

13.7 Warewashing Evaluation

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13.7.1 Introduction

13.7.1.1 Methodology Source

resources

The following warewashing machine evaluation procedure was compiled from the NSF International (NSF) brochure *Food Service: Recommended Field Evaluation Procedures for Spray-Type Dishwashing Machines*, 1991, and *Food Code*, 1999. ANSI/NSF 3-1996, *Commercial Spray-Type Dishwashing and Glasswashing Machines* and the CDC / VSP Operations Manual should be consulted for recommended construction and operational parameters.

13.7.1.2 Recommended Evaluation Equipment

The following equipment to conduct warewashing evaluations is recommended:

TMD

(1) Thermocouple or thermistor temperature-measuring device for warewasher operational temperatures;

maximum registering

(2) Maximum registering temperature-measuring device or temperature-sensitive tapes for verifying hot water warewasher final rinse temperature, 73°C (160°F);

wax crayons

(3) *Optional: Calibrated melting temperature wax crayons with melt points set at 82°C (180°F) and another at 91°C (195°F);*

pressure gauge

(4) Pressure gauge, as applicable, for determining in-line pressure of hot water at injection point of warewasher in the 100-170 kilopascals (15-25 pounds per square inch) range;

chemical test kit

(5) Chemical test kits for different chemical sanitizer types used on the vessel;

flashlight

(6) Flashlight;

<i>tape measure</i>	(7) Tape measure; and
<i>timing device</i>	(8) Watch or stop watch.
<i>calibrated</i>	The temperature-measuring devices and pressure gauges shall be calibrated against standards to ensure reliable warewasher evaluations. The chemical test kits and temperature sensitive tapes shall be maintained as specified by their manufacturer to ensure accuracy.
<i>mercury spills</i>	Mercury-filled maximum registering temperature-measuring devices are subject to breakage and shall be carefully used during the evaluations. If they break, a through clean-up shall be performed before warewashing operations resume.

13.7.2 Machines Data Plates

<i>data plate required</i>	The required manufacturer's data plate shall be studied for correct operating parameters. If data plate indicates a flow pressure, the machine shall have a gauge or a gauge valve to measure it. If manufacturer's data plate does not state a flow pressure, the machine is not required to have a gauge or a gauge valve.
<i>temperature requirements</i>	The temperatures stated on the warewash machine data plate shall be considered minimums. Except for chemical sanitizing machines, the machine should not heat to more than 9°C (15°F) above its minimum temperatures to reduce steam buildup and baking food particles on the articles being washed. Differences will be noted on the tank temperatures when the pumps are activated and when they are not.
<i>conform to ANSI / NSF 3 - 1996</i>	The warewash machine temperatures shall conform to those specified in these guidelines for the specific type of machine. For those manufactured to different temperature standards, evidence shall be furnished that they at least conform to the minimum equivalent standards of ANSI/NSF 3-1996, <i>Commercial Spray-Type Dishwashing and Glasswashing Machines</i> .

13.7.3 Evaluation Procedures

13.7.3.1 Operating Procedures

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|--------------------------------|---|
| <i>prescraped /
racked</i> | (1) Dishes shall be properly prescraped and racked. |
| <i>scrap trays</i> | (2) The machine prewash “scrap trays” shall be clear of excessive soil and debris. |
| <i>curtains /
baffles</i> | (3) The curtains and baffles on conveyor type machines shall be intact and in their proper position. |
| <i>conveyor speed</i> | (4) The conveyor speed and cycle times shall be set according to manufacturer’s specifications. |
| <i>overflow</i> | (5) The overflow standpipe shall be installed, not blocked or leaking. |
| <i>nozzles aligned</i> | (6) The wash and rinse nozzles shall be properly aligned and provide a uniform spray pattern. |
| <i>nozzles clear</i> | (7) The wash and rinse nozzles shall be clear of obstructions. |
| <i>manifolds repair</i> | (8) The wash and rinse manifolds shall be in good repair, properly installed in the machine, and end caps installed. |
| <i>heating
elements</i> | (9) The heating elements used in tanks shall not have mineral or other deposits on them. |
| <i>strainer clear</i> | (10) The rinse supply line strainer shall be clear of debris. |
| <i>TMDs accurate</i> | (11) The wash and rinse tanks, and final rinse manifold temperature-measuring devices shall be accurate to $\pm 1.5^{\circ}\text{C}$ ($\pm 3^{\circ}\text{F}$). |
| <i>pressure
regulator</i> | (12) The pressure regulator shall be functioning properly. |
| <i>flow pressure</i> | (13) The flow pressure shall be 100-170 kilopascals (15-25 pounds per square inch). |

13.7.3.2 Temperature Evaluation

- | | |
|--|---|
| <i>manufacturer’s
instructions</i> | (1) The machine shall be installed and operated in accordance to the manufacturer’s instructions. |
| <i>warm-up</i> | (2) The machine shall be run through at least two complete cycles before testing unless it has been operating just before |

the evaluation. On conveyor machines, this is accomplished by running at least two racks through the machine.

*additional
warm-up*

(3) When minimum temperatures are not indicated on the machine-mounted temperature-measuring devices, additional preevaluation cycles may be run to determine, if higher temperatures are possible.

*tank
thermometer
calibration*

(4) Temperatures of the wash water and pumped rinse shall be taken directly from the tanks of the machines and compared against the machine mounted temperature-measuring devices. The evaluation temperature-measuring device probe shall be placed in the tank near the machine mounted temperature-measuring device probe, if possible.

*sanitizing rinse
TMDs*

(5) A maximum registering temperature-measuring device, remote sensing thermocouple or nonreversible thermo-labels such as paper temperature-measuring devices that turn from silver to black or similar device shall be used to confirm the effectiveness of heat sanitization.

rinse exposure

(6) The maximum registering temperature-measuring device shall be attached in a vertical position in a rack that is exposed to the final sanitizing rinse spray at the approximate level of a plate. The nonreversible thermo-labels shall be attached to the center of a dry ceramic plate.

*high wash /
rinse
temperature
factor*

(7) The effect of the temperatures of the wash water and pumped rinse shall be factored into the evaluation, if the tank thermometers indicate they are above 74°C (165°F). *The maximum-registering TMD may also be checked at the end of each part of the cycle to verify that the wash and rinse temperatures have not been in excess of 71°C (160°F).*

*effective
sanitization*

(8) Effective sanitization shall be evaluated by noting one of the following:

In a mechanical operation, the temperature of the fresh hot water sanitizing rinse as it enters the manifold may not be more than 90°C (194°F), or less than:

(A) For a stationary rack, single temperature machine, 74°C (165°F); or

(B) For all other machines, 82°C (180°F).

(C) A utensil surface temperature of 71°C (160°F) as

measured by an irreversible registering temperature indicator shall be achieved.

indirect methods

(9) *The final rinse spray temperature may be indirectly evaluated by using a non-reversible thermo-labels attached to manifold or by using a calibrated melting temperature wax crayons. A mark is made on a dry portion of the final sanitizing rinse manifold or supply line with a crayon that melts at 82°C (180°F) and another that melts at 91°C (195°F).*

13.7.3.3 Chemical Sanitizing Evaluation

chemical sanitizing

Obtain sample at end of the final chemical sanitizing rinse cycle, and use a sanitizer test kit to confirm sanitizer level is at minimum specified on machine data plate and in these guidelines.

13.7.4 Routine Monitoring

periodic detailed evaluations

Proper warewashing is critical to protecting the health of a vessel's passengers. The procedures provided in this annex may assist the vessel crew in periodically verifying the proper operation of its warewashing machines. Following the manufacturer's recommendations for maintenance and operation will ensure the warewashing machines continue to meet the criteria of these guidelines and standards of ANSI/NSF 3-1996, *Commercial Spray-Type Dishwashing and Glasswashing Machines*.

start-up evaluations

During each warewashing machine's startup, the proper setup and operation of the equipment should be verified with basic checks. These would include checks of the tank, manifold, and curtain assemblies to ensure they are properly installed. Proper operating temperatures should be verified to meet the minimum required temperatures during the start-up.

routine operation evaluations

Periodic operation and temperature checks by the warewashing crew during the warewashing time should detect problems soon after they occur. The person removing the clean and sanitized ware must examine each piece to determine if it is clean. Periodic management checks of the warewashing process during operation verify that the machines are operating properly and the utensils processed are indeed clean and sanitized.

simple records

Simple records can assist in the warewash machine monitoring process. A review of these records can ensure

proper monitoring is being conducted and assist in determining a gradual or severe malfunction of the machine.