

**INTERPRETATION IC 90.1-2010-31 OF
ANSI/ASHRAE/IES STANDARD 90.1-2010
Energy Standard for Buildings Except Low-Rise Residential Buildings**

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Request from: Junaid Bin Naseer, KEO Office, Mezzanine Floor, Jazeera Tower, P. O. Box 27594, Abu Dhabi.

Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE/IES Standard 90.1-2010, Sections G3.1.3.8, 3.1.3.9 and 3.1.3.10, regarding district cooling systems.

Background: I am working on a mixed used project in Saudi Arabia. District Cooling is only used in the proposed design therefore section G3.1.1.3.2 applies to our project.

The conflict arises when modeling district cooling for baseline and proposed systems. It is not clear from sections G3.1.3.8, G3.1.3.9 & G3.1.3.10 regarding Heat Exchangers Sizes, control strategy, and chilled water pumps.

In our proposed design, and in our plot boundary (chilled water plant/district cooling plant is located outside boundary), an ETS room is present which contains:

- a. Chilled Water Pumps with VFD
- b. Plate Heat Exchangers
- c. Chemical Dosing Pots etc.

The chilled water cold line comes into the heat exchangers at 4.4°C & leaves the heat exchanger at 5.5°C to the chilled water pump and then to the building load. Chilled water returns from the building at 14.4°C and passes through heat exchanger and back to the main outgoing line provided by the chilled water distributor.

Interpretation No.1: We understand that Appendix G's intent is to negate the advantage of district cooling savings when compared to baseline system. Therefore, we interpret that when district cooling is used, the baseline-chilled water system should be exactly similar to the proposed system.

Question No.1: Is this interpretation correct?

Answer No.1: No, Appendix G's direction for projects using purchased cooling and heating is intended to remove the impact of cooling and heating source equipment efficiencies from the building performance rating by using the same purchased energy rates in the baseline and proposed designs. When purchased chilled water is used as the cooling source in the proposed design, the baseline building design should also use purchased chilled water as the cooling source, but the baseline building design system should be as specified in Appendix G. The proposed design purchased chilled water system should be as designed and installed. The chilled water utility rate should be the same for the baseline and proposed.

Interpretation No.2: The chilled water supply temperature for baseline system should be the same as the proposed design and which in our case is 5.5°C supply temperature and 14.4°C return temperature.

Question No.2: Is this interpretation correct?

Answer No.2: No, when purchased chilled water is used as the cooling source in the proposed design, the baseline building design should also use purchased chilled water as the cooling source, and the baseline building design chilled water supply and return temperature should be modeled as 6.7°C and 13°C respectively, as specified in Section G3.1.3.8. The proposed design chilled water temperatures should be as designed and installed.

Interpretation No.3: The baseline design chilled water reset should be based on the proposed design system control sequence rather than section G3.1.3.9 Chilled Water Supply Temperature Reset.

Question No.3: Is this interpretation correct?

Answer No.3: No, when purchased chilled water is used as the cooling source in the proposed design, the baseline building design should also use purchased chilled water as the cooling source, and the baseline building design chilled water supply temperature reset should be as specified in Section G3.1.3.9. The proposed design chilled water temperature reset should be as designed and installed.

Comment: Note, the approach described above may result in higher chilled water pump energy use in the baseline and no reduction in chilled water generation energy since the district generation equipment is not being directly modeled in the baseline. An addendum to ASHRAE 90.1-2013 (addendum bv) revised Section G3.1.3.9 to eliminate the chilled water temperature reset requirement for baseline purchased chilled water systems. If this addendum is followed, no chilled water supply temperature reset is required for the baseline model. The proposed design model would be required to be modeled with the design chilled water temperature controls.

Interpretation No.4: The baseline design chilled water pump power, quantity and speed control should be the same as the proposed design.

Question No.4: Is this interpretation correct?

Answer No.4: No, when purchased chilled water is used as the cooling source in the proposed design, the baseline building design should also use purchased chilled water as the cooling source, and the baseline pump power and controls should be modeled as specified in Section G3.1.3.10. The proposed design chilled water pump power, quantity, and speed control should be as designed and installed.

Interpretation No.5: The proposed system should be modeled per design documents and the baseline design chilled water should follow Appendix G requirements.

Question No.5: Is this interpretation correct?

Answer No.5: Yes, when purchased chilled water is used as the cooling source in the proposed design, the baseline building design should also use purchased chilled water as the cooling source. The proposed system should be modeled as designed, and the baseline building design system should be modeled as specified in Appendix G.