

**INTERPRETATION IC 90.1-2013-24 OF
ANSI/ASHRAE/IES STANDARD 90.1-2013
Energy Standard for Buildings Except Low-Rise Residential Buildings**

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Request from: Scott Lindgren, U.S. Army Corps of Engineers, 1616 Capitol Avenue, Omaha, NE 68102.

Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE/IES Standard 90.1-2013, Sections 3, 9.4.1.1 and 9.6.1, regarding automatic daylighting control implications of subspaces of the same space type (but with independent functions) within a larger, uninterrupted space.

Background: Section 9.4.1.1 Items (e) and (f) provide lighting power thresholds for automatic daylighting controls requirements for sidelighting and toplighting applications. The ASHRAE 90.1 User Manual sections corresponding to automatic daylighting controls do not explicitly indicate the rationale behind these thresholds, however, the requester assumes the thresholds in the generic requirements were established with the same or similar rationale as the 200W threshold for the Climate Zone 8 exception: the energy savings below this threshold do not justify the daylighting control expenses (ASHRAE 90.1-2013 User Manual page 9-11).

“Space” is defined in Section 3.2 “Definitions” as “an enclosed space within a building. The classifications of spaces are as follows for the purpose of determining building envelope requirements ...” The context of this definition is largely centered around HVAC applications. Lighting control zones are not included in the “space” definition, nor in the discussion of subspaces in Chapter 9.

Section 9.4.1.1 states the space type used for determining control requirements shall be the same space type used to determine the LPD. Section 9.6.1 states “[i]f a space has multiple functions, where more than one space type is applicable, that space shall be broken up into smaller subspaces, each using its own space type from Table 9.6.1” for the purposes of “Lighting Power Allowance” per the title and contents of the section, however, this space division makes no mention of control requirements. Sections 9.4 and 9.6 do not address zonal control requirements for large spaces with several identical but independent areas.

Example: Three equally-sized identical screening/sorting areas/zones have no separating partitions and are approximately 1,100 SF each (approximately 3,300 SF total). Each area/zone has dedicated lighting controls. The luminaire layout is designed to provide sufficient performance in each area/zone independent of the function of other areas/zones. One side of the collective enclosed space has windows spanning across all three areas/zones, creating primary and secondary sidelighted areas. Each individually-controlled area/zone does not have sufficient lighting power to meet the threshold requiring sidelighting control in either the primary (150W) or primary plus secondary (300W) areas, however, the collective space exceeds these thresholds but would require three sets of daylighting controls because of the functional zone controls provided.

Similar language has been used in 90.1-2010, 90.1-2016 and 90.1-2019; 2010 daylighting thresholds are by area rather than by lighting power.

Interpretation No.1: Section 9.6.1 “multiple functions” may be interpreted to be “independent functions”, even if the functions of the zones within the enclosed space are identical.

Question No.1: Is this interpretation correct?

Answer No.1: No

Comments: The rationale behind allowing a single space to be broken up into subspaces, each using its own space type from Table 9.6.1, is for determining the LPD requirements for spaces with different primary uses, and thus different lighting power allowances. In the example given there is only one space type, one primary use, and one lighting power allowance.

Interpretation No.2: Division of a space into subspaces permits the corresponding control requirements of Table 9.6.1 to be used for each subspace, similar to the LPD application to each subspace.

Question No.2: Is this interpretation correct?

Answer No.2: Yes

Comments: The control requirements allocated in Table 9.6.1 must be followed. However, the daylighting requirements in 9.6.1 refer to 9.4.1.1.(f) which does not recognize subspaces.

Interpretation No.3: The ASHRAE 90.1-2013 power thresholds for automatic daylighting control were established by life-cycle cost analysis, and independently-controlled zones whether as a function of subspace lighting controls or separate control zones in a large undivided space shall be permitted to be calculated by control zone because separate costs will be associated with each control zone based on an extension of the User Manual rationale provided for the Climate Zone 8 exception, not necessarily each “space” or “subspace”.

Question No.3: Is this interpretation correct?

Answer No.3: No

Comments: There is no reference to “independently-controlled zones whether as a function of subspace lighting controls or separate control zones in a large undivided space shall be permitted to be calculated by control zone because separate costs will be associated with each control zone based on an extension of the User Manual rationale provided for the Climate Zone 8 exception, not necessarily each “space” or “subspace”. Additionally, the User Manual does not alter the Standard and is intended to be informational in nature.

Interpretation No.4: Section 9.6.1 “each using its own space type” means each subspace is designated with a space type, and the space type may be the same or different space type as other subspaces within the enclosed space as long as each space has a separate use and is provided with controls and performance supporting such separate use.

Question No.4: Is this interpretation correct?

Answer No.4: No

Comments: Space type is determined by the primary use of the space and is selected from the space types listed in Table 9.6.1. Breaking a space up into any subspaces is only applicable if the primary use of the proposed subspace is substantially different from another subspace that is listed as a space type in Table 9.6.1. In the example provided the proposed subspaces have the same primary use.

Interpretation No.5: Zones within an enclosed space which are independently controlled may be divided into subspaces of the same space type where the separately controlled zones have independent uses and are not dependent on the function of adjacent subspaces (even of the same space type). Consequently, calculations regarding daylight harvesting thresholds may be treated on an individual zone “subspace” basis rather than for the collective enclosed space. The zone boundaries shall form the extents of the sidelighted and toplighted areas for the respective zones.

Question No.5: Is this interpretation correct?

Answer No.5: No

Comments: There is no allowance for “subspaces of the same space type”. The existence of a subspace is predicated on the need for a separate space type. In the example given there is only one space type.