Cooling Load Method	CLTD

Default Input Data Criteria

**** Default data to use only for spaces that hasn't an actual value or not listed in the following tables, otherwise the real value to be used***

1) Climatic conditions

Outside DB temperature	109.8 ºF
Outside WB temperature	75.9ºF
Daily temp range	22.5ºF
Latitude	21.7 N
Longitude	39.18 E
Elevation (Altitude)	56 Feet

Ref. *ASHARAE Fundumental 2013, Ch. 14 CLIMATIC DESIGN INFORMATION

2) Building Material Data

External Walls	U =	0.11 Btu/hr ft^2 °F		
Partition Walls	U =	0.38 Btu/hr ft^2 °F	Temp. Diff.	10°F
Flooring/Ceiling Partition	U =	0.38 Btu/hr ft^2 °F	Temp. Diff.	10°F
Roof	U =	0.15 Btu/hr ft^2 °F		
Glass				
	U =	0.44 Btu/hr ft^2 °F		
	Shading Coef =	0.5		
	Clearance Factor =	1		
Door	U =	0.6 Btu/hr ft^2 °F	**Ref. SBC 601 Energy Conservation**	
Skylight (double Glazing)	U =	1.4 Btu/hr ft^2 °F	**Ref. SBC 601 Energy Conservation**	

Ref. *Assumed as per common Arch. Material selection (vary as per final approval)

3) Electrical Input Criteria

Lighting Criteria	3 W / Ft^2	Unless space is not listed in Lighting Power Densities tables , use this value
Equipment Criteria	1 W / Ft^2	Unless space is not listed inEqupment heat gain tables, use this value

4) People Criteria Unless space is not listed in ventillation tables, use the following value

Density	80 Ft^2 / Person
Activity Level	Office Work

5) HVAC Equipment Criteria

System Type	VAV	**Ref.**	***Design Concept**
Leaving DB Temp.	50 ºF	**Ref.**	***Design Concept**
Buildings that connected to KAU CUP			
Chiller Entering Temp. Diff.	60 ºF	**Ref.**	***KAU CUP Value**
ChillerWater Leaving Temp.	46 ºF	**Ref.**	***KAU CUP Value**
Buildings that connected to Stand alone chiller			
Chiller Entering Temp. Diff.	58 ºF	**Ref.**	***Design Concept**
ChillerWater Leaving Temp.	42 ºF	**Ref.**	***Design Concept**
Ductwork Temp. Change			
	Summer Rise		
	Supply =	1	
	Supply =	0.25	

Unconditioned temperature for partitions is 86 ºF

6) Indoor temperature condition

74 ºF	DB
50%	RH

Ref. *ASHARAE Application 2011, Ch. 7 EDUCATIONAL FACILITIES

7) Fresh air

Ref. *ASHRAE Standard 62-2007 - Ventilation for Acceptable Indoor Air Quality

Ventilation

Table 6-1

Space	People Outdoor Air Rate	Area Outdoor Air Rate	Occupant Density (1)	Combined Outdoor Air Rate (2)
	CFM/Person	CFM/Ft²	#/1000 Ft² or #/100 m²	CFM/Person
Lecture classroom	7.5	0.06	65	8
Lecture hall (fixed seats)	7.5	0.06	150	8
Science laboratories	10	0.18	25	17
University / college laboratories	10	0.18	25	17
Computer lap	10	0.12	25	15
Office Space	5	0.06	5	17
Reception Area	5	0.06	30	7
Telephone / Data Entry	5	0.06	60	6
Main Entry Lobbies	5	0.06	10	11
Lobbies	7.5	0.06	30	10
Corridors	-	0.06	-	-
Media center	10	0.12	25	15
Theater	10	0.06	35	12
Restaurant dining rooms	7.5	0.18	70	10
Cafeteria / Fast-food dinning	7.5	0.18	100	9
Conference / meeting	5	0.06	50	6
Storage rooms	-	0.12	-	-
Bedroomlliving room	5	0.06	10	11
Laundry Room	5	0.12	10	17
Electrical equipment Rooms	-	0.06	-	-
Elevator machine rooms	-	0.12	-	-
Transportation waiting	7.5	0.06	100	8
Auditorium seating area	5	0.06	150	5
Places of religious (Masjid)	5	0.06	120	6
Libraries	5	0.12	10	17
Swimming (pool & deck)	-	0.48	-	-

(1) Default occupant density: The default occupant density shall be used when actual occupant density is not known

(2) Default combined outdoor air rate (per person): This rate is based on the default occupant density

(3) Smoking: This table applies to no-smoking areas. Rates for smoking-permitted spaces must be determined using other method

(4) Unlisted occupancies: If the occupancy category for a proposed space or zone is not listed, the requirements for the listed occupancy category that is most similar in terms ofoccupant density, activities and building construction shall be used

Exhaust

Table 6-4

Space	Exhaust Rate	Exhaust Rate
	CFM/Unit	CFM/Ft²
Copy, printing rooms	-	0.50
Educational science laboratories	-	1.00
Janitor closets, trash rooms, recycling	-	1.00
Kitchenettes	-	0.30
Residential kitchens	50 / 100	-
Locker rooms	-	0.50
Parking garages	-	0.75
Pet shops (animal areas)	-	0.90
Storage rooms, chemical	-	1.50
Toilets - Private	25 / 50	-
Toilets - Public	50 / 70	-

8) Lighting Power Densities

Ref. *ASHARAE Fundumental 2013, Ch. 18 Nonresidential Cooling and Heating Load Calculations

Lighting Power Densities Using Space-by-Space Method **Table 2**

Space	W / Ft²
Classroom/lecture/training	1.24
Conference/meeting/multipurpose	1.23
Corridor/transition	0.66
Electrical/mechanical	0.95
Food preparation	0.99
Lobby	0.90
Lounge/recreation	0.73
Locker room	0.75
Restrooms (Toillet)	0.98
Stairway	0.69
Exhibit space	1.45
Storage	0.63
Religious buildings	1.53
Warehouse	
Fine material storage	0.95
Medium/bulky material storage	0.58
Atrium	
First 40 ft in height	0.03 per ft (height)
Height above 40 ft	0.02 per ft (height)
Office	
Enclosed	1.11
Open plan	0.98
Laboratory	
For classrooms	1.28
For medical/industrial/research	1.81
Library	
Card file and cataloging	0.72
Reading area	0.93
Stacks	1.71
Hospital	
Corridor/transition	0.89
Emergency	2.26
Exam/treatment	1.66
Laundry/washing	0.60
Lounge/recreation	1.07
Medical supply	1.27
Nursery	0.88
Nurses' station	0.87
Operating room	1.89
Patient room	0.62
Pharmacy	1.14
Physical therapy	0.91
Radiology/imaging	1.32
Recovery	1.15

9) Equipment Heat Dissipation

Ref. ***ASHARAE Fundamental 2013, Ch. 18 Nonresidential Cooling and Heating Load Calculations**

RecommendedRates of Radiant and Convective Heat Gain from Unhooded Electric AppliancesDuring Idle (Ready-to-Cook) **Table 5A**

Appliance	Rate of Heat Gain, Btu/h			
	Sensible Radiant	Sensible Convective	Latent	Total
Cabinet: hot serving (large), insulated*	400	800	0	1200
hot serving (large), uninsulated	700	2800	0	3500
proofing (large)*	1200	0	200	1400
proofing (small 15-shelf)	0	900	3000	3900
Coffee brewing urn	200	300	700	1200
Drawer warmers, 2-drawer (moist holding)*	0	0	200	200
Egg cooker	300	400	0	700
Espresso machine*	400	800	0	1200
Food warmer: steam table (2-well-type)	300	600	2600	3500
Freezer (small)	500	600	0	1100
Hot dog roller*	900	1500	0	2400
Hot plate: single burner, high speed	900	2100	0	3000
Hot-food case (dry holding)*	900	1600	0	2500
Hot-food case (moist holding)*	900	1800	600	3300
Microwave oven: commercial (heavy duty)	0	0	0	0
Oven: countertop conveyorized bake/finishing*	2200	10400	0	12600
Panini*	1200	2000	0	3200
Popcorn popper*	100	100	0	200
Rapid-cook oven (quartz-halogen)*	0	0	0	0
Rapid-cook oven (microwave/convection)*	1000	3100	0	1000
Reach-in refrigerator*	300	900	0	1200
Refrigerated prep table*	600	300	0	900
Steamer (bun)	600	100	0	700
Toaster: 4-slice pop up (large): cooking	200	1400	1000	2600
contact (vertical)	2700	2600	0	5300
conveyor (large)	3000	7300	0	10300
small conveyor	400	3300	0	3700
Waffle iron	800	400	0	1200

Recommended Rates of Radiant Heat Gain from Hooded Electric Appliances During Idle (Ready-to-Cook) Conditions **Table 5B**

Appliance	Rate of Heat Gain, Btu/h
	Sensible Radiant
Broiler: underfired 3 ft	10800
Cheesemelter*	4600
Fryer: kettle	500
Fryer: open deep-fat, 1-vat	1000
Fryer: pressure	500
Griddle: double sided 3 ft (clamshell down)*	1400
Griddle: double sided 3 ft (clamshell up)*	3600
Griddle: flat 3 ft	4500
Griddle-small 3 ft*	2700
Induction cooktop*	0
Induction wok*	0
Oven: combi: combi-mode*	800
Oven: combi: convection mode	1400
Oven: convection full-size	1500
Oven: convection half-size*	500
Pasta cooker*	0
Range top: top off/oven on*	1000
Range top: 3 elements on/oven off	6300
Range top: 6 elements on/oven off	13900
Range top: 6 elements on/oven on	14500
Range: hot-top	11800
Rotisserie*	4500
Salamander*	7000
Steam kettle: large (60 gal) simmer lid down*	100
Steam kettle: small (40 gal) simmer lid down*	300
Steamer: compartment: atmospheric*	200
Tilting skillet/braising pan	0

Recommended Rates of Radiant Heat Gain from Hooded Gas Appliances During Idle (Ready-to-Cook) Conditions **Table 5C**

Appliance	Rate of Heat Gain, Btu/h
	Sensible Radiant
Broiler: batch*	8100
Broiler: chain (conveyor)	13200
Broiler: overfired (upright)*	2500
Broiler: underfired 3 ft	9000
Fryer: doughnut	2900
Fryer: open deep-fat, 1 vat	1100
Fryer: pressure	800
Griddle: double sided 3 ft (clamshell down)*	1800
Griddle: double sided 3 ft (clamshell up)*	4900
Griddle: flat 3 ft	3700
Oven: combi: combi-mode*	400
Oven: combi: convection mode	1000
Oven: convection full-size	1000
Oven: conveyor (pizza)	7800
Oven: deck	3500
Oven: rack mini-rotating*	1100
Pasta cooker*	0
Range top: top off/oven on*	2000
Range top: 3 burners on/oven off	7100
Range top: 6 burners on/oven off	11500
Range top: 6 burners on/oven on	13600
Range: wok*	5200
Rethermalizer*	11500
Rice cooker*	300
Salamander*	5300
Steam kettle: large (60 gal) simmer lid down*	0
Steam kettle: small (10 gal) simmer lid down*	300
Steam kettle: small (40 gal) simmer lid down	0
Steamer: compartment: atmospheric*	0
Tilting skillet/braising pan	400

Recommended Heat Gain fromMiscellaneous Office Equipment **Table 10**

Equipment	Recommended Rate of Heat Gain	
	W	
Mail-processing equipment		
Folding machine		
Inserting machine, 3600 to 6800 pieces/h	390 to 2150	
Labeling machine, 1500 to 30,000 pieces/h	390 to 4300	
Postage meter	150	
Vending machines		
Cigarette	72	
Cold food/beverage	575 to 960	
Hot beverage	862	
Snack	240 to 275	
Other		
Bar code printer	370	
Cash registers	48	
Check processing workstation, 12 pockets	2470	
Coffee maker, 10 cups	1050 W sens.,	
	1540 Btu/h latent	

Equipment	Recommended Rate of Heat Gain	
	W	
Microfiche reader	85	
Microfilm reader	520	
Microfilm reader/printer	1150	
Microwave oven, 1 ft^3	400	
Paper shredder	200 to 2420	
Water cooler, 32 qt/h	350	
Computer	97	table 8
Flat Panel Monitor	400	table 8
Laser Printer	130	table 9
Scanner	16	table 9
Copy machine	1850	table 9
Fax machine medium	936	table 9
Fax machine small	40	table 9
Plotter	456	table 9