**Conference for Food Protection**

**2010 Issue Form**

**Internal Number: 085**

**Issue: 2010 III-007**

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| **Council Recommendation:** | Accepted as  Submitted |  | Accepted as Amended |  | No Action |  |
| **Delegate Action:** | Accepted |  | Rejected |  |  |  |

*All information above the line is for conference use only.*

**Title:**

Reduced Minimum Temperatures for Mechanical Warewashing Equipment

**Issue you would like the Conference to consider:**

Standards and Codes have evolved over the years to be performance based rather than construction based which fosters innovation and progress while still maintaining the desired requirement. Toward the goal of enabling performance based design, sections 4-501.110 and 4-501.112 should be revised to eliminate the minimum temperature requirements and substitute wording that will allow equipment that has been verified as meeting the sanitization equivalent to 5 log reduction of microorganisms of public health importance. Section 4-703.11 must also be revised to allow a utensil surface temperature less than the current requirement of 160°F.

For far too long the minimum hot water sanitizing temperatures for commercial dishwashers have been wasting valuable energy. Approximately 18% of a typical restaurant's energy consumption is for water heating and sanitation[1]. It is time to reverse this trend and establish guidelines that can provide significant reductions in energy consumption and green-house gas emissions while still maintaining an approved level of sanitization.

The attached research data from the Ohio State University confirms that a 5 log reduction in pathogens of public health concern can be obtained in a conveyor dishwasher with reduced wash and final rinse temperatures. This same machine was also tested for the hot water sanitizing efficacy of 3600 heat unit equivalents (HUE) using NSF International Standard 3-2009 for Warewashing Equipment. These test results are also attached. If adopted in the Food Code, this revision has the potential to reduce the energy consumption for a single tank conveyor dishwasher by approximately 5,300 kW-hrs each year. The potential savings in one year for all conveyor dishwashers could approach 1.8 million kW-hrs. The North American Association of Food Equipment Manufacturers (NAFEM) and the Pacific Gas and Electric, Food Service Technology Center (FSTC) supports this proposal (see attached letters).

Section 4-703.11 of the Food Code must be revised to allow a reduced utensil surface temperature for machines with a reduced final rinse temperature. The 160°F utensil surface temperature was never intended to be a performance criterion, but was adapted as merely an inspection tool. The Food Code paragraphs 4-501.11, 4-501.14 (B), and 4-501.15 require the proper operation of a mechanical dishwasher. If the machine is operating in accordance with the nameplate times, temperatures, conveyor speed, etc. and if the wash and final rinse arms are spraying properly, adequate sanitization will take place. As an alternative to the 160°F utensil surface temperature, there are devices available that can record the time and temperature through the complete process to verify adequate sanitization on-site.

An additional benefit of reduced tank and final rinse temperatures is the potential to reduce cold water tempering of drain water required by section 701.7 and 803.1 of the 2009 International Plumbing Code. This code limits the temperature of water entering the sanitary drainage piping to 140°F to minimize expansion and contraction damage and softening of ABS and PVC pipes.

[1] Young, R., 2008, Greening Food Service Energy Efficiency: Issues and Resources, PG & E Food Service Technology Center

**Public Health Significance:**

This proposed change will maintain the current Code requirement of 5-log reduction in pathogens of public health concern. This can be confirmed by the NSF International Standard 3-2009 sanitizing efficacy performance requirement, or other means acceptable to the Authority Having Jurisdiction (AHJ). As long as the equipment is operated in accordance with the manufacturer's instructions, as required by 4-501.15 (A), adequate sanitization will be achieved. Research has shown that mechanical washing is more effective than manual warewashing and therefore is more flexible in operational parameters[2].

[2] Pascall, M., 2009, The number of warewashing cycles single batches of different chemical detergents can support in meeting the FDA Food Code mandates for commercial dishwashing machines in restaurants, Dept. of Food Science and Technology, The Ohio State University.

**Recommended Solution: The Conference recommends...:**

that a letter be sent to FDA requesting the FDA Food Code be revised as follows:

**4-501.110 Mechanical Warewashing Equipment, Wash Solution Temperature.**

(A) The temperature of the wash solution in spray type warewashers that use hot water to SANITIZE may not be less than:

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

(2) For a stationary rack, dual temperature machine, 66°C (150°F); Pf

(3) For a single tank, conveyor, dual temperature machine, 71°C (160°F); Pf or

(4) For a multitank, conveyor, multitemperature machine, 66°C (150°F). Pf

(B) The temperature of the wash solution in spray-type warewashers that use chemicals to SANITIZE may not be less than 49°C (120°F). Pf

(C) As an alternative to (A) above, the temperature of the wash solution in spray type warewashers that use hot water to SANITIZE may not be less than the marked minimum temperatures on the equipment data plate when the equipment has been evaluated and verified as meeting the sanitizing performance criteria of 5 log reduction of pathogens of public health concern. Pf

**4-501.112 Mechanical Warewashing Equipment, Hot Water Sanitization Temperatures.**

(A) Except as specified in ¶ (B) of this section, 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: Pf

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

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

(B) The maximum temperature specified under ¶ (A) of this section, does not apply to the high pressure and temperature systems with wand-type, hand-held, spraying devices used for the in-place cleaning and SANITIZING of EQUIPMENT such as meat saws.

(C) As an alternative to (A) above, 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 the marked minimum temperature on the equipment data plate when the equipment has been evaluated and verified as meeting the sanitizing performance criteria of 5 log reduction in pathogens of public health concern. Pf

**4-703.11 Hot Water and Chemical.**

After being cleaned, EQUIPMENT FOOD-CONTACT SURFACES and UTENSILS shall be SANITIZED in:

(A) Hot water manual operations by immersion for at least 30 seconds and as specified under § 4-501.111; P

(B) Hot water mechanical operations by being cycled through EQUIPMENT that is set up as specified under §§ 4-501.15, 4-501.112, and 4-501.113 and achieving a UTENSIL surface temperature of 71°C (160°F) as measured by an irreversible registering temperature indicator for machines with a marked minimum final rinse temperature of 180°F (82°C). For machines with a marked minimum final rinse temperature other than 180°F (82°C), the utensil surface temperature shall be as marked on the machine (typically 20°F (11°C) below the marked minimum final rinse temperature); P or...

{Note - this modification will require a new marking on the machine data plate for hot water sanitizing models with less than 180°F final rinse temperature. This will require a similar change to NSF 3.}

**Submitter Information:**

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| Name: | Joel Hipp | | |
| Organization: | Hobart, ITW Food Equipment Group | | |
| Address: | 701 S. Ridge Ave. | | |
| City/State/Zip: | Troy, OH 45374 | | |
| Telephone: | (937) 332-2836 | Fax: | (937) 332-2624 |
| E-mail: | joel.hipp@hobartcorp.com | | |

**Attachments:**

* "OSU\_Study\_on\_sanitizing\_efficacy\_with\_reduced\_temperatures.doc"
* "HUE\_Test\_Result.doc"
* "NAFEM\_Support-Food\_Code\_Change.doc"
* "FSTC\_Letter\_of\_Support\_for\_FDA\_Code\_Change-January\_8\_2010.pdf"
* "History\_of\_Dishwashing\_Machine\_Sanitation\_12\_14\_09-JH.pdf"

It is the policy of the Conference for Food Protection to not accept Issues that would endorse a brand name or a commercial proprietary process.