



YOUR PROFESSIONAL ENGINEERING TEAM SINCE 1957

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Building 206 ASHRAE Standard 55 Compliance

Introduction:

This document outlines the building systems and outdoor design conditions such that the indoor thermal conditions in the occupied spaces are maintained as specified by the Analytical Comfort Zone Method explained in ASHRAE Standard 55.

Outside Air Conditions and Design Conditions:

Design Conditions	Summer (Cooling)	Winter (Heating)
Peak Conditions (.4% DB)	99° F (0.4%) DB	21° F (99.6%) DB
Hours per typical year that exceed peak weather design conditions	35 Hours	35 Hours
Design Operative Temperature	75° F	70° F
Design Humidity (RH%)	60%	20%
Average Air Speed	20 ft/min	20 ft/min

*Note: ASHRAE Handbook 2013 Fundamentals Chapter 14 used for peak condition data.

Total Indoor Load (cooling): 250,000 BTU/Hr (Areas affected by the Standard)

Clothing Level and Metabolic Rates Used for PMV and PPD Calculations:

Space Type	Clothing Level (CLO)		Metabolic Rate (MET)
	Winter	Summer	
Room 106 (larger)	.94 - .986	.426 - .576	1.266
Rooms 107-188, 153-170, 205-212, 214-221, 253-262, 264-271	.94 - .986	.426 - .576	1.19
Offices/IT/Consulting 102, 103, 104, 122, 123, 124, 202, 213, 225, 263	.97 - 1.21	.376 - .816	1.196
TV Rooms 119, 171, 222, 272	1.1	.6 - .8	1.05
Laundry/Multipurpose 152, 174, 203, 275	≤.93	≤0.5	1.55
Staff Break 252	.97 - 1.24	≤.75	1.28

The clothing levels and metabolic rates above were used as inputs into the ASHRAE Thermal Comfort Tool Version 2 to calculate the PMV and PPD values on the following page.

Predicted Mean Vote (PMV) and Predicted Percentage of Dissatisfied (PPD):

Space Type	PMV		PPD (%)	
	Winter	Summer	Winter	Summer
Room 106 (larger)	-0.21 to -0.15	-0.18 to 0.1	6% - 5%	6% - 5%
Rooms 107-188, 153-170, 205-212, 214-221, 253-262, 264-271	-0.37 to -0.30	-0.35 to -0.05	8% - 7%	8% - 5%
Offices/IT/Consult 102 ,103, 104, 122, 123, 124, 202, 213, 225, 263	-0.31 to -0.01	-0.45 to 0.35	7% - 5%	9% - 8%
TV Rooms 119, 171, 222, 272	-0.47	-0.33 to 0.05	10%	7% - 5%
Laundry/ Multipurpose 152, 174, 203, 275	0.21	0.41	6%	8%
Staff Break 252	-0.15 to 0.16	0.39	5% - 6%	8%

*Note: Ranges calculated using the extreme values of the clothing levels and metabolic rates listed on the preceding page.

Spaces Not Included Under Standard:

Space	Reason for Exclusion
All Corridors	Occupants won't typically be spending more than 15 minutes in corridors at a time. They will use them frequently for transit.
All Restrooms	Occupants will not regularly be spending more than 15 minutes in any bathroom. Showering is the only exception, but showering isn't under the scope of the standard.
All Stairwells	See Corridors
Sprinkler 101	Occupants will only have to check this once a week at most. For a period less than 15 minutes.
Electric 126, 227	See Sprinkler
Housekeeping 172, 223, 273	Occupants will only enter this room to get supplies. Occupants will not stay more than 15 minutes inside the room at one time.
Storage 173, 201, 204, 224, 274	See Housekeeping.

*Note: Section 2 of the Standard clearly defines the scope of the Standard. These spaces were excluded because they did not fit under this definition.

Local Thermal Discomfort:

According to the ASHRAE Standard 55 section 5.3.4.1, “Applicability,” local thermal discomfort needs to be addressed when a space’s clothing level is less than .7 and metabolic rate is less than 1.3. Every space in building 206 has clothing levels above .7 clo during the winter. The Laundry and Multipurpose rooms all have metabolic rates above 1.3 during both the winter and summer. All rooms excluding the Laundry and Multipurpose rooms have been considered and addressed in the sections below.

Radiant Temperature Asymmetry: All occupied spaces in building 206 are conditioned and insulated. The floor, ceiling and wall temperatures will be very similar to the room’s temperature, and thus radiant temperature asymmetry won’t be a problem.

Draft: Chilled beams tend to have very low air volume, so the average air speed will never exceed 30 ft/min. A draft does not need to be considered.

Vertical Air Temperature Difference: In accordance with the 2015 ASHRAE Handbook HVAC Applications 57.20, active chilled beams directly supply a mixture of primary and secondary air and should therefore be treated as a fully mixed air distribution system. Vertical air temperature difference does not need to be considered

Floor Surface Temperature: As stated all walls, floors and ceilings are insulated. Therefore the floor’s temperature will be relatively the room’s temperature. The design operative temperature is either 70° F or 75° F, so the floor will never be lower than 66.2° F or higher than 84.2° F.

The entirety of building 206 complies with Section 5 of the Standard, and thus does not risk local thermal discomfort as shown in the topics above.

System Equipment Capacities:

Space	Cooling Capacity	Heating Capacity	Model Number	Unit Size	Number of Units
Consulting: 1A, 1B, 1D, 2A, 2B (103, 104, 123, 263, 213); IT 1 (124)	2,606	5,107	IQIB	6'	1
SSA 1 (102); TV: (119, 171, 222, 272); Multipurpose 1A, 1B, and 275 (174, 275, 152); Consulting 1C (122); IT 2 (225); Staff Break (252)	5,212	10,114	IQIB	6'	2
SSA 2 (202)	7,818	15,321	IQIB	6'	3
Room 106-118, 153-170, 205-212, 214-221, 253-262, 264-271	3,227	2,987	IQFH	8'	1
Laundry 203	5,937	4,726	IQFH	16'	1

*Note: All capacities and loads measured in BTU/Hr. All units are SEMCO brand chilled beams.