

**INTERPRETATION IC 90.1-2007-31 OF
ANSI/ASHRAE/IESNA STANDARD 90.1-2007
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/IESNA Standard 90.1-2007, Section G3.1.1 Exception b and Table 3.1.1B, regarding Baseline HVAC System Type & Description.

Background: Exceptions to System 8.

We are currently working on a project which has residential and non-residential areas. The following are details of the project:

Climate Zone: 1B

Area: 58,613 m²

Residential Area: 24,232 m²

Non-Residential Area (Conditioned): 13,884 (Floors Greater Than 5)

No Electric Source: Baseline Selected Electric and Other

The baseline system selected for residential area is system 2 PTHP whereas for non-residential, System 8 is selected. As per exceptions in section G3.1.1 Exception b, spaces differing in following elements area assigned system 4.

1. Heat Dissipation Greater than 31.2 W/m²
2. Occupancy Schedule
3. Operating Schedule (40 hours more than system 8)
4. Room Set points
5. Retail Space area 885m² (2 separate floors) (Core and Shell)

The non-residential dominant space is corridor with an area of 5,666 m² and floors greater than 5. The electrical/mechanical/IT rooms have an area of 4,445 m² but the process load and room set points are different therefore system 4 is chosen for baseline.

The corridor is considered to have a continuous set point of 23°C whereas Electrical/Mechanical/IT Rooms are considered to be 26°C.

Interpretation No.1: It is correct to assign SYSTEM 4 to rooms/spaces having a different room set points than System 8 even if operating schedule and process load is within 31.2 W/m².

Question No.1: Is this interpretation correct?

Answer No.1: NO

Comments No.1: Because the space does not have occupancy or process loads or schedules that differ significantly from the rest of the building, see exception (b) of G3.1.1.

Interpretation No.2: It is correct to assign SYSTEM 4 to Retail as the operating schedule for it is 84 hours weekly whereas for System 8 (dominant) is 168 hours.

Question No.2: Is this interpretation correct?

Answer No.2: YES

Comments No.2: Provided that this corresponds to greater than 40 equivalent full load hours per week.

Background: Baseline System Descriptions.

As per Table G3.1.1B, System 2 PTHP has a Fan Control of constant volume whereas cooling system is direct expansion.

The residential spaces in baseline building are served by System 2 PTHP where Fan is assumed to cycle on and off during unoccupied hours to maintain setback temperature whereas during occupied hours it runs on constant volume.

The compressor cools the refrigerant which cools the air at 12°C (Room Setpoint – 11°C) and ventilation is considered off during unoccupied hours for baseline system. The compressor of baseline system is connected to room thermostat and starts on/off to maintain space temperature.

Interpretation No.3: In proposed design the ventilation is on during unoccupied times as it is in climate zone 1b. It is justifiable to keep ventilation on for baseline system as well because switching off proposed ventilation will not represent real life condition.

Question No.3: Is this interpretation correct?

Answer No.3: NO

Comments No.3: From Table G3.1 part 4 Schedules the proposed ventilation should cycle on and off when unoccupied unless it qualifies for one of the exceptions. The baseline and proposed should have the same ventilation rate and schedule. Also according to G3.1.2.5 the minimum outdoor air ventilation rates shall be the same for the proposed and baseline building designs.

Interpretation No.4: It is not clear from the standard the working of direct expansion cooling system. It is correct to simulate the direct expansion cooling system cycle on and off during all the times to meet space temperature.

Question No.4: Is this interpretation correct?

Answer No.4: NO

Comments No.4: The compressors may cycle on and off to meet the space temperature setpoint but the supply and/or return fan should operate continually when spaces are occupied and cycled when unoccupied as described in G3.1.2.4.