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TEST REPORT

DRAFT

Report Number: 002-253022 **Lab Project No.**: 46841

Report Issued: October 17, 2025

Client: TOTO USA Inc.
5351 E. Jurupa St.
Ontario. CA 91761

Source of Samples: The samples were shipped to IAPMO R&T Lab from TOTO USA Inc. and received in good condition on July 17, 2025.

Date of Testing: August 21, 2025, through October 16, 2025.

Sample Description: A vitreous China water closet. The unit was a one-piece, elongated bowl, 12" rough-in, single flush, 1.0 gpf gravity fed, high-efficiency water closet.

Model:

CST686CUF(G)	Toilet only
CST686CUFGAT40	Toilet only with special home punching on rim to conceal Washlet cable and hose
MS686124CUF(G)	Toilet + soft close seat contemporary
MS686234CUFG(A)	Toilet + soft close seat traditional
MW686****CUFG(A)	Toilet + various Toto Washlet bidet seat combinations

The fill valve was a TOTO model TSU900-A. The critical level of the fill valve was 8.5 in. as measured from the inside bottom of the tank. There are two flush valves involved, the rim wash valve TOTO model THU894-A, and the jet valve model THU895-A. The top of the overflow tube was 7.25 in. as measured from the inside bottom of the tank. The water level was marked at 6.88 in. as measured from the inside bottom of the tank. The water surface area of the bowl was 6.25 in from left to right and 9.25 in front to rear. The trap seal depth was 2.25 in, and the trap passed a 2 in. diameter ball.

Scope of Testing: The purpose of testing was to determine whether the sample tested of the water closet met the applicable requirements of ASME A112.19.2-2024/CSA B45.1:24 entitled, "Ceramic Plumbing Fixtures".

CONCLUSION: **The sample tested the water closet, model as shown above, from TOTO USA Inc., COMPLIED with the applicable requirements of ASME A112.19.2-2024/CSA B45:24.**

Tested by,

Victor M. Soria, Test Technician

Approved by,

Xuefeng (Jeff) Huang, Director-Fixture Testing

Primary Standard: ASME A112.19.2-2024/CSA B45.1:24. Applicable Sections Tested/Evaluated:

Section 4.1.1	Thickness
Section 4.2	Glazing
Section 4.6	Additional Requirements for Water Closets
Section 4.11	Accessible Design Fixtures
Section 5	Flushing Devices Used with Fixtures
Section 5.2	Gravity Flush Tanks
Section 5.6	Dual-Flush Water Closets
Section 6.1	Absorption Test
Section 6.2	Crazing Test
Section 6.3	Surface Examination
Section 6.4	Warpage Test
Section 6.9	Joint Seal Test
Section 7	Water Closet Tests
Section 9	Markings, Packaging, and Installation Instructions and Other Literature

Test Results: All tests and evaluations were conducted per the written procedure in the specific standard**.**

ASME A112.19.2-2024/CSA B45.1:24

Section 4.1.1 Thickness – COMPLIED

The thickness of the ceramic material was at least 6 mm (0.25 inch) throughout (exclusive of the glaze), except as noted in Clause 4.8.1.4.

Findings: Minimum thickness found, exclusive of the glaze, was 7 mm (0.28 in) inside the bowl.

Section 4.2 Glazing – COMPLIED

The glaze was thoroughly fused to the fixture body. All exposed surfaces required to be glazed were glazed properly.

Section 4.6 Additional Requirements for Water Closets

Section 4.6.1 Outlet Dimensions – COMPLIED

Outlets shall have the dimensions shown in Figure 2 for floor-mounted bottom-outlet water closets or Figure 3 for rear-outlet and rear-spigot-outlet water closets.

Findings: The water closet conformed to the dimensions shown in Figure 2 of the standard for floor mounted floor outlet water closets.

Figure 2

Location	Found (mm)	Required (mm)
Bottom Recess	13	13 - 19
Discharge Flange	90	95 max
Retainer Ring	187	184 min
Slots CL to CL	152	144 - 160
Slot Length	*16	19 - 25
Slot Width	*16	11 - 13

*Note: The water closet was intended to be installed with a provided plastic floor flange to be connected to the closet flange.

Section 4.6.2 Non-Standard Outlets – NOT APPLICABLE

Outlets that require connections other than a closet flange and ring shall not leak when tested in accordance with Clause 6.9 and shall allow for field repair or replacement.

Finding: The sample did not have a non-standard outlet.

Section 4.6.4 Roughing-In Details – COMPLIED

The water closet outlet rough-in was 305 mm (12 in).

Section 4.6.5 Seat-Mounting Holes – COMPLIED

The water closet seat hole details were configured as shown in Figure 5 of the standard.

Location	Found (mm)	Required (mm)
Opening Diameter	15.2	12.5 – 15.5
Center to Center	140	133 – 147
Material Thickness	10	6 – 16

Section 4.6.6 Rim Profiles – COMPLIED

The adult water closet bowl rim profile complied with Figure 6 of the standard for an elongated bowl.

Location	Found (mm)	Required (mm)
Hole Center to Center	140	133 – 147
Length	476	456 – 484
Width	381	345 – 367

Section 4.6.7 Water Surface Dimensions – COMPLIED

The water closet tested had a 235 x 159 mm water surface. The minimum required was 125 x 100 mm.

Section 4.6.8 Trap Diameter – COMPLIED

The water closet trap passed a 51 mm diameter solid ball. The minimum required to pass was 38 mm.

Section 4.6.10 Rim Heights – COMPLIED

The adult water closet had a rim height of 419 mm (18.75 in). The minimum required was 343 mm (13.5”).

Section 4.11 Accessible Design Fixtures – NO TESTING CONDUCTED

Fixture designed to be accessible shall comply with the dimensional requirements specified in CSA B651 or ICC A117.1, as applicable.

Findings: The water closet was not evaluated for accessible design.

Section 5 Flushing Devices Used with Fixtures

Section 5.1 General– COMPLIED

5.1.1 The water closet had a flushing device that delivered at a sufficient rate and quantity to permit the fixture to comply with the hydraulic performance requirements of the standard.

5.1.2 The backflow prevention device was positioned above the overflow tube.

Section 5.2 Gravity Flush Tanks

5.2.1 General – COMPLIED

- The fill valve TOTO model TSU900-A was tested and complied with ANSI/ASSE 1002. Refer to separated report for compliance
- The rim wash valve TOTO model THU894-A, and the jet valve model THU895-A were tested and complied with ASME A112.19.5./CSA B45.15. Refer to separated report for compliance.
- The top of the overflow tube was 184 mm (7.25 in) as measured from the inside bottom of the tank.

5.2.2 Fill Valve Opening Diameter and Location –COMPLIED

The fill valve opening shall have the diameter shown in Figure 10 but may be located on either side of the flush tank. The fill valve opening diameter was between 27.1 mm to 29.9 mm.

Findings: The fill valve opening was 30 mm (1.19 in) and located at the left side of the flush tank.

5.2.3 Critical Level – COMPLIED

The critical level mark was 32 mm (1.25 in) above the flush tank overflow. The minimum required was 25 mm (1 in). The critical level height measured from the inside bottom of the tank was 216 mm (8.5in).

Section 5.2.5 Water Closet Fill Valve– COMPLIED

The water closet fill valve shall be the pilot valve type only or, alternatively, the fill valve shall meet the performance requirements of the fill valve test protocol in Clauses 7.10 and 7.11.

Findings: The fill valve was a pilot valve type.

Section 5.2.6 Water Closet Tank Capacity– COMPLIED

Any barrier, bucket, dam, displacement device, or similar fixture used in a water closet tank to affect flush volume shall be tamper-resistant and permanently affixed to the tank. Any device that can be tampered with or removed such that the water closet can be made to flush with greater than the maximum flush volumes specified in Clauses 7.13 and 7.14 shall be deemed noncompliant.

Findings: The tank did not use any barrier, bucket, dam, displacement device or similar fixture to affect the flush volume.

Section 6.1 Absorption – COMPLIED

Three samples each with approximately 5 square inches of unglazed surface area and not more than 0.63 inch thick, were dried at 230 degrees Fahrenheit, cooled in a desiccator, weighed, boiled in distilled water for 2 hours, allowed to soak for an additional 18 hours, had all surface water wiped off and weighed. The average absorption weight was less than 0.5%.

Findings:

Sample	Weight Before (gram)	Weight After (gram)	Absorption (%)	Average Total (%)
1	40.22	40.23	0.02	0.04
2	52.63	52.65	0.04	
3	58.48	58.52	0.07	

Section 6.2 Crazing – COMPLIED

A test sample with approximately 5 square inches of glazed surface area and not more than 0.63 inch thick was heated at 230 degrees Fahrenheit for 90 minutes, then immediately submerged into an ice water bath of 37 degrees Fahrenheit for one hour. The test sample was then soaked in a 1% solution of methylene blue dye for 12 hours, removed and examined for crazing lines.

Findings: There was no crazing.

Section 6.3 Surface Examination – COMPLIED

When evaluated in accordance with Section 6.3.2.3 and Table 1, the unit did not contain any discolored areas, dull or eggshell finish, dints, exposed body, fire cracks, large blisters, or projections. The wavy finish, spots, blisters, pinholes or specks on the bowl were less than the maximum allowed in Table 1 of the standard.

Section 6.4 Warpage Test – COMPLIED

The water closet met the warpage requirements listed in Table 1 of the standard when evaluated in accordance with section 6.4.1.

Findings:

Location	Measured Warpage (mm)	Requirements (mm)
Foot / wall	1.0	3.0 max.
Rocker	1.0	1.5 max.
Top-left to right	2 mm/m	21 mm/m max.
Top-front to back	2 mm/m	21 mm/m max.

Section 6.9 Joint Seal Test – COMPLIED

The joint between the floor flange and the water closet was subjected to a hydrostatic pressure of 5 psi for 15 minutes.

Findings: There was no evidence of leakage.

Section 7 Water Closet Tests

Section 7.2 Trap Seal Depth Determination Test – COMPLIED

The trap seal depth was 57 mm (2.25 in). The minimum requirement was 51 mm (2.0 in).

Section 7.3 Water Consumption Test – COMPLIED

The average of the total flush volumes obtained in Clause 7.3.3 (e) over the range of pressures specified in Table 5 did not exceed (a) 4.8 Lpf (1.28 gpf) for high-efficiency water closets; (b) 6.0 Lpf (1.6 gpf) for the full flush volume mode of dual-flush high-efficiency water closets; and (c) 6.0 Lpf (1.6 gpf) for low-consumption water closets.

Findings: The average water consumption for 140, 350 and 550 kPa was 3.50 lpf (0.92 gpf) and identified as “High Efficiency Water Closet”.

Static Pressure (kPa)	Test Run	Min. Flow Pressure (kPa)	Cycle Time (sec)	Main Flush (L)	After Flow (L)	Total Flush (L)	Rounded Total Flush (L)	Trap Seal Restore (mm)
140	1	90	32	3.25	0.00	3.25	3.25	57
140	2	90	32	3.25	0.00	3.25	3.25	57
140	3	90	32	3.25	0.00	3.25	3.25	57
350	1	241	33	3.70	0.00	3.70	3.50	57
350	2	241	33	3.70	0.00	3.70	3.50	57
350	3	241	33	3.70	0.00	3.70	3.50	57
550	1	448	30	3.75	0.00	3.75	3.75	57
550	2	448	30	3.80	0.05	3.85	3.75	57
550	3	448	30	3.80	0.05	3.85	3.75	57

Section 7.4 Trap Seal Restoration Test – COMPLIED

The trap seal depth was restored to at least 51 mm after 10 flushes. Measured at 57 mm.

Section 7.5 Granule and Ball Test – COMPLIED

The standard requires that less than 125 granules and 5 balls to be visible after each of the three flushes when tested in accordance with paragraph 7.5.2.

Findings:

Run	Granule	Nylon Ball	Restore (mm)
1	20	0	57
2	26	0	57
3	29	0	57

Section 7.6 Surface Wash Test – COMPLIED

The standard requires that the total length of ink line segments remaining on the flushing surface after each flush shall not exceed 51 mm (2") when averaged over three test runs. No individual segment shall be longer than 13 mm (0.5").

Findings:

Test Run	No. of Segments	Position of Max Segment in Bowl	Max Length (mm)	Total Length (mm)
1	0	-	-	0
2	0	-	-	0
3	0	-	-	0
Average				0

Section 7.7 Drain Line Transport Characterization Test – COMPLIED

Findings: The standard requires that the average carry distance per ball shall be reported as 12.2 m (40 feet) or greater. The average carry distance found was 13.6 m (44.5 ft).

Location	1st Run	2nd Run	3rd Run	Total Balls In 3 Runs	Average Weighted Distance Traveled	Distance	Carry
In bowl	1	1	0	2	X 0 Ft	0	1
0-10 Ft	0	0	0	0	X 5 Ft	0	0
10-20 Ft	0	0	0	0	X 15 Ft	0	0
20-30 Ft	2	0	0	2	X 25 Ft	50	2
30-40 Ft	55	42	34	131	X 35 Ft	4585	55
40-50 Ft	6	33	26	65	X 45 Ft	2925	6
50-60 Ft	22	0	23	45	X 55 Ft	2475	22
Out	14	24	17	55	X 60 Ft	3300	14
Total Number of Balls		300					
Total Carry of All Balls						13335	Ft
Average Carry Distance Per Ball						44.45	Ft

Section 7.8 Overflow Test for Gravity Flush Tanks – COMPLIED

The overflow device in the gravity tank was capable of discharging the full open flow of the fill valve when tested in accordance with section 7.9.2.

Findings: There was no leakage or water discharge outside the fixture.

Section 7.9 Waste Extraction Test – COMPLIED

When tested in accordance with clause 7.10.3, the toilet in the full flush mode shall successfully and completely clear all the soybean paste test media and 4 loosely crumbled balls of toilet paper from the fixture in at least 4 of 5 attempts. The sample shall clear the bowl and trapway and fully restore the trap seal.

Findings: The unit successfully and completely cleared all the test media in 5 of 5 attempts (cased). In addition, the trap seal was restored.

Section 7.10 Consistent Water Level Test – NOT APPLICABLE

The consistent water level test shall be conducted on non-pilot valves only.

Findings: The fill valve was a pilot valve type.

Section 7.11 Fill Valve Shutoff Integrity Test with Increased Water Pressure – NOT APPLICABLE

The fill valve shutoff integrity test shall be conducted on non-pilot valves only.

Findings: The fill valve was a pilot valve type.

Section 7.12 Adjustability Test for Tank-Type Gravity Water Closets with Original Equipment – COMPLIED

The fill valve was adjusted so the water level in the tank was 6.35 mm (1/4") below the top of the overflow tube and tested in accordance with clause 7.13.1. The maximum average flush volume of the toilet using the original flush valve seal shall be less than 5.3 Lpf (1.40 gpf) and 7.6 Lpf (2.00 gpf) for reduced flush and full flush, respectively.

Findings: The maximum average total flush volume for 5 test runs using the original flush valve seal was 3.88 lpf (1.02 gpf) for the full flush.

Static Pressure (kPa)	Test Run	Min. Flow Pressure (kPa)	Cycle Time (sec)	Main Flush (L)	After Flow (L)	Total Flush (L)	Rounded Total Flush (L)	Trap Seal Restore (mm)
140	1	90	38	3.60	0.35	3.95	3.75	57
140	2	90	38	3.60	0.35	3.95	3.75	57
140	3	90	38	3.65	0.30	3.95	3.75	57
140	4	90	38	3.60	0.35	3.95	3.75	57
140	5	90	38	3.65	0.25	3.90	3.75	57
550	1	448	35	3.75	0.25	4.00	4.00	57
550	2	448	35	3.75	0.25	4.00	4.00	57
550	3	448	35	3.75	0.30	4.05	4.00	57
550	4	448	35	3.80	0.25	4.05	4.00	57
550	5	448	35	3.75	0.30	4.05	4.00	57

Section 7.13 Adjustability Test for Tank-Type Gravity Water Closets with Aftermarket Closure Seals – N/A

The adjustability test for tank-type gravity water closets with aftermarket closure seals.

Findings: The flush valve was a special flush valve using a special seal that was not available in the after-market or can be replaced with other manufacturer's part. The replacement part must be purchased directly from the manufacturer/distributor.

Section 9 Markings, Packaging, and Installation Instructions and Other Literature

Section 9.1 General– COMPLIED

The bowl and tank were marked with the manufacturer's name or trademark, "TOTO". The marking was permanent, legible, and visible after installation.

Section 9.3.1 Close-Coupled Water Closets – N/A

The model number should be marked on both the bowl and the tank of close-coupled water closets.

Findings: The toilet was a one-piece type.

Section 9.3.2 Water Consumption – COMPLIED

Water closets shall be marked with the water consumption in liters and gallons per flush.

Findings: The water closet was marked with the water consumption in both litters and gallons per flush

Section 9.3.3 Water Level Mark in Gravity Flush Tank Water Closets – COMPLIED

The water level mark "WL" was visible inside on the overflow tube inside the tank. The vertical distance between water level mark and overflow did not exceed 38 mm (1.5"). The actual distance was 16 mm (0.62 in.).

Note: Water level was marked at 175 mm (6.88 in) as measured from the inside bottom of the tank.

Section 9.3.4 Water Closet Tank Repair Parts – COMPLIED

The water closet tank had a label indicating at least the following:

(a) the telephone number of a service department from which end-users can obtain replacement parts,
(b) the serial or part number of the flush valve seal; and
(c) information on procuring replacement parts for maintaining the original flush volume.

Section 9.5 Packaging – COMPLIED

The packaging contained the manufacturer's name and the water consumption. The model number and the litter were marked in the packaging.

Section 9.6 Installation Instructions and Other Literature

9.6.1 General

9.6.1.1 Installation instructions – COMPLIED

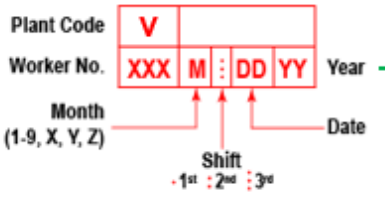
The manufacturer provided installation instructions with water closets (except for flushometer valve water closets).

Photographs of the Sample Tested:

Markings & Labeling

Date:	3/6/2025	Product No.:	CST686CEF(R)(G)	Product Type:	1PC
OEM	Toto Vietnam	Prepared By:	Gary Tan	Revision No.:	00

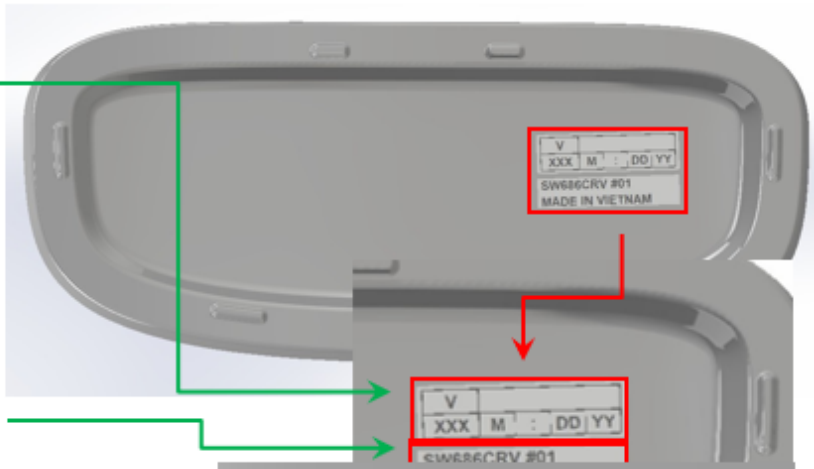
Casting No. stamped or Carved underside tank at **TVN**



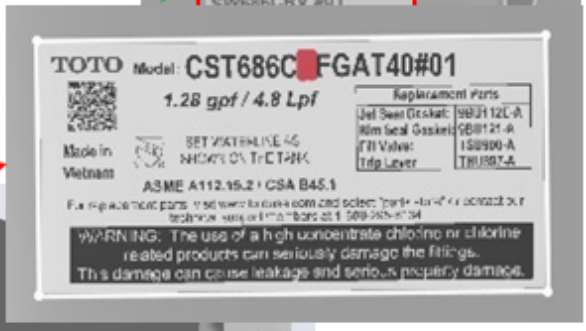
Made in Vietnam
Stamped at **TVN**

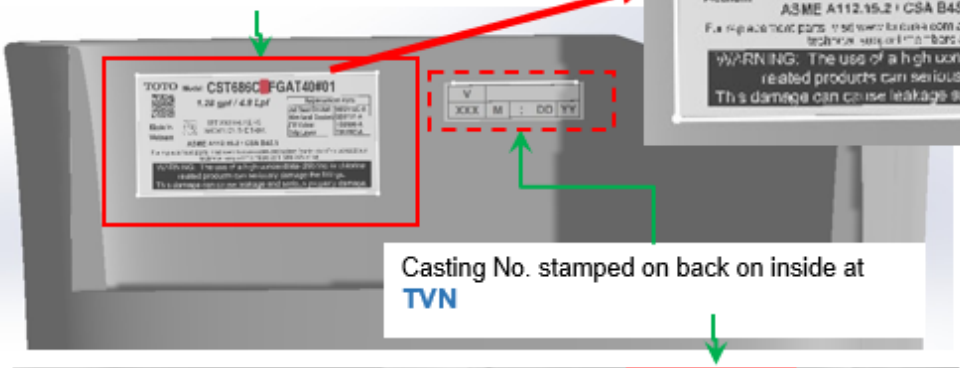
SW686CRV Tank Lid part number stamped or carved underside at **TVN**

Color No. **#01, #51** Stamped at **TVN**



Pre printed Sticker placed at TVN Sitcker is placed inside back wall





Casting No. stamped on back on inside at **TVN**

QR code
underside rim
applied at **TVN**