and overflow provision *(see* **6.3.2.4)**
D.2.2.5 Flush volume*(see* **6.3.2.5)**
D.2.2.6 Flush rate*(see* **6.3.2.6)**
D.2.2.7 Flushing device: Physical endurance and leakage *(see* **6.3.2.7)**

D.2.2.8 Flushing device: Chemical endurance *(see* **6.3.2.8)**
D.2.2.9 Solids discharge and after flush volume for maximum flush *(see* **6.3.2.9)**
D.2.2.10 Paper discharge for reduced volume*(see* **6.3.2.10)**
D.2.2.11 Liquid contaminant dye retention*(see* **6.3.2.11)**
D.2.2.12 Wash of bowl*(see***6.3.2.12)**
D.2.2.13 Water seal depth *(see***6.3.2.13)**
D.2.2.14 Static load *(see* **6.3.2.14)**
D.2.2.15 Dangerous substances *(see* **6.4)**

D.3 Criteria for Conformity

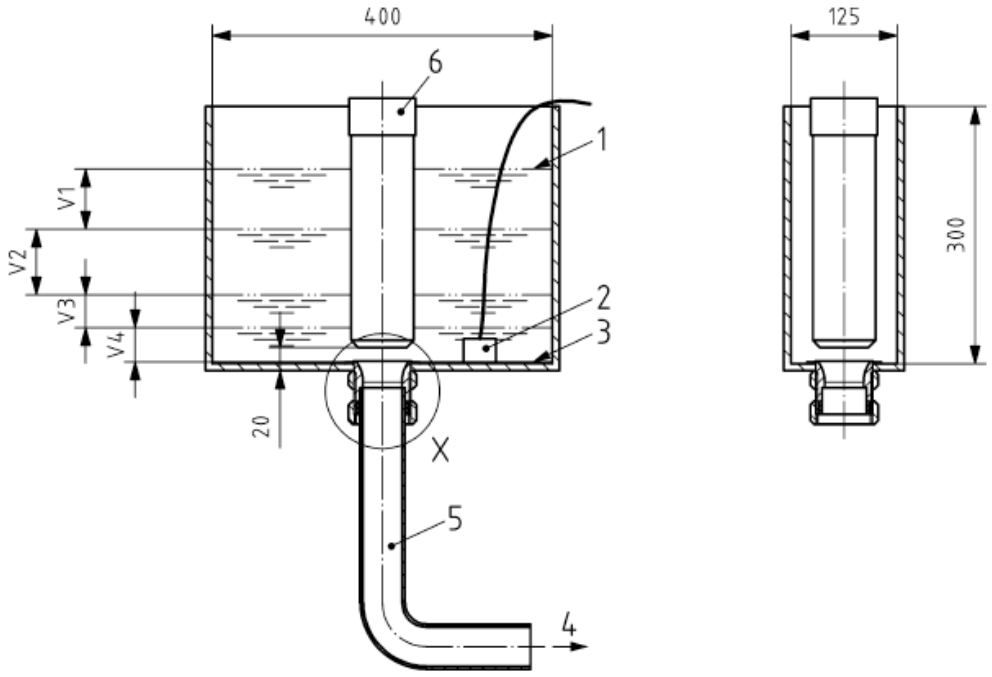
D.3.1 A lot shall be declared as conforming to the requirements of this standard, if the conditions given below are satisfied.

D.3.1.1 When the tiles inspected in accordance with **D.2.1** and/or **D.2.2**, number of defectives conform to the corresponding acceptance number given in column **3** of Table **D1**.

APPENDIX AA
(normative)
VALVE-TYPE TEST FLUSHING CISTERN

AA.1 Valve-type test flushing cistern (Figures AA.1 to AA.3)

Dimensions in millimeters



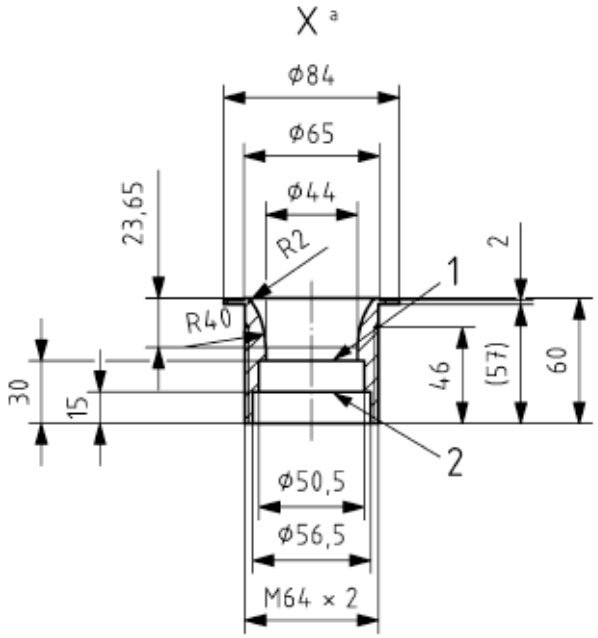
Key

1. water level for the total test volume
2. pressure sensor (pick-off), see **NOTE 1**
3. residual water
4. flow rate and impact force in accordance with Table **AA.1,** related to the nominal flushing volume 6 1
5. flush pipe in accordance with Figure **AA.3**
6. outlet valve of the test flushing cistern, for examples see Appendix **AF** (Figures **AF.1**, **AF.2**, **AF.3** and **AF.4**)

V1 starting volume (see Table **AA.2**)
V2 measuring volume (see Table **AA.2**)
V3 finishing volume (see Table **AA.2**)
V4 residual volume (see Table **AA.2**)
Test flush volume V1 + V2 + V3
Total test flush volume V1 + V2 + V3 + V4

FIGURE AA.1 — Valve-type test flushing cistern

Dimensions in millimetres



Key
1 bedstop for flush pipe with 50 mm diameter
2 bedstop for flush pipe with 56 mm diameter

FIGURE AA.2 — Detail X

The flush pipe shall be mounted at the bedstop fixed by the screw connection.
NOTE 1:
The *measurement with an upper and lower water level sensor connected to a level control unit and an electronic timer instead of the pressure sensor (2) is possible.*

Dimensions in millimetres

Key

1 flush pipe “type B” for floor standing WC’s, for examples see **Appendix AF**, (Figures **AF.**1, **AF.2, AF.3** and **AF.4**)

2 flush pipe “type C” for wall mounted WC’s, for examples see **Appendix AF**, (Figures **AF.**1, **AF.2, AF.3** and **AF.4**)

FIGURE AA.3 — Flush pipes for valve-type test flushing cistern

AA.2 Calibration of the valve-type test flushing cistern

Use the procedure to test the flush rate, detailed in **AA.3**, with a total test flush volume of 6 l to calibrate the test flushing cistern and the procedure to measure the impact force, detailed in **AA.5**, to verify the impact force. Adjust the flush pipe(s) to achieve the flush rate(s) in accordance with Table **AA.1**. This is usually achieved by cutting the flush pipe.

TABLE AA.1 — Correlation between independent WC sub-type and flush pipe to be used

WC pan sub-type	Intended to be equipped with type of flushing cistern	Description of the flush pipe	Flush rate	Impact force from	
				0.35 s to 0.5 s after start of the signal	maximum method
			l/s	N	N
Pedestal	Wall-hung low-level	Flush pipe “type B”	2.3 ± 0.1	—	—
Back-to-wall	Built-in	Flush pipe “type C”	2.1 ± 0.1	3.8 ± 0.1	4.0 ± 0.1
Wall-hung	Built-in	Flush pipe “type C”	2.1 ± 0.1	3.8 ± 0.1	4.0 ± 0.1

TABLE AA.2 — Test volumes of the test flushing cistern

Nominal flush volume	Total test flush volume	Starting volume V1	Measuring volume V2	Finishing volume V3	Residual volume V4
l	l	l	l	l	l
9	9	—	—	—	0
7	7	—	—	—	0
6 [a]	6	1	3	2	0
[a] for nominal flushing volumes less than 6 l, use the total test flush volume of 6 l, decrease the finishing volume (V3) and increase the residual volume (V4) accordingly. In this case the test flushing cistern can be equipped with a closing unit at the outlet valve. Other equipment, e.g. limitation ring, is permissible.					

AA.3 Procedure to test the flush rate of the test flushing cistern

Use a calibrated container for all water to be added.

1. Fix the applicable flush pipe to the bedstop of the test flushing cistern (see Table **AA.1**).
2. Fix the pressure sensor at the bottom of the test flushing cistern.
3. Connect the pressure sensor to a measuring device (e.g. an oscilloscope).
4. Fill the test flushing cistern to the total test flush volume in accordance with Table **AA.2** and mark this.
5. Flush the test flushing cistern.
6. Add V3 l water to the residual water and document the voltage of the pressure sensor for this water level.
7. Add V2 l water and document the voltage of the pressure sensor for this water level.
8. Add V1 l water to reach the total test volume.
9. Flush the test flushing cistern and use the oscilloscope to record the pressure decline during the flush.
10. Determine the time t between the voltages of point 6 and 7 of the procedure.
11. Calculate the flow rate by V2/t.
12. The required flush rate according to Table **AA.1** is verified by the arithmetic average of five flushing operations.
13. The outlet valve shall be closed in such a way, that the relevant nominal flush volume is submitted.

AA.4 Procedure to test the flushing requirements of the WC

a) Fix the applicable flush pipe to the bedstop of a calibrated test flushing cistern and connect the WC to be tested with a flush pipe according Table **AA.1**.

b) Fill the flushing cistern to the total test volume in accordance with Table **AA.2**. In case of nominal flushing volumes less than 6 l, use the total test flush volume of 6 l and increase the residual volume (V4) accordingly.
c) Flush the flushing cistern for executing the flush test.

AA.5 Procedure to measure the impact force of the test flushing cistern

AA.5.1 General

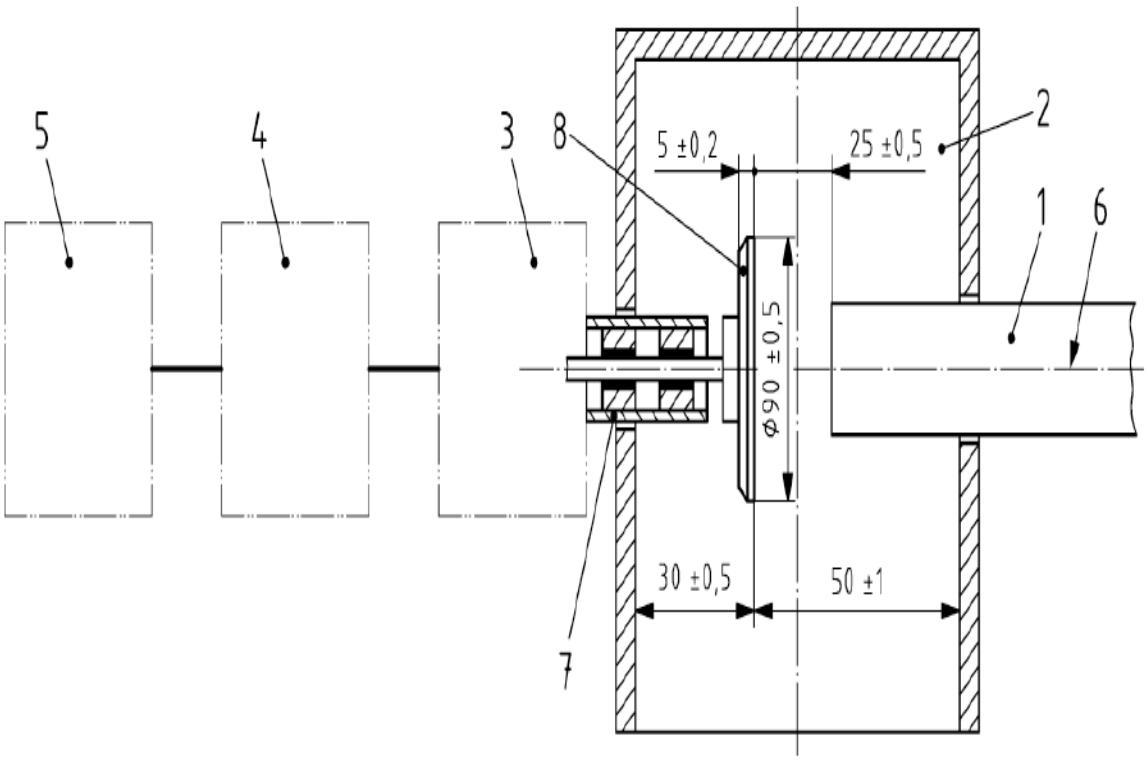
The impact force of the test flushing cistern complete with the flush pipe in accordance with Table **AA.1** shall be measured with the test device shown in Figure **AA.4**. The flushing water from the flush pipe shall be directed against the sensor plate (90 mm diameter) to create an impact force. This impact force shall be measured with a load cell and expressed in Newton.
The test procedure consists of the measurement procedure and the calculation procedure using calibrated test equipment.

AA.5.2 Test device

The test device shall meet the following requirements:

— The test device shall be in accordance with Figures **AA.4** and **AA.5.**
— The centre axis of the flush pipe shall be in line with the centre axis of the sensor plate.
— The mechanical connection between the sensor plate and the load cell shall be suitable for the correct function of the load cell. It is recommended to have short distances to the load cell and sufficient adequate bearings.
— The load cell shall have an accuracy of 0,2 g (C3 (OIML)) and a load capacity of 3 kg regardless of the mounting position.
— Measurement amplifier and load cell shall form one system.
— The measurement amplifier shall work with a sampling frequency of 600 Hz and a 100 Hz Bessel filter.
— The system (consisting of the measurement amplifier and load cell) shall have a tare function.
— The water used for the test shall have a temperature between 7 °C and 25 °C.

Dimensions in millimetres

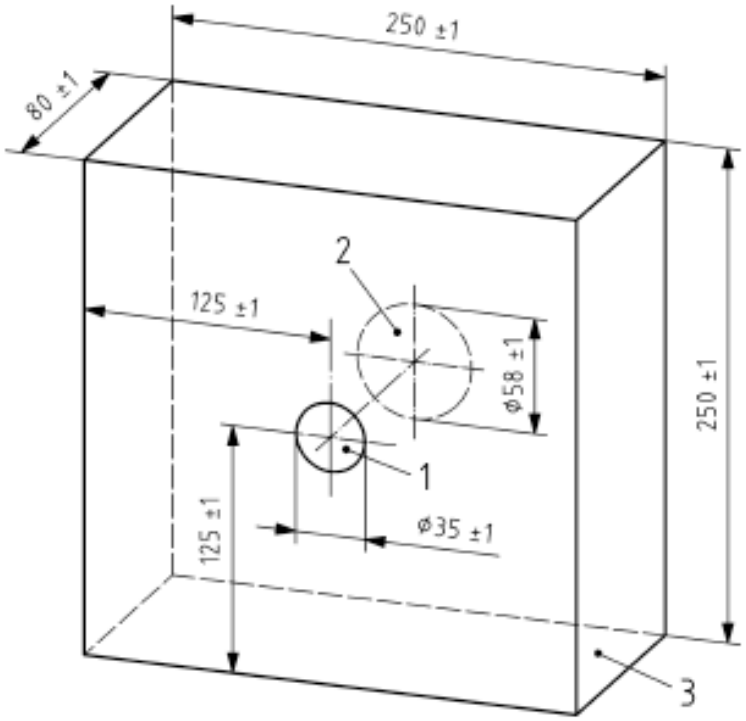


Key

1.flush pipe of the flushing cistern
2.splash guard (for details see Figure **AA.5**)
3.load cell unit
4.measurement amplifier for data acquisition
5.computer for recording and evaluating the measurement data (with suitable software)
6.the centre axis of the flush pipe
7.the mechanical connection between the sensor plate and the load cell
8.sensor plate

FIGURE AA.4 — Test device to measure the impact force

Dimensions in millimetres



Key

1. hole diameter: (35 ± 1) mm for fixing the sensor plate including the mechanical connection to the load cell to the front of the splash guard
2. hole diameter: (58 ± 1) mm for fixing the flush pipe (position 1 of Figure **AA.4**) to the back of the splash guard
3. wall thickness minimum 5 mm

Dimensions shown are internal dimensions

FIGURE AA.5 — Splash guard

It is not permissible to use other test equipment than the one shown in Figure **AA.4.**

AA.5.3 Procedure for calibrating the load cell unit and the measurement amplifier

The test device (see Figure **AA.4** except position 1) with all its components assembled shall be calibrated in its testing position with a force of 4 N.

AA.5.4 Measurement procedure

1. Check and record the correct horizontal alignment of the flush pipe and the vertical alignment of the flushing cistern (see position 6 of Figure **AA.4**).
2. Record the water temperature.
3. Set the load cell unit and the measurement amplifier to zero by using the tare function of the system.
4. Start the recording of the impact force measurement values with a resolution of 600 Hz.
5. Activate the flushing device for full flush with an activating speed of 14 cm/s. In the case of non-manually (e.g. electronic) activated outlet valve, the activating speed is not applicable.
6. Stop the recording of the measurement data after the complete flush.
7. Export the measurement data (time and force) into a table calculation file and store the data.
8. Repeat the procedure 3) to 6) a further 9 times (10 measurements).

AA.5.5 Calculation procedure for fixed time frame 0.35 s to 0.5 s

1) Open the recorded measurement data.
2) Set the time point zero of the flush where the force signal exceeds 0,5 N for the first time and number this point with 1.
3) Number the data sets to point 299 beginning with the time point zero.
4) Calculate the average of the 90 force values from point 210 (0.35 s) to point 299 (0.5 s).
5) Record average of the 90 force values as the impact force of this measurement.
6) Evaluate the impact force for each test by repeating the procedure 1) to 5) a further 9 times.
7) Calculate the average of the 10 measurements of 6) to two decimal places the result of which is the impact force of the flushing cistern.
8) Record the impact force of the flushing cistern.

AA.5.6 Calculation procedure for maximum impact force

1) Open the recorded measurement data.
2) Set the time point zero of the flush were the force signal exceeds 0.5 N for the first time and number this point with 1.
3) Determine the arithmetic average value of each of the possible 60 consecutive measuring values.

EXAMPLE

$$\overline{F_1} = \frac{1}{60}\sum_{i=1}^{60} F_1$$

$$\overline{F_2} = \frac{1}{60}\sum_{i=2}^{61} F_1$$

$$\overline{F_3} = \frac{1}{60}\sum_{i=3}^{62} F_1$$

where

$\overline{F_1}$ is the arithmetic mean of the impact force calculated out of the measurement point 1 to 60, in N;

$\overline{F_2}$ is the arithmetic mean of the impact force calculated out of the measurement point 2 to 61, in N;

$\overline{F_3}$ is the arithmetic mean of the impact force calculated out of the measurement point 3 to 62, in N;

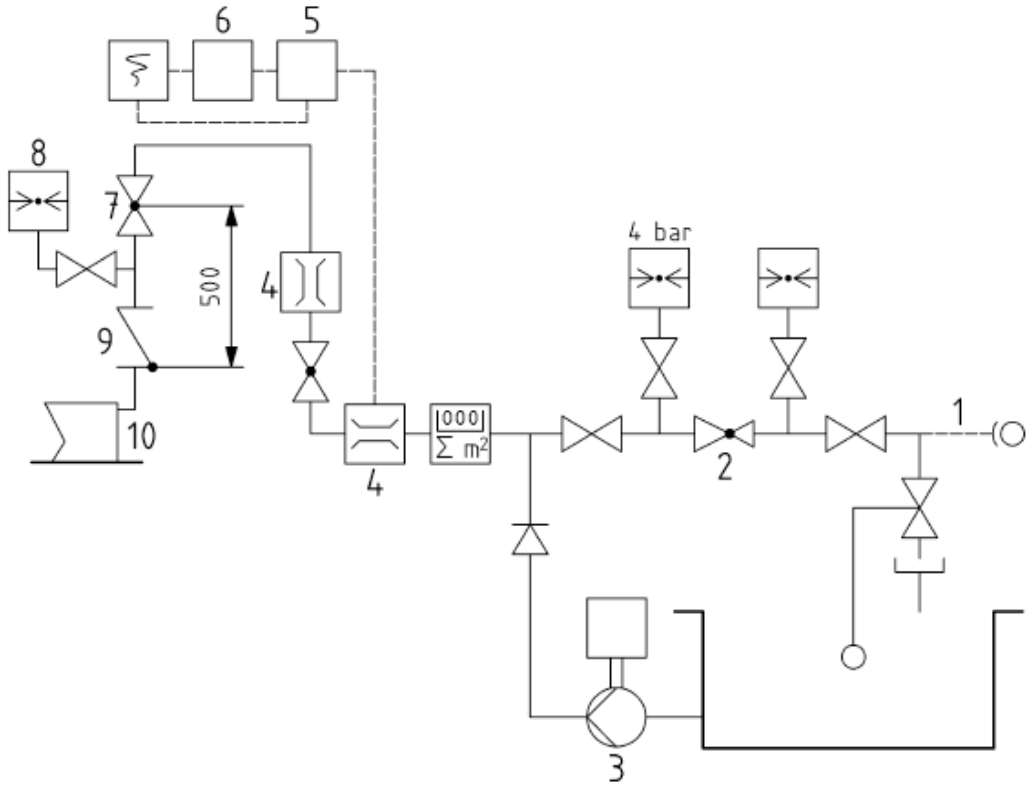
F_1 is the specific impact force of a measuring point, in N.

4) The impact force of this measurement is the maximum of all the average values.
5) Record the impact force of this measurement.
6) Evaluate the impact force for each measurement by repeating the procedure 1) to 5) a further 9 times.
7) Calculate the average of the 10 measurements of 6) to two decimal places the result of which is the maximum impact force of the flushing cistern.
8) Record the impact force of the flushing cistern.

APPENDIX AB
(normative)
TEST RIG FOR TEST PRESSURE FLUSH VALVE

AB.1 Test rig (Figure AB.1)

Dimensions in millimetres



Key

1 main water supply	6 integrating/differentiating instrument
2 pressure regulator	7 control valve
3 centrifugal-pump with frequency meter	8 pressure gauge
4 flow meter	9 test pressure flushing valve (Figure B.2)
5 amplifier	10 flush pipe

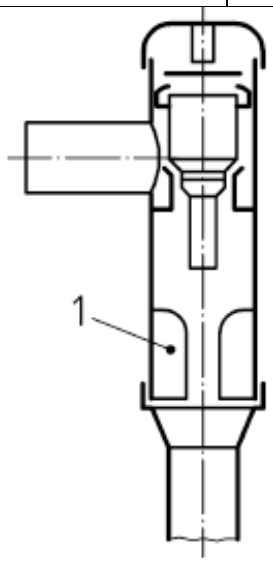
Main supply (1) or tank with pump (3) are alternatives.

FIGURE AB.1 — Test rig

The test pressure flush valve shall deliver the hydraulic values specified in Table **AB.1.**

TABLE AB.1 — Test pressure flush valve

Flush volume l	Flush rate l/s	Impact force measured at the end of the flush pipe N
$5\,^{0}_{-0.1}$	$5\,^{+0.05}_{0}$	5.0 ± 0.2
$6\,^{0}_{-0.1}$	$5\,^{+0.05}_{0}$	5.0 ± 0.2
$7\,^{0}_{-0.1}$	$1.15\,^{+0.05}_{0}$	6.5 ± 0.2
$9\,^{0}_{-0.1}$	$1.15\,^{+0.05}_{0}$	6.5 ± 0.2



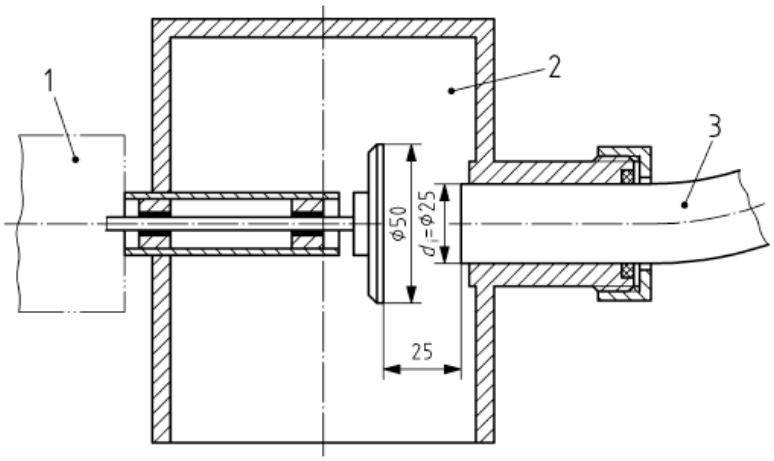
Key
1 air inlets

FIGURE AB.2 — Test pressure flush valve

AB.2 Procedure to measure the impact force.

The impact force in newtons (N) of a pressure flush valve complete with the flush pipe shall be measured with the test device shown in Figure **AB.3**. The flushing water from the flush pipe shall be directed against the disc (50 mm diameter) to create an impact force. This impact force shall be measured with a load cell and expressed in newtons (N).

Dimensions in millimetres



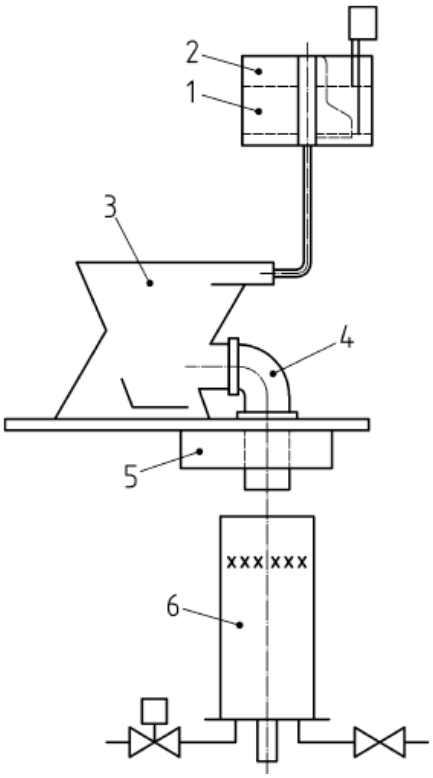
Key
1 load cell
2 measuring box
3 flush pipe

FIGURE AB.3 — Test device to measure the impact force

APPENDIX AC
(normative)

TEST RIG FOR AFTER-FLUSH VOLUME TEST

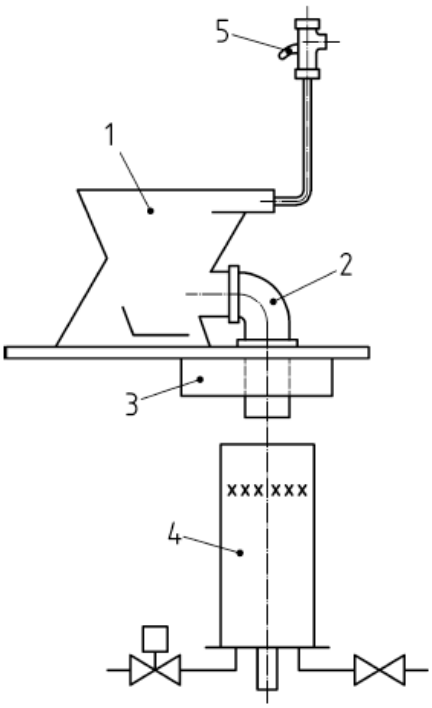
AC.1 Test rig for after-flush volume test for independent WC pans (Figures AC.1 and AC.2)



Key

1 test flushing cistern in accordance with Annex A
2 outlet device of test flushing cistern
3 WC pan to be tested
4 discharge bend (if needed)
5 sensor

FIGURE AC.1 — Test rig for independent WC pan and flushing cistern

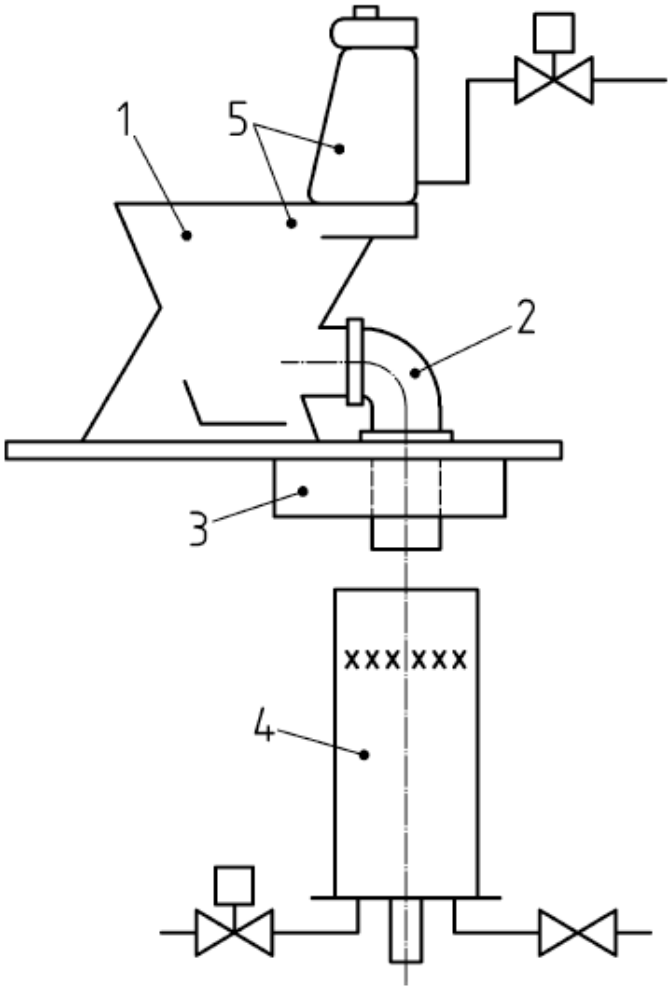


Key

1 WC pan to be tested
2 discharge bend (if needed)
3 sensor
4 measuring vessel
5 test pressure flush valve in accordance with Appendix **AB**

FIGURE AC.2 — Test rig for independent WC pan and pressure flush valve

AC.2 Test rig for after-flush volume test for one-piece WC pans, close-coupled suites and WC suites (Figure AC.3)



Key
1 WC pan to be tested
2 discharge bend (if needed)
3 sensor
4 measuring vessel
5 one-piece WC pan, close-coupled suite or WC suite

FIGURE AC.3 — Test rig for one-piece WC pans, close-coupled suites and WC suites

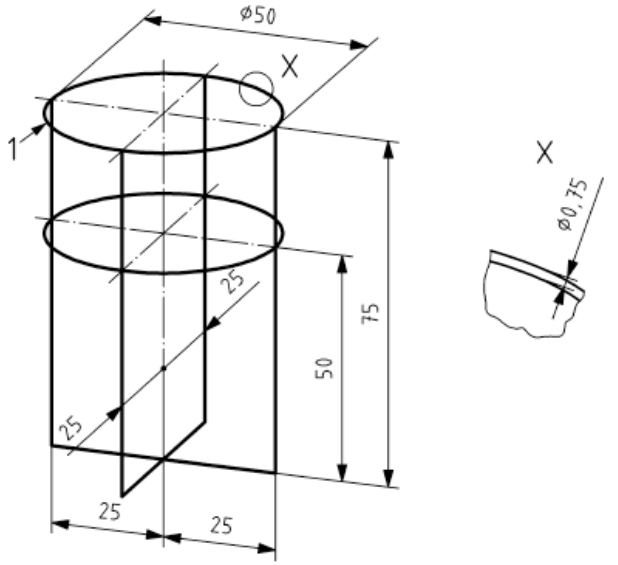
APPENDIX AD
(normative)

BASKET METHOD

The saturation time of single-layer paper is measured using the basket method.

A sufficient number of sheets of paper are stacked and cut to a size of 75 mm × 250 mm. Approximately 5 g are weighed out, rolled up and put into the basket in accordance with Figure **AD.1.**
Place the inverted basket containing the paper into a cylindrical glass vessel in accordance with Figure **AD.2** containing water that does not deviate more than ± 3 °C of the temperature of the water used for flushing. Measure the time in seconds from placing the basket into the water until it is completely immersed. Repeat the test 3 times and record the arithmetical average time taken.
The test shall be carried out under the same conditions of relative humidity and temperature of air as for the flushing test.

Dimensions in millimetres



Diameter of wire 0.75 mm
Mass 3 g

FIGURE AD.1 — Basket

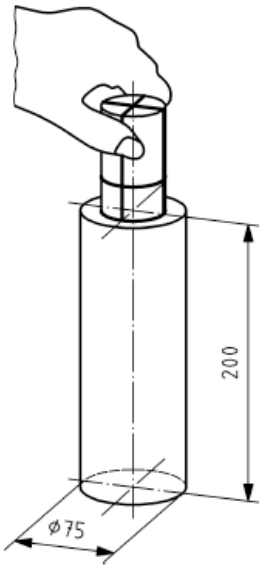


FIGURE AD.2 — Placing the basket

APPENDIX AE
(normative)

PREPARATION OF TEST SPECIMENS

1) Moisten the artificial sausage skin and cut it to length in accordance with Figure **AE.1**. Tie the bottom end with string of 1 mm diameter in accordance with Figure **AE.2.**
2) Insert the metal detector ring with a 14 mm internal diameter (diameter of the wire 1.6 mm, mass 1.53 g) out of stainless steel or a ring with a 10 mm internal diameter (diameter of the wire 2.0 mm) out of silver, fill in 37 ml of water and tie the upper end with string. Position the O-rings diameter 10/14 in accordance with Figure **AE.2**.
3) Verify whether the specimen is completely filled with water in accordance with Figure **AE.3**.
4) For protection the test specimen shall be covered with a tubular bandage and tied with strings in accordance with Figures **AE.4** and **AE.5**.
5) Check finally the test specimens with a template in accordance with Figure **AE.6**.

Dimensions in millimetres

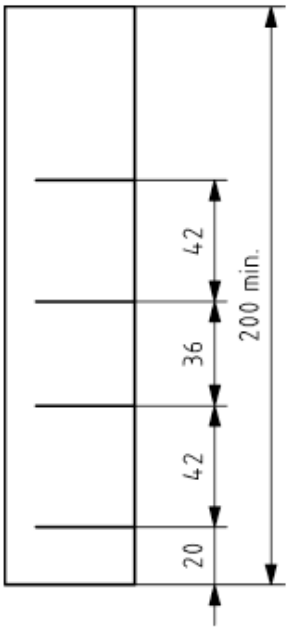
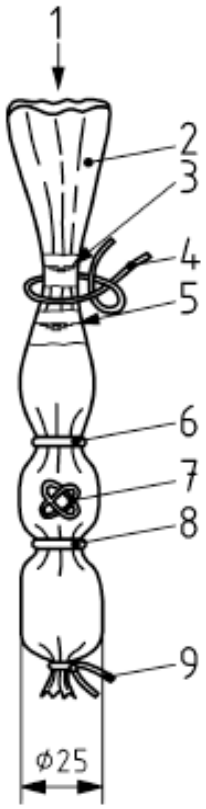


FIGURE AE.1 — Measuring template



Key

1 37 ml water
2 artificial skin
3 water level after tying
4 string
5 water level before tying
6 O-ring
7 metal detector ring
8 O-ring
9 string

FIGURE AE.2 — Tie position of test specimen

Dimensions in millimetres

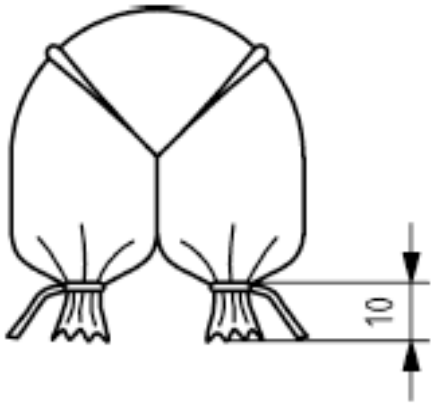


FIGURE AE.3 — Verifying position of test specimen

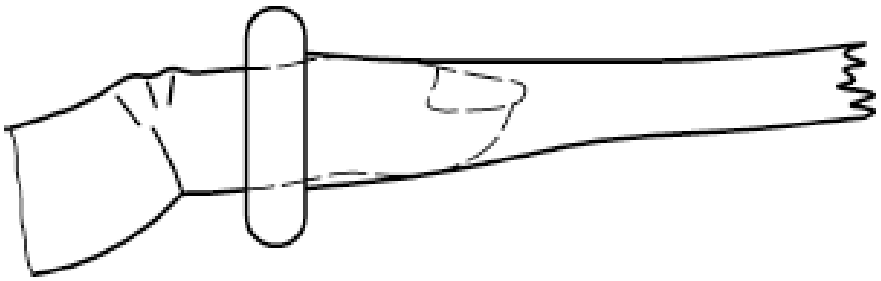


FIGURE AE.4 — How to roll the tubular bandage over the test specimen

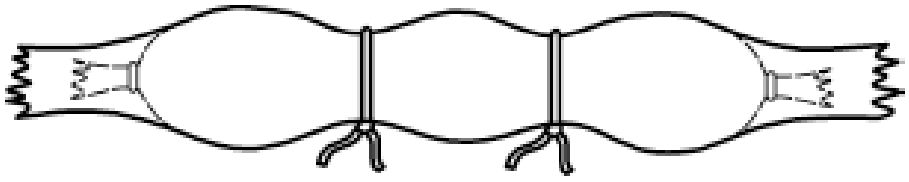
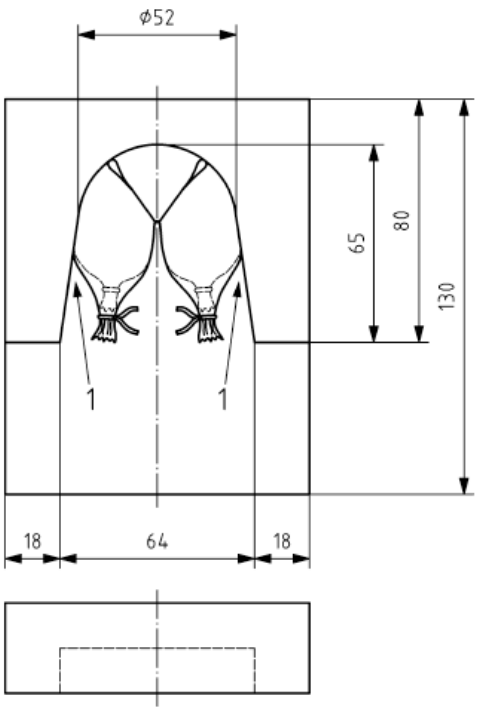


FIGURE AE.5 — Protected test specimen with tubular bandage

Dimensions in millimetres



Key

1position of test specimen in the gauge without any tension

FIGURE AE.6 — Template to check the final configuration of the test specimen

ANNEX AF
(normative)
EXAMPLES OF FLUSH PIPES AND OUTLET VALVES FOR TEST FLUSHING CISTERNS

Dimensions in millimetres

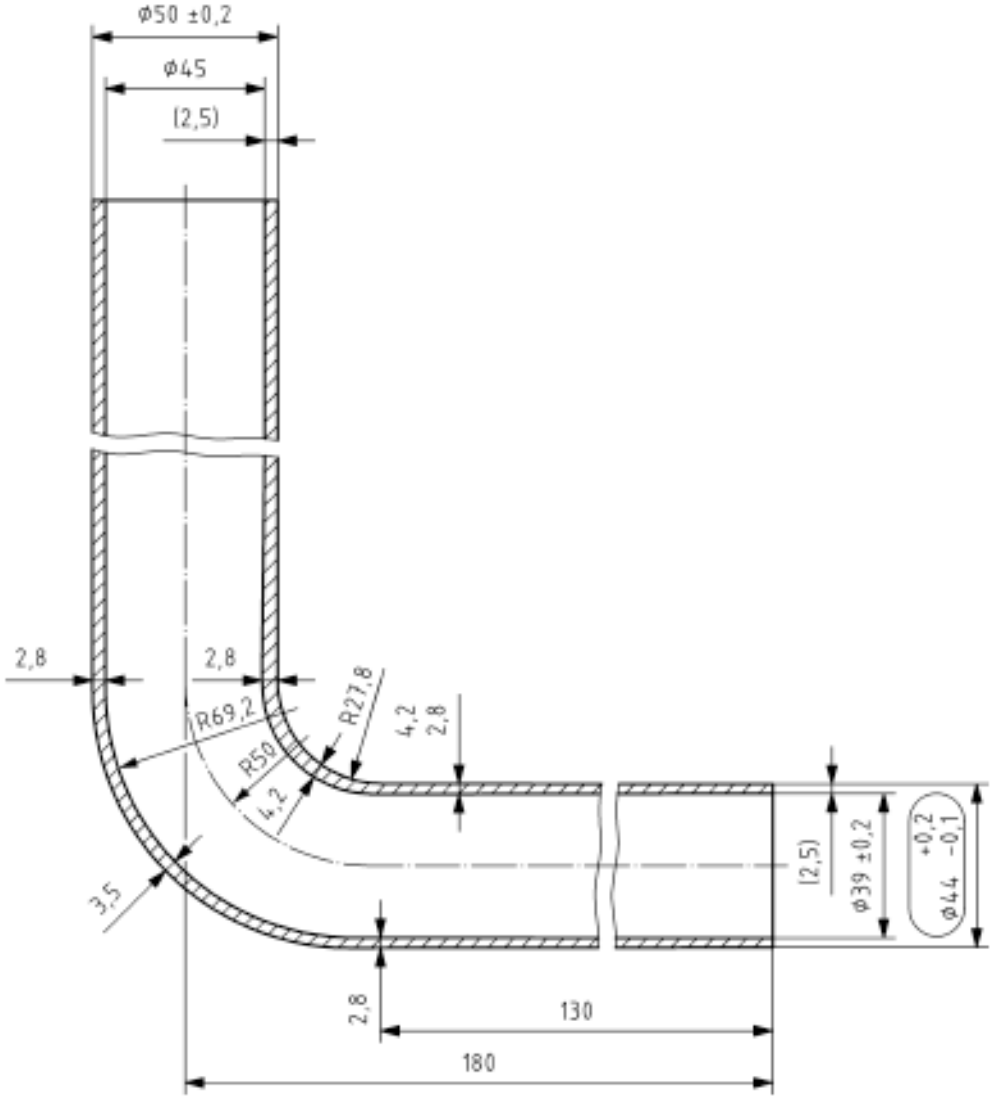


FIGURE AF.1 — Drawing of the flush pipe type B

Dimensions in millimetres

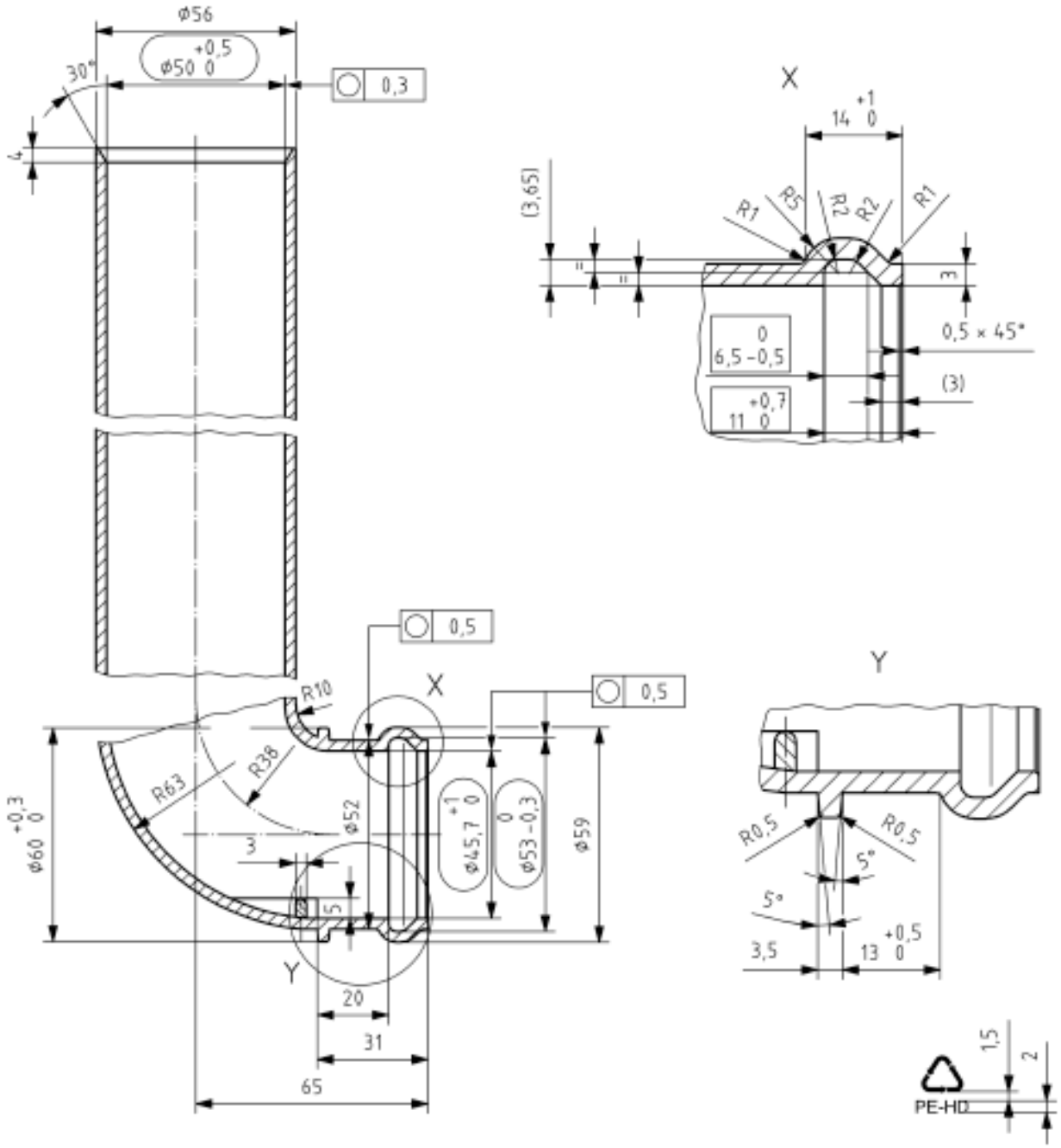
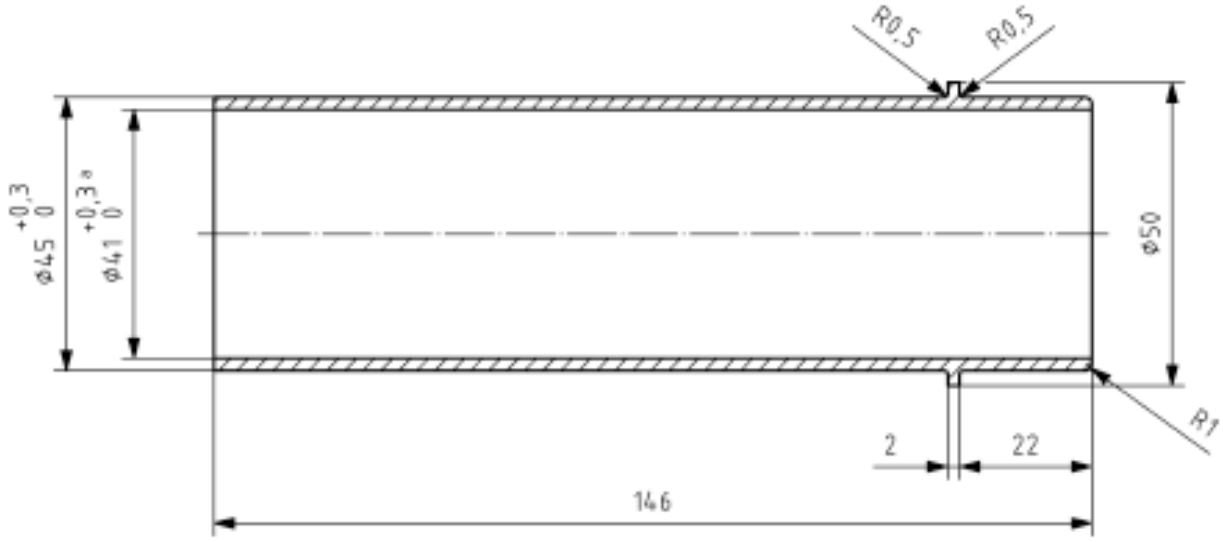


FIGURE AF.2 — Drawing of the flush pipe type C

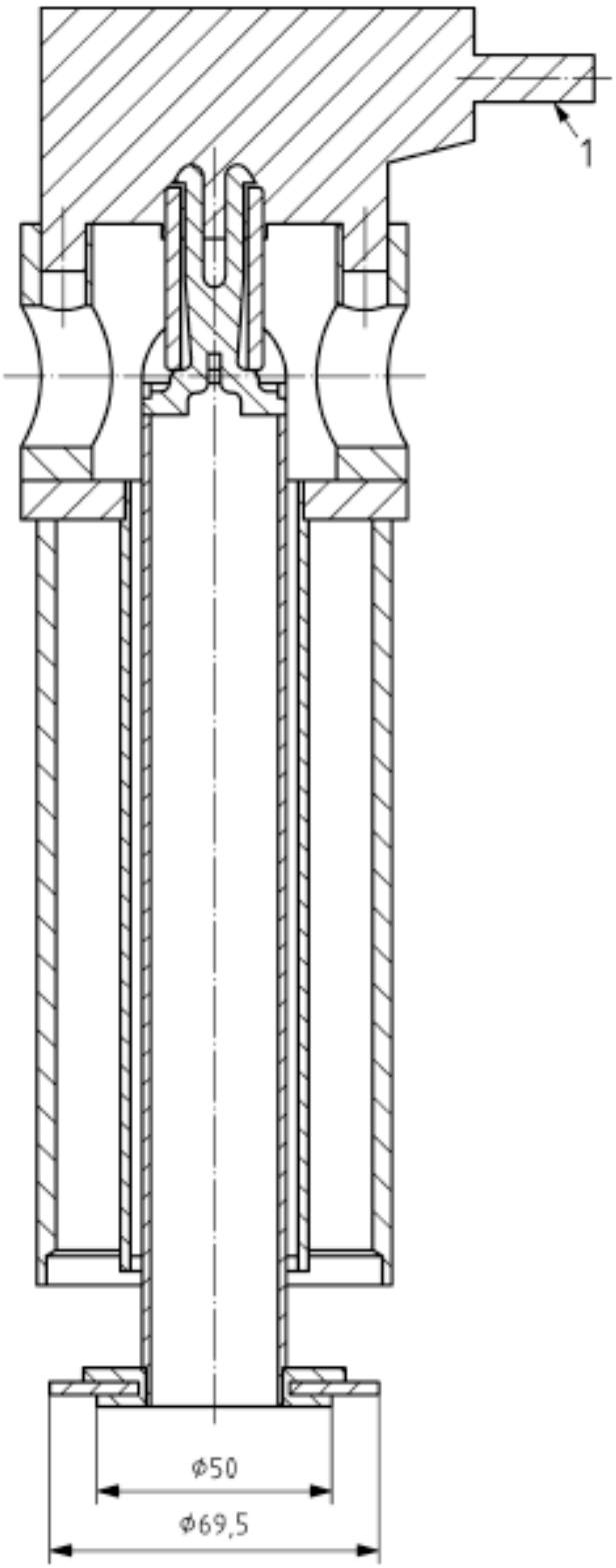
Dimensions in millimetres



The calibration shall be made without the collar.

FIGURE AF.3 — Drawing of horizontal pipe of the flush pipe type C

Dimensions in millimetres



Key

1 connection to the automatic actuator/closing unit

FIGURE AF.4 — Drawing of the outlet valve