

STANDARD INFORMATION

Standard: NSF/ANSI 3

Standard ID: Commercial Warewashing Equipment [NSF/ANSI 3:2023]

Previous Standard ID: Commercial Warewashing Equipment [NSF/ANSI 3:2021]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **January 1, 2027**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

Overview of Changes:

- New performance test for the soil redeposition and rinseability of warewashing equipment
- New requirements for bottle washing machines

Specific details of new/revise requirements are found in table below

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
5	Info	Design and construction
5.20	Info	Additional design and construction requirements for specific machine designs
5.20.4	Info	Bottle washing machines
		<i>New clause added;</i>
5.20.4.1		Machines designed and manufactured to wash bottles shall be marked in accordance with Section 7.3.3.
		Performance
		Equipment performance tests shall be performed with the equipment operating at its lowest operational settings and shortest cycle times. <u>If a machine is intended to wash dishware and bottles with or without modifications to the basic machine, all performance tests shall be run in both bottle washing mode and normal dishwashing mode.</u> All sanitizing efficacy tests shall be performed according to the following:
6		<ul style="list-style-type: none">— if the machine is marked for final rinse pressure ratings of 20 ± 5 psi (138 ± 34 kPa), the test shall be run at 20 ± 1 psi (138 ± 7 kPa); or— if the machine is marked for final rinse pressure ratings other than 20 ± 5 psi (138 ± 34 kPa), and the marked pressure range is > 5 psi (34 kPa), the test shall be run with the final rinse pressure set at both the minimum and maximum ratings marked on the unit (a unit marked 5 to 15 psi [34 to 103 kPa] shall be tested at both 5 and 15 psi [34 to 103 kPa]); or— if the machine is marked for final rinse pressure ratings other than 20 ± 5 psi (138 ± 34 kPa), and the marked pressure range is ≤ 5 psi (34 kPa), the test shall be run with the final rinse pressure set at the minimum rating marked on the unit (a unit marked 5 to 10 psi [34 to 69 kPa] shall be tested at 5 psi [34 kPa]).
6.1	Info	Soil removal
		<i>New section added;</i>
6.1.4		Bottle washing machines
		Performance requirement
6.1.4.1		When operated in accordance with manufacturer's instructions, bottle washing machines shall render bottles free of soil and detergents.



CLAUSE	VERDICT	COMMENT
		Test method
6.1.4.2		<p>The soil removal efficacy of bottle washing machines shall be evaluated by observing the machine's ability to remove a dry coating of buttermilk from the surface of bottles. A coating of buttermilk (1% milkfat) shall be applied to the outer lips and interior surfaces of Libbey #131500208 (34 oz [1005.5 mL]) glass water bottles or equivalent. The soiled bottles shall be inverted and allowed to drain for 45 min before being transferred to racks where they shall be allowed to air dry at 100 °F (38 °C) for 17 h. The bottles shall be arranged in the racks or directly on the conveyor according to the full rack test patterns shown in Figure 2, Pattern 1 for stationary machines or Pattern 4 for rackless conveyor machines. The full rack patterns shown in Figure 2 are based on standard 20 × 20 in (508 × 508 mm) rack sizes. If a bottle washing machine is specifically designed and manufactured to accommodate fewer bottles, the patterns shall be adjusted accordingly to achieve the maximum number of bottles the bottle washing machine will accommodate. In addition, the bottles shall be loaded in accordance with the manufacturer's instructions, including aligning the bottle with the adjacent wash and rinse nozzles, if applicable, to facilitate optimum washing and rinsing. Up to two trials of the full rack test pattern shall be subjected to a complete bottle washing machine cycle in accordance with the manufacturer's instructions. The surfaces of the bottles shall be visually inspected for any remaining buttermilk or detergent.</p>
		Acceptance criteria
6.1.4.3		<p>The surfaces of all bottles for the full rack pattern shall be free of visible soil and detergent. The presence of soil or detergent on bottles following the full rack pattern is not grounds for rejection unless soil or detergent is also present following a second, separate trial of the same pattern.</p>
6.2	Info	Sanitization efficacy
		<i>New section added;</i>
6.2.6		Bottle washing machines
		Performance requirement
6.2.6.1		<p>To ensure adequate sanitization, the complete cycle of hot water sanitizing bottle washing machines shall deliver a minimum of 3600 HUE at the surface of bottles.</p>
		Test method
6.2.6.2		<p>HUE delivered by a hot water sanitizing bottle washing machine shall be quantified by continuous monitoring of the temperature at the bottom, inside surface of a bottle over the course of a complete machine cycle. The bottle shall be a Libbey #13150020 (34 oz [1005.5 mL]) water bottle or the equivalent. Prior to the test, the machine shall be operated for at least one cycle to verify that the machine is operating in accordance with the manufacturer's minimum specifications. After</p>



CLAUSE	VERDICT	COMMENT
		<p>verification of proper machine functioning, a standard rack containing a single bottle at each of the three locations shown in Figure 7 shall be subjected to one complete machine cycle.</p> <p>A single empty rack may be run through a complete cycle just prior to the test rack. The temperature at the bottle surface shall be monitored by a calibrated thermocouple attached at the inside, bottom, center of the bottle. The thermocouple shall have an accuracy of ± 1 °F (± 0.6 °C). This test shall be repeated for the two remaining bottle locations indicated in Figure 7. For testing of rackless conveyor machines, the bottle shall be placed on the conveyor at locations corresponding to those on the rack in Figure 7. If required due to the type of construction, the bottles shall be loaded in accordance with the manufacturer's instructions, including aligning the bottle with the adjacent wash and rinse nozzles, if applicable, to facilitate optimum washing and rinsing.</p> <p>If the bottle washing machine is specifically designed to accommodate fewer bottles, the location of the bottle shall be adjusted to achieve the maximum locations the machine will accommodate relative to the patterns in Figure 7. For stationary rack machines, bottle temperatures shall be recorded at intervals of 1 s from the start of the cycle until 10 s after the cycle is finished (the machine door shall be opened at cycle completion).</p> <p>For conveyor machines, bottle temperatures shall be recorded at intervals of 1 s from the time the bottle enters the machine until 10 s after the bottle has emerged from the final sanitizing rinse.</p> <p>All temperature data points of 143 °F (62 °C) or greater shall be used to calculate the total HUE delivered. Calculation of HUE at each bottle location shall be based on the information in Annex N-1.</p>
		<hr/> <p>Acceptance criteria</p>
6.2.6.3		<p>A minimum of 3600 HUE shall be accumulated at each of the three bottle locations in the machine.</p>
		<hr/> <p><i>New section added;</i></p>
6.2.7		<p>Chemical sanitizing dishwashing and bottle washing machines</p>
		<hr/> <p>Performance requirement</p>
6.2.7.1		<p>The sanitization portion of a chemical sanitizing machine shall be capable of yielding a 99.999% reduction (\log_{10} reduction ≥ 5) of microorganisms of public health significance on the surface of dishes.</p>



CLAUSE	VERDICT	COMMENT
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Sanitization efficacy testing shall not be required of machines that use a chlorine sanitizing solution, do not apply a post-sanitizing rinse and where one of the following conditions is met:

- the final sanitizing rinse is applied to all dishes for a minimum of 7 s; or
- the combined duration of the pumped rinse and the final sanitizing rinse is a minimum of 7 s, provided that the minimum temperature and free chlorine concentration specified for the final sanitizing rinse (see Table 6.1) are also maintained in the pumped rinse.

Test method

6.2.7.2

- a) Prior to the test, the sanitization portion of the machine shall be operated for at least one cycle to verify that the machine is operating in accordance with the manufacturer's minimum specifications.
- b) A suspension of *E. coli* (ATCC #11229)9 in SBDW shall be prepared by washing four 24 h French bottle slants into 0.5 L of SBDW. This technique ensures that the suspension contains $> 1.0 \times 10^6$ CFU/mL. An aliquot of the suspension shall be aseptically removed. Density shall be determined via optical density, or alternatively, by performing direct plating (i.e., via VRB pour plate method), or using commercially available density standards (i.e., McFarlands). The dispersion and morphological characteristics of the challenge culture suspension shall be microscopically examined using Brightfield microscopy and differential staining (i.e., gram stain). A Brightfield microscope and a calibrated ocular micrometer shall be used to verify the size, shape, and arrangement of the organisms. The bacteria present in the challenge suspension shall be confirmed to be singlet in arrangement and dispersed in a homogeneous manner. If a certified organism strain is used for testing, and it meets quality requirements, the microscopic examination is not required.
- c) 12 Libbey #13150020 (34 oz) bottles or the equivalent shall be inoculated with the *E. coli* / SBDW suspension. Each bottle shall be inoculated in succession by filling the bottle with the suspension and then pouring the contents into the next bottle. The lip of each emptied bottle shall be dipped 1 in (2.54 cm) into a container of the suspension.
- d) The inoculated bottles shall be air-dried for 10 ± 2 min before the test run. The bottles shall be placed upside down in the bottle washer rack. The rack shall be delineated into sections as shown in Figure 8. In addition, the bottles shall be loaded in accordance with the manufacturer's instructions, including aligning the bottle with the adjacent wash and rinse nozzles, if applicable, to facilitate optimum washing and rinsing.
- e) For rackless conveyor machine designs, the bottles shall be arranged directly on the conveyor in the same configuration shown in Figure 8.
- f) The bottles shall be run through the sanitizing rinse portion of the machine cycle under one of the conditions in the manufacturer's specifications.
- g) Immediately upon removal from the machine, each section of bottles shall be sampled by swabbing all interior surfaces of the three bottles with a single sterile



CLAUSE	VERDICT	COMMENT
		<p>cotton swab. The cotton swab shall be placed into a vial (containing 5 mL of sterile neutralizing buffer) corresponding to the section in which the bottles were placed. Samples shall be handled aseptically. Analysis shall be initiated within 15 min of sampling. If analysis cannot be performed within 15 min, the swabs shall be refrigerated at 4 ± 2 °C (39 ± 4 °F) for a maximum of 24 h.</p> <p>h) These procedures shall be repeated for two additional trials to make a total of 36 bottles in 12 sections. The swab samples shall be enumerated using the VRB agar pour plate method.</p> <p>i) Positive control: Three of the inoculated bottles shall be randomly selected as positive controls. All interior surfaces of the three control bottles shall be swabbed with a single cotton swab after inoculation and the required drying period. The cotton swab shall be placed in a vial with 5 mL sterile neutralizing buffer and enumerated (CFU/mL) by the VRB agar pour plate method.</p> <p>j) Negative control: Individual negative control samples shall be collected from a bottle that has not been inoculated, the VRB agar, the swab, the SBDW, and the pipette used. Enumeration shall be by the VRB agar pour plate method.</p>
		<p>Acceptance criteria</p> <p>For each of the 12 zones, R shall be ≥ 5.0:</p> $R = \log_{10} (N_i/N_f)$ <p>where: N_i = initial inoculum density (CFU/mL) N_f = number of CFU/mL recovered in each section of each rack</p> <p>If $N_f < 1$, the samples shall be considered acceptable.</p> <p>This pattern is for a standard bottle washing rack. Similar patterns shall be used for different sizes and configurations.</p>
		<p><i>New section added;</i></p>
6.4		<p>Rinse effectiveness</p>
		<p>Performance requirement</p>
6.4.1		<p>When operated in accordance with manufacturer's instructions, the rinse spray shall remove the challenge test mixture described in Annex N-3 from the plates.</p>
		<p>Application</p>
6.4.2		<p>The following models are not required to be subjected to this test:</p> <ul style="list-style-type: none">- dump and fill;- pot, pan, and utensil;- glasswasher;



CLAUSE	VERDICT	COMMENT
		<ul style="list-style-type: none">- bottlewasher;- multiple tank rack conveyor; and- rackless conveyor.
		Test Method
6.4.3		<p>a) The rinse effectiveness of dishwashing machines shall be evaluated by observing the machine's rinse ability to remove the challenge test mixture, which is intended to mimic soil redeposition from wash water.</p> <p>b) The dishwashing machine shall be operated with only the final rinse in operation. Auxiliary rinses (if equipped) shall also be operational during evaluation.</p> <p>c) The challenge test mixture and plates (Corelle Winter Frost White or equivalent) shall be prepared in accordance with Annex N-3.</p> <p>d) The dishwashing machine shall be conditioned in accordance with the manufacturer's instructions to the manufacturer's specified pressures and temperatures.</p> <p>e) The rinse cycle shall be tested at a pressure of 20 ± 2.0 psi or the manufacturer's specified pressure ± 2.0 psi, if applicable. Does not apply to models with pumped rinse. The final rinse temperature shall be no more than 2° F (1° C) above the nameplate minimum.</p> <p>f) A rack of challenge test mixture coated plates shall be tested through one rinse cycle.</p> <p>g) The plates shall be inspected for residual challenge test mixture in a darkroom using a long wave UV light with a nominal wavelength of 366 ± 30 nm and a UV radiant intensity of 480 ± 30 mW. The UV light shall have a UV irradiance of 2200 uW/cm² and be placed no greater than 24 in (61 cm) from the plates.</p> <p>NOTE — The UV light specifications described here have been demonstrated to fluoresce the fluorescein in the challenge test mixture. Other lights capable of fluorescing the fluorescein may be used.</p> <p>h) The top surface of the plates only shall be evaluated in accordance with this procedure. Any challenge test mixture remaining on the back shall be disregarded.</p>
		Acceptance criteria
6.4.4		<p>The top surface of the three test plates shall be free of visible challenge test mixture when observed using the UV light.</p> <p>The presence of residual challenge test mixture is not grounds for immediate test failure. In the case of residual challenge test mixture on any or all of the plates, the test shall be repeated on a new set of plates per Section 6.4.3.</p>



CLAUSE	VERDICT	COMMENT
7	Info	Manufacturer's specifications
7.3	Info	Equipment labeling
7.3.1	Info	Combination equipment
		<i>New clause added;</i>
7.3.1.1		<p>Warewashing machines that are intended for use as both a dishwashing machine and a bottle washing machine, and that have passed all applicable performance tests of Sections 6.1 and 6.2, shall have a permanently attached label that states the following, or equivalent:</p> <p>"This equipment is intended for the washing and sanitizing of bottles as well as dishes and glassware."</p>
		<i>New clause added;</i>
7.3.1.2		<p>Warewashing machines that are intended for use as both a pot, pan, and utensil machine and a bottle washing machine, and that have passed all applicable performance tests of Sections 6.1 and 6.2, shall have a permanently attached label that states the following, or equivalent:</p> <p>"This equipment is intended for the washing and sanitizing of bottles as well as pots, pans, and utensils."</p>
		<i>New section added;</i>
7.3.3		Bottle washing machines
7.3.3.1		When the bottle washing capabilities are only functional when a machine is equipped with a specific modification and/or is operated in a specific operational cycle, there shall be a permanent marking on the machine indicating the accessory and cycle selection, as applicable.
7.3.3.2		Machines designed to wash bottles by adding or replacing components such as wash and rinse arms or racks, shall include a marking on the product with details of the components required for the conversion, as well as extended minimum wash and rinse times, if applicable. The instructions for the conversion may be in the instruction manual or online through a website or QR code.
7.3.3.3		<p>Warewashing machines that are intended for use only as bottle washing machines, and that have passed the applicable performance tests of Section 6.1.4, and either Section 6.2.6 or 6.2.7, shall have a permanently attached label that states the following, or equivalent:</p> <p>"This equipment is intended for the washing and sanitizing of bottles."</p>



CLAUSE	VERDICT	COMMENT
		<i>New annex added;</i>
Normative Annex 3		Ingredients and procedure for rinse effectiveness challenge test mixture The following procedure describes the preparation and execution of challenge test mixture to be used in the evaluation of rinse effectiveness of commercial warewashing machines.
		Ingredients
N-3.1		— xanthan gum powder (lab quality, CAS #11138-66-2): 0.18 oz (5.1 g) — distilled water: 5.0 gal (18.9 L) at 70 ± 5 °F (21 ± 3 °C) — fluorescein (water soluble, CAS #518-47-8): 0.004 oz (0.1 g)
		Preparation procedure
N-3.2		a) Thoroughly mix xanthan gum and approximately 0.26 gal (1.0 L) distilled water first with a handheld blender in a beaker to homogenize the mixture completely. b) Add above mixture to remaining distilled water and fluorescein and mix with a handheld blender until completely blended. This may take several minutes. c) Allow this mixture to rest for 2 h at room temperature. d) Briefly stir the mixture again prior to application to the test plates to ensure consistent blend of ingredients. e) Prior to application of the challenge test mixture, the plates shall be washed and rinsed five times in a hot water sanitizing dish machine without detergent or rinse aid and dried. f) Immediately prior to the application of the challenge test mixture, the mixture shall be stirred for 1 min with a drill and stirrer attachment. g) Plates shall be dipped in the mixture until completely submerged and placed on a peg-type rack. Three plates positioned according to Figure 9 shall be used for each test. In a dark room, use the UV light to verify the presence of the challenge mixture on the plates. h) The rack of test plates shall be subjected to one rinse cycle. i) Once the rinse is complete, in a dark room using the UV light according to the performance testing procedures, verify the presence of any remaining challenge test mixture on the front of the plates. This evaluation shall take place within 5 min of cycle completion.