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Colorado Department
of Public Health
and Environment

MEMORANDUM Consumer Protection Division

TO: Local Health Agencies
Food Program Managers

FROM: Rick Colonno, Plan Review Coordinator
Consumer Protection Division

DATE: March 2, 2007

SUBJECT: Guidance Document for Instantaneous Water Heaters

The following information is provided only as a guideline to be used as a plan review tool in determining an establishment's compliance with the regulatory requirements for adequate peak hot water supply.

To start, determine the (individual) heater unit output from the information provided by the manufacturer for the required temperature rise. If there is not proper documentation available from the manufacturer to determine this, then the unit cannot be approved.

Next, calculate the hot water demand of the system as you would from Appendix D of the Retail Food Regulations but using the Gallon Per Minute (gpm) values supplied in the table attached to this guideline.

Comparing the demand value to the output or supply value will determine the number of heater units needed to meet or exceed the demand of the facility.

In addition, the following notes must be followed.

1. All water heater units considered must be designed for Commercial use.
2. If multiple units are required they must be installed in parallel.

3. Unit(s) flow rates may be calculated utilizing 80° F rise if there are no fixtures requiring input water temperature of 140°F (100°F rise) or more. Flow rates need to be greater than or equal to the calculated peak gallons per minute (gpm) based on the facility's equipment.
 - a. If it is determined that 100° rise water is needed by 1 or more fixtures (high temperature dishwasher), the entire water system demand must be designed and sized, based on the 100° F rise values, unless a separate hot water supply is dedicated to the high temperature fixtures.
4. Any *high temperature* dish machine must have a separate booster heater. An instantaneous water heater cannot fulfill this purpose.
5. A GPM hot water consumption value for any dishwasher, if not supplied by the manufacturer, should be calculated by using the cycle times and hot water usage per cycle.
6. When including any mechanical dishwasher, in addition to the GPM calculated demand value for any dishwasher, a storage tank sized at 20% of the GPH (gallons per hour) dishwasher demand must be installed. The minimum tank size would be 20 gallons. This tank must be installed in the hot water supply line between the heater(s) and the hot water distribution line.
7. The storage tank must have a recirculation line and aquastat (water thermostat) to assure that water in the tank remains at the appropriate temperature, (120-140° F). The line shall connect between the tank and the cold water supply line to the heater unit(s).
8. Where the nearest fixture(s) are located more than 60 feet from the heater(s) or storage tank, a recirculation line may be required as well. In this case, the recirculation line would be connected just upstream of the nearest fixture instead of at the tank. A licensed plumber must determine the proper sizing of a recirculation pump.
9. For sizing purposes, if the heater unit is not rated for altitude, then the flow rate supplied by the manufacturer (for the appropriate degree rise) must be multiplied by the Thermal Efficiency rating.
10. Electric units will only be approved as a dedicated supply to handsinks.
11. If Rinnai or any other brand heaters are being considered that have sizing, installation and system design requirements developed by the manufacturer, then the manufacturer information can be used in assessing the equipment needs and compliance. The documentation, such as those provided by Rinnai, must have been previously established and proven by the company.
12. It is recommended that in no case shall an installation be approved that does not meet or exceed the requirements stated in this guideline.

These criteria should be utilized for proposed installations that service entire establishments. Also, these types of units could provide assistance to establishments that have bars or food operations far removed from the location of their traditional type hot water heaters or boiler units. An example of this would be to install a supplemental tankless unit to serve remote handsinks within restrooms or remote food preparation sites within the establishment.

This document is not intended to address all circumstances that may arise during the course of reviewing plans as they relate to a facility's hot water supply system. It is at the discretion of any local health agency to use this guideline, either in part or whole, if at all. Final approval of water systems utilizing non-traditional or instantaneous style water heaters remains under the authority of the local health agency conducting the plan review or assessment of the retail food establishment.

If, after review, approval, and installation of an instantaneous system, a shortage of hot water is experienced during normal operation of the establishment, the burden of augmentation or replacement of the hot water system, in an effort to comply with the regulation, ultimately rests with the establishment.

Instantaneous hot water calculator.			
Facility Name			
Address			
Hand Sink		.5 GPM each	
3-C Utensil Wash Sinks (single faucet)		2 GPM each	0
Mop Sink		2 GPM each	0
Prep Sink		1 GPM each	0
Can Wash		1 GPM each	0
Other equipment	Enter description below	Enter GPM value below	
Hose-Bibb for Cleaning		5 GPM each	0
Utensil Soak Sink		1 GPM	0
Clothes Washer		2 GPM	0
Shower		1 GPM	0
Pre-Rinse Sprayer		2 GPM	0
Other equipment			0
Total GPM at degrees rise needed			0