



New Castle County Government Center
87 Reads Way
New Castle, DE 19720
Department of Land Use - Building Inspections

Date: **August 23, 2012**
Subject: **Thermal expansion control requirements**
References: **2009 International Plumbing Code**

This Staff Code Interpretation is intended to be used to clarify Section 607.3 in the above referenced Code Edition.

Below is the exact text from the section of the 2009 International Plumbing Code in question.

Section 607.3, Thermal expansion control. A means of controlling increase pressure caused by thermal expansion shall be provided where required in accordance with Sections 607.3.1 and 607.3.2.

Question: Does a water distribution system with tankless water heater require control of pressure increases caused by thermal expansion?

Answer: It depends on the configuration of the hot water distribution system. Consider the following:

System A: Water distribution system with a tankless, on-demand water heater (electric or gas) without a storage tank. In this system, water is heated only when a hot water outlet is open. Because the water distribution system is now an 'open' system (i.e. a hot water outlet is open), any thermal expansion is relieved through the open hot water outlet and no pressure increase can occur. When the outlet is closed, the system becomes a closed system but, since the flow has ceased, the tankless water heater stops heating the water. Therefore, methods for controlling pressure increases due to thermal expansion are not required.

System B: Water distribution system with tankless, on demand water heater (electric or gas) with a storage tank. The water service line has a backflow preventer (such as a dual check valve at the water meter). In this system, an unfired hot water storage tank may be required to provide for hot water recirculation to lessen the "wait time" for hot water to arrive at any fixture. Or the storage tank might be required to provide for large simultaneous hot water demands (that the tankless water heater cannot produce without the storage).

STAFF CODE INTERPRETATION

For either reason, as the hot water storage tank cools off, a circulation pump is switched on to cause flow out of the storage tank, through the tankless water heater and back into the storage tank until the water in the storage tank is at an acceptable temperature level. Because there will be times where no hot water outlet is opened during the time that the tankless water heater is heating water, the water distribution system is a closed system. Therefore, a means for controlling pressure increases due to the thermal expansion must be provided.

NCC Stance: When a tankless water heater is connected to a secondary storage tank, a means of controlling thermal expansion shall be provided (typically an expansion tank).

Code Updates: The adoption of the 2015 IPC has introduced new language which further clarifies this section's requirements for expansion control.

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