IAPMO IGC 380-202y

PUBLIC REVIEW DRAFT

Industry Standard for

Plastic Sanitary Latrine Pans

IAPMO Standard

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Preface

This is the third edition of IAPMO IGC 380, Plastic Sanitary Latrine Pans. Previous editions of this Standard are : November 2023 and January 2024

This Standard was developed by the IAPMO Standards Review Committee (SRC) in accordance with the policies and procedures regulating IAPMO industry standards development, Policy S-001, Standards Development Process. This Standard was approved as an IAPMO Industry Standard on 2024.

Notes:

(1) The use of the singular does not exclude the plural (and vice versa) when the sense allows.

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(4) During its development, this Standard was made available for public review, thus providing an opportunity for additional input from stakeholders from industry, academia, regulatory agencies, and the public at large. Upon closing of public review, all comments received were duly considered and resolved by the IAPMO Standards Review Committee.

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- *(a) standard designation (number);*
- *(b) relevant section, table, or figure number, as applicable;*
- *(c) wording of the proposed change, tracking the changes between the original and the proposed wording; and*
- *(d) rationale for the change.*

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- *(a) the edition of the standard for which the interpretation is being requested;*
- *(b) the definition of the problem, making reference to the specific section and, when appropriate, an illustrative sketch explaining the question;*
- *(c) an explanation of circumstances surrounding the actual field conditions; and*
- *(d) the request for interpretation phrased in such a way that a "yes" or "no" answer will address the issue.*

(9) IAPMO does not "approve", "rate", or endorse any item, construction, proprietary device, or activity.

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IAPMO IGC 380-202y
Plastic Sanitary Latrine Pans

1 Scope

1.1 General

1.1.1 ~~1.1.1~~ This Standard covers pour flush plastic latrine toilet fixtures with water seals intended for indoor, and outdoor applications, and specifies requirements for materials, construction, performance, testing, and markings.
Note: the water seal may be an add-on component as specified by the manufacturer.

1.1.2 Plastic latrine fixtures covered under this Standard include but are not limited to:
(a) Squat Pan
(b) Sit Stool
(c) Footrest
~~(c)~~(d) Add-on Water Seal Assemblies

1.2 Terminology

In this Standard,
(a) "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the Standard;
(b) "should" is used to express a recommendation, but not a requirement;
(c) "may" is used to express an option or something permissible within the scope of the Standard; and
(d) "can" is used to express a possibility or a capability.

Notes accompanying sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.3 Units of Measurement

SI units are the primary units of record in global commerce. In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application, but each unit system is to be used independently. All references to gallons are to U.S. gallons.

2 Reference Publications

This Standard refers to the following publications and, where such reference is made, it shall be to the current edition of those publications, including all amendments published thereto.

ASME International (The American Society of Mechanical Engineers)
ASME A112.18.2/CSA B125.2
Plumbing waste fittings

ASME A112.19.2/CSA B45.1
Ceramic plumbing fixtures

CSA Group (Canadian Standards Association)
ASME A112.18.2/CSA B125.2
Plumbing waste fittings

ASME A112.19.2/CSA B45.1
Ceramic plumbing fixtures

CSA B45.5/IAPMO Z124
Plastic Plumbing Fixtures

IAPMO (International Association of Plumbing and Mechanical Officials)
CSA B45.5/IAPMO Z124
Plastic Plumbing Fixtures

Koeller and Company / Gauley Associates Ltd.
Maximum Performance (MaP) Testing Toilet Fixture Performance Testing Protocol 1 Version 7 – January 2018

3 Definitions

The following definitions shall apply in this Standard:

Add-on Water seal assembly – a component that creates a gas seal with water which is used with a Squat Pan, Sit Stool, or Footrest

Footrest – a feature of a latrine pan that provides secure footing while using the toilet. Footrest may be raised from floor level of pan to minimize soiling of feet and may have a textured top surface to avoid slippage.

Gas Seal – a device that separates the waste containment space from the user space to prevent the escape of sewer gas.

Pour Flush – water is poured into latrine pan with roughly 1 liter per second flowrate, using a cup or scoop like apparatus with a minimum opening diameter of 4 inches from 2 ft above the floor level, aimed directly at the waste specimen to evacuate waste.

Sanitary Latrine Pan – a receptacle that is used as a toilet and is not attached to a water source. Sanitary latrine pan may include but are not limited to squat pans, sit stools, footrests, and a gas seal.

Sit Stool — a latrine pan that provides an elevated sitting surface for comfort during usage.

Squat Pan — a low profile latrine pan that is intended for use in the squatting position.

Waste Containment – a container or a pit hole that contains human excreta.

4 General Requirements

4.1 Materials

Plastic latrine fixtures covered by this Standard shall comply with the applicable material requirements in CSA B45.5/IAPMO Z124.

4.2 Fixtures Including Water Traps

Ceramic latrine fixtures covered by this Standard shall comply with the applicable requirements in ASME A112.19.2/CSA B45.1.

4.3 Factory Supplied Waste Fittings

Plastic latrine fixtures covered by this Standard shall comply with the applicable requirements in ASME A112.18.2/CSA B125.2.

4.4 Waste Flush

Sanitary latrine pans shall be tested for waste flush in accordance with Section 5.9.

4.5 Sanitary Gas Seal

Sanitary latrine pans shall be provided with a seal that prevents the entry of sewer gas into the occupant space. Sanitary latrine pans shall be tested to Section 5.10.

5 Testing Requirements

5.1 Stain Resistance Test

The stain resistance test shall be performed in accordance with the requirements of Section 5.11, Stain Resistance Test of CSA B45.5/IAPMO Z124.

5.2 Colorfastness Test

The colorfastness test shall be performed in accordance with the requirements of Section 5.~~11~~10, Colorfastness Test of CSA B45.5/IAPMO Z124.

5.3 Cleanability and Wear Tests

The cleanability test shall be performed in accordance with the requirements of Section 5.12, Cleanability Test of CSA B45.5/IAPMO Z124.

5.4 Cigarette Test

The cigarette test shall be performed in accordance with the requirements of Section 5.14, Cigarette Test of CSA B45.5/IAPMO Z124.

5.5 Chemical Resistance Test

The chemical resistance test shall be performed in accordance with the requirements of Section 5.15, of CSA B45.5/IAPMO Z124.

5.6 Load Test for Squat Pans with Load Bearing Footrests

5.6.1 Test Procedure

The load test for squat pans with load bearing footrests shall be conducted as follows:

(a) Set the fixture using a method equivalent to the manufacturer's installation instructions.

(b) Preload the specimen with a 150 ± 2.5 kg (330 ± 5.5 lb) test load applied to the center of the footrest of the specimen using a 127 mm (5 in) diameter load-distribution disk resting on a 13 mm (0.5 in) thick sponge rubber or equivalent pad. If the squat pan has footrests on both sides of the well, the load test shall be performed on each footrest. In the case of squat pans with no load bearing footrests, this test can be omitted.

(c) Leave the load in place for 2 minutes to allow for settlement of the test apparatus and initial slip in the fasteners.

(d) Remove the load.

(e) After 10 minutes of removing the preload, reapply the test load for 2 minutes to the center of the same footrest of the specimen and, where applicable, midway between the ribs.

(f) Measure the deflection under the load with a deflectometer with a reading accuracy of at least 0.025 mm (0.001 in).

(g) Measure the residual deflection 10 ± 1 minutes after removal of the test load.

(h) Repeat steps (a) to (g) if the squatting pan has multiple loading points as stated in step (b).

5.6.2 Performance Requirements

There shall be no visible cracks of the specimen, deflections under the test load shall not exceed 4 mm (0.160 in); and the maximum residual deflection 10 min after removal of the load shall not exceed 2 mm (0.08 in).

5.7 Impact Test for Squat Pan Well

5.7.1 Test Procedure

The impact test for the squat pan well shall be conducted as follows:

(a) Set the fixture using a method equivalent to the manufacturer's installation instructions.

(b) A 50 kg (110 lbs.) sandbag shall be dropped onto the center of the well from a height of 30 cm (12 inches) above floor level.

(c) Remove the sandbag and inspect for damage.

5.7.2 Performance Requirements

There shall be no visible cracks or permanent deformation of the specimen.

5.8 Load Test for Sit Stool

5.8.1 Test Procedure

The load test for sit stool shall be conducted as follows:

(a) Set the fixture using a method equivalent to the manufacturer's installation instructions.

(b) Preload the specimen with a 150 ± 2.5 kg (330 ± 5.5 lb) test load applied to the sitting surface of the stool using a 127 mm (5 in) diameter load-distribution disk resting on a 13 mm (0.5 in) thick sponge rubber or equivalent pad. If the sitting surface makes multiple contact points with the user, as in the case of two contact points on the two sides of the well, the load test shall be performed at the center of each contact point with a loading of 150 ± 2.5 kg (330 + 5.5 lbs.) divided by the number of contact points.

(c) Leave the load in place for 2 minutes to allow for settlement of the test apparatus and initial slip in the fasteners.

(d) Remove the load.

(e) After 10 minutes of removing the preload, reapply the test load for 2 minutes to the stool and, where applicable, midway between the ribs.

(f) Measure the deflection under the load with a deflectometer with a reading accuracy of at least 0.025 mm (0.001 in).

(g) Measure the residual deflection 10 ± 1 minutes after removal of the test load.

5.8.2 Performance Requirements

There shall be no visible cracks of the specimen, deflections under the test load shall not exceed 4 mm (0.160 in); and the maximum residual deflection 10 minutes after removal of the load shall not exceed 2 mm (0.08 in).

5.9 Full assembly with water seal testing

5.9.1 Squat Pan, Sit Stool or Footrest which do not have an integral water seal shall be tested in accordance with section 5.9.2 and 5.9.3 with the appropriate add-on water seal as specified by the manufacturer

5.9.2 Waste Flush Test

5.9.~~1~~2.1 Test Procedure

The flush test for a sanitary latrine pan shall be conducted as follows:

(a) Set the fixture using a method equivalent to the manufacturer's installation instructions.
(b) Prepare the simulated waste per Maximum Performance (MaP) Testing Toilet Fixture Performance Testing Protocol 1 Version 7, Section 5.1 Nominal specifications for soybean paste used in preparation of MaP test media, and 5.3 Uncased Test Media.
(c) Pour flush the latrine pan two times prior to the introduction of the simulated waste in accordance with the manufacturer's specified volume of water.
(d) Follow test specimen drop guide as detailed in the Maximum Performance Tetting of Toilet Models, Section 3.6.1, 3.6.2, and 3.6.3.
(e) Drop a total of 5 test specimens into the latrine pan.
(f) Wait 1 minute.
(g) Pour flush the sample with the manufacturer's specified volume of water.

5.9.2.2 Performance Requirements

There shall be no visible remains of the media inside the well of the latrine pan. Minimal media stain that can easily be rinsed off are permissible on the surface of the well of the latrine pan.

5:~~10~~9.3 Sanitary Gas Seal Test

5.~~10~~9.3.1 Test Procedure

The test rig shall consist of two sealed chambers, CO2 meter, data loggers, and candles. Ensure that there are no external sources of CO2 present during set up and testing. The sanitary gas test for a sanitary latrine pan shall be conducted as follows.:

(a) Install the latrine pan fixture using a method equivalent to the manufacturer's installation instructions into chamber 1 of the test rig. See Figure 1 for details.
~~(a)~~(b) Determine the volume of Chamber 1 and Chamber 2
~~(b)~~(c) Install two CO2 sensors in chamber 1 such that they are along the centerline of the chamber 1, on opposing walls, and 1 inch above the latrine pan opening. Opposing walls can be front to back of pan, or on the left-right sides of the pan. Choose the sensor locations such that the sensors are protected from flushing water during flushing sequence in step (d).
~~(c)~~(d) Install two CO2 sensors in chamber 2 such that they are directly opposing each other, 1 inch above the flush water level and clear of any contact with water during flush cycles (read step d).
~~(d)~~(e) Flush the latrine pan three times in accordance with the manufacturer's instructions. The resulting water level in chamber 2 is the flush water level.
~~(e)~~(f) Place the candles in chamber 1 and record the baseline CO2 concentration/liter in chamber 2. Read step (~~h~~i) to determine the number of candles.
~~(f)~~(g) Ignite the candles.

~~(g)~~(h) Seal the lid and begin data logging.

~~(h)~~(i) Wait until the candles exhaust the oxygen and go out before initiating the 10-minute countdown. This could take several minutes depending on the size of the chambers. Multiple candles may be needed to expedite the process.

~~(i)~~(j) The CO2 level in chamber 1 should be a minimum of 5000 ppm at the start of the test.

~~(j)~~(k) Track the CO2 level in chamber 2 for 10 minutes by monitoring the two CO2 sensors and record the CO2 level at the 10-minute mark. Calculate the Concentration per liter for chamber 2.

5.~~10~~9.3.2 Performance Requirements

The sanitary gas seal must not allow the CO2 level recorded in step (~~j~~k) to read more than ~~600~~ 50 ppm/liter over the baseline CO2 level measured in step (~~e~~f).

6 Markings and Accompanying Literature

6.1 Markings

Plastic latrine toilets complying with this Standard shall be marked with the:

(a) manufacturer's name or trademark;
(b) model number;
(c) IAPMO standard designation (i.e., “IAPMO IGC 380”);
(d) Water volume required to pass the flush test in liter (L) units in increments of 0.1 liter.

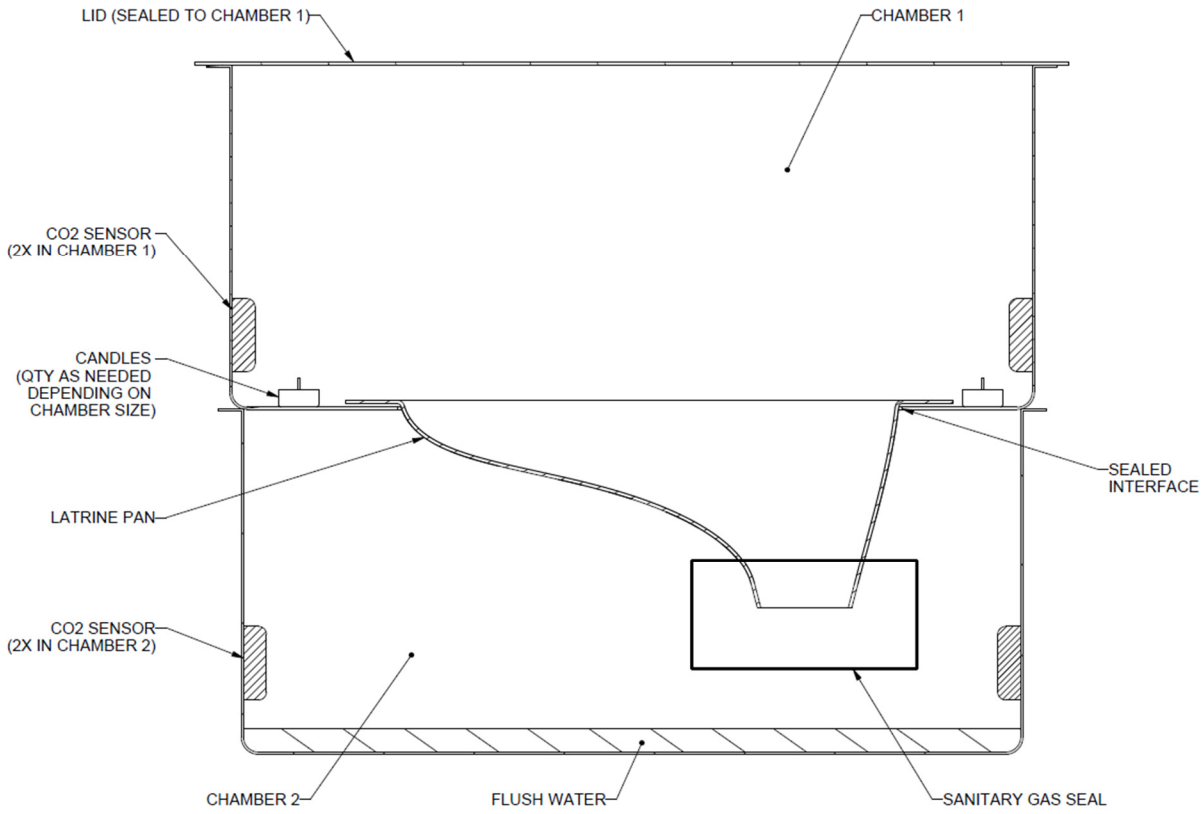
6.2 Visibility

Markings shall be permanent, legible, and visible after installation, or clearly listed under product page on manufacturer’s website.

6.3 Installation Instructions

Sanitary latrine pans covered by this Standard shall be accompanied by instructions for their installation.

Sanitary latrine pans which do not have an integral water seal shall specify in the instructions the manufacturer’s recommended add-on water seal to be used during installation.



a. The test rig shall comprise of two chambers of equal volume. ~~The figure above is not representative of equal volume~~.
b. CO2 meters shall be installed at the bottom of chamber 1. CO2 meters in chamber 2 shall be installed 1" above the flush water level.
c. Each chamber shall be sealed from each other and to the external environment.
d. Use heat shields in chamber 1 to protect the test rig from catching fire.

Figure 1
Section 5.10.1(a)

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