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## Summary of Rules for Water Heaters Used for Space Heating, State of Wisconsin, Department of Safety and Professional Services, Industry Services Division December 08, 2016

The Uniform Dwelling Code (UDC), SPS 320-325, only applies to one- and two-family dwellings built since 1980. The Wisconsin Commercial Building Code, SPS 361-366 and the Wisconsin--amended 2009 International Mechanical Code, International Energy Conservation Code, and International Fuel Gas Code apply only to commercial and multi-family dwellings. The Wisconsin Plumbing Code, SPS 381-387, apply to all buildings. Note the code from which a requirement arises, and to what buildings the requirement applies.

- **Wisconsin Boiler Code:** SPS 341.45(1) of this code exempts water heaters from the boiler code.
- **Listing:** Per SPS 323.04 and IFGC 301.3/SPS 365.0301, heating equipment shall be listed and installed per its listing. Water heaters used for space heating need to be listed for such use and their data plate shall indicate that the unit can be used for simultaneous space heating. IFGC 624 specifies that they be listed per ANSI Z21.10.1 or ANSI Z21.10.3. These standards are intended for dual use, which means that in addition to the heating use, the water heater shall also be used for potable use, which may be satisfied with at least one properly-connected plumbing appliance or fixture. (A hose bibb is considered a fixture.)
- **Unlisted Space-Heating Only Equipment:** Space-heating only usage would be considered an unlisted use of water heaters, listed per ANSI Z21.10.1 or ANSI Z21.10.3 for dual-use. SPS 365.0301(2) for gas-fired appliances, and SPS 364.0301(3) for other fuels, allow unlisted equipment if a Wisconsin-registered engineer or architect tests the appliance output and safety controls to these or other appropriate standards as determined by the manufacturer. This may be done for each installation or the manufacturer may obtain a Wisconsin Material Approval for repetitive installations. These material approvals may also be valid under the UDC.
- **Efficiency:** Federal appliance efficiency standards have precedence over Wisconsin's efficiency requirements for smaller appliances, if there is a standard developed for a specific unit. Federal rules require that a manufacturer meet the standard for the type of appliance that the manufacturer is marketing the unit as. There is a federal standard for potable water heaters. There is a federal standard for boilers, which would apply to water heaters used for space heating only. There is **no** state or local responsibility or authority to enforce the federal rules.
- **Sizing:** Per SPS 323.04(5), SPS 364.1001, IFGC 624 for gas appliances, and SPS 382.40(5) (a), a dual-use water heater shall be sized to provide sufficient hot water to supply both the daily and hourly peak loads of the building.

- **Plumbing Code:** Any equipment or piping that comes in contact with potable water must meet the potable water plumbing materials standards. (A Wisconsin Plumbing Products Approval is not required.) The installation of the system that comes in contact with the potable water system must be installed by a properly-credentialed plumber. A floor drain must be provided for the water heater, if the water heater is installed on the lowest floor level. If a heat exchanger is used and only non-toxic grade additives are used, it may be a single-wall heat exchanger. If toxic additives are used, then the heat exchanger shall be a vented, double-wall heat exchanger as required by SPS 382.41(3)(d). The valving and safety devices on the system must comply with the Wisconsin Plumbing Code.
- **Non-potable piping:** If the listing, engineer/architect statement, or Wisconsin Material Approval permits the installation of backflow prevention at the water heater inlet or isolation of the water heater, then non-potable piping and devices may be used. Non-potable, heat distribution piping shall comply with Chapter. 12 of the IMC.
- **Backflow Protection:** If backflow protection is installed before the water heater, then the building's water system is no longer available for expansion of the heated water. A temperature-pressure relief valve must be selected in coordination with the backflow preventer. There needs to be an expansion tank or other expansion means provided. These items, if allowed, shall be installed per the water heater's listing.
- **Non-potable labeling -** Where a building or a structure is served by a non-potable water distribution system and a potable water distribution system, each distribution system shall be identified in accordance with SPS 382.40(3)(d). The piping, valves and outlets downstream of the backflow preventer to the point of connection to the boiler shall be labeled as Non Potable Water or Not Safe for Drinking per Table SPS 382.40-1a .
- **Temperature Setting:** Per s. 704.06 of the Wisconsin statutes, a residential landlord shall set the potable water heater temperature no higher than 125 degrees F. Per SPS 381.01(126) of the Plumbing Code, the minimum water temperature for hot potable water is 110 degrees F.
- **Isolated Water Heaters:** If a water heater is installed with no connection to the potable water system, then typically, proper water expansion means shall be provided per the water heater's listing.
- **Pipe Insulation:** Per SPS 322.44, heating pipes shall be insulated to a minimum of R-4.
- IECC 403.3 requires mechanical system piping capable of carrying fluids above 105°F or below 55°F to be insulated to a minimum of R-3. IECC 403.4 requires all circulating service hot water piping in low rise residential buildings with three tenants or more is to be insulated to a minimum of R-2. IECC 503.2.8 defines minimum insulation requirements for all piping serving as part of a heating or cooling system in commercial buildings, or high rise residential buildings four stories or more above grade with three tenants or more. IECC 504.5 defines minimum insulation requirements for automatic circulating hot water systems installed in commercial buildings or high rise residential buildings four stories or more above grade.
- **Combustion Air:** Combustion air shall be provided per SPS 323.06, IFGC 304 for gas fired appliances or IMC 701 for all other fuels.

For more information, contact your local building inspector or the State of Wisconsin, Department of Safety and Professional Services, Industry Services Division at 608-266-2112.