

**INTERPRETATION IC 90.1-2010-32 OF
ANSI/ASHRAE/IES STANDARD 90.1-2010
Energy Standard for Buildings Except Low-Rise Residential Buildings**

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Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE/IES Standard 90.1-2010, Sections G3.1.3.5, G3.1.3.10 and G3.1.3.11, regarding chilled water / hot water loop control and pump control.

Background: Hot Water Loop and Pump Operation: Section G3.1.3.5 states “The pumping *system* shall be modeled as primary-only with continuous variable flow.” It is unclear whether “continuous” flow refers to 8,760 hours per year, or “continuous flow” when there is a heating demand. However, if operated 8,760 hours per year, the Baseline hot water pump energy would be significantly higher than for a system that is shut down in periods when there is no heating load. Furthermore, operating the hot water loop 8,760 hours per year when there are prolonged periods with no heating load appears to contradict ASHRAE mandatory provisions for Automatic Shutdown (Section 6.4.3.3.1) and Optimum Start (Section 6.4.3.3.3).

Chilled Water and Condenser Water Loop and Pump Operation: Section G3.1.3.11 states: “Each chiller shall be modeled with separate condenser water and chilled water pumps interlocked to operate with the associated chiller.” Section G3.1.3.10 states that systems shall be modeled either as “primary/secondary systems with variable speed drives on the secondary loop” or as “Primary/secondary *systems* with secondary pumps riding the pump curve”. The requirement for primary chilled water pumps and condenser water pumps to be “interlocked to operate with the associated chiller” appears to suggest that the chilled water and condenser water loops should only operate during periods when there is cooling demand. This also appears to be consistent with ASHRAE mandatory provisions for Automatic Shutdown (Section 6.4.3.3.1) and Optimum Start (Section 6.4.3.3.3).

Interpretation No.1: The Appendix G requirement for the Baseline hot water pumping system to be “modeled as primary-only with continuous variable flow” means that the hot water loop and pump(s) shall be modeled to operate in “on-demand mode”. In other words, the loop and pumps shall be modeled to operate continuously when there is heating demand on the loop, and shall be off during periods when there is no demand on the loop.

Question No.1: Is this interpretation correct?

Answer No.1: Yes.

Interpretation No.2: The Appendix G requirement for the Baseline primary chilled water pumps and condenser water pumps to be “interlocked to operate with the associated chiller” means that the chilled water primary and secondary loop, and the condenser water loop shall be modeled to operate in “on-demand mode”. In other words, the primary and secondary chilled water loop(s), chilled water pumps, condenser water pumps, and cooling tower shall be off during periods when there is no demand on the loop.

Question No.2: Is this interpretation correct?

Answer No.2: Yes.