

Project HVAC Heat Load Calculations for Seaux Polished

Date 2/20/2019

Zone # Nail Salon (Sensible Heat Loads)

Zone Specs 500 s.f. total area for Zone 1

- 0 s.f. North Shaded Single Pane Glass
- 0 s.f. North Shaded Double Pane Glass
- 0 s.f. North Shaded Triple Pane Glass
- 0 s.f. NorthEast or NorthWest Single Pane Glass
- 0 s.f. NorthEast or NorthWest Double Pane Glass
- 0 s.f. NorthEast or NorthWest Triple Pane Glass
- 0 s.f. East/West Single Pane Glass
- 170 s.f. East/West Double Pane Glass
- 0 s.f. East/West Triple Pane Glass
- 0 s.f. SouthEast or SouthWest Single Pane Glass
- 0 s.f. SouthEast or SouthWest Double Pane Glass
- 0 s.f. SouthEast or SouthWest Triple Pane Glass
- 0 s.f. South Single Pane Glass
- 0 s.f. South Double Pane Glass
- 0 s.f. South Triple Pane Glass

- 21 s.f. Single Pane Exterior Doors
- s.f. Double Pane Exterior Doors
- s.f. Triple Pane Exterior Doors

Sensible BTUh Gain for North Shaded Single Pane Glass

0 BTUh

Sensible BTUh Gain for North Shaded Double Pane Glass	0 BTUh
Sensible BTUh Gain for North Shaded Triple Pane Glass	0 BTUh
Sensible BTUh Gain for NorthEast or NorthWest Single Pane Glass	0 BTUh
Sensible BTUh Gain for NorthEast or NorthWest Double Pane Glass	0 BTUh
Sensible BTUh Gain for NorthEast or NorthWest Triple Pane Glass	0 BTUh
Sensible BTUh Gain for East/West Single Pane Glass	0 BTUh
Sensible BTUh Gain for East/West Double Pane Glass	16,150 BTUh
Sensible BTUh Gain for East/West Triple Pane Glass	0 BTUh
Sensible BTUh Gain for SouthEast or SouthWest Single Pane Glass	0 BTUh
Sensible BTUh Gain for SouthEast or SouthWest Double Pane Glass	0 BTUh
Sensible BTUh Gain for SouthEast or SouthWest Triple Pane Glass	0 BTUh
Sensible BTUh Gain for South Single Pane Glass	0 BTUh
Sensible BTUh Gain for South Double Pane Glass	0 BTUh
Sensible BTUh Gain for South Triple Pane Glass	0 BTUh
	BTUh
Sensible BTUh Gain for Single Pane Exterior Doors	277 BTUh
Sensible BTUh Gain for Double Pane Exterior Doors	0 BTUh
Sensible BTUh Gain for Triple Pane Exterior Doors	0 BTUh

Glass total BTUh gain = 16,427 BTUh

Zone 1 area with walls demising to non-temperature controled areas

200 s.f. Exterior CMU wall, R-5 insulation

0 s.f. of inside demising wall to next door tennant space, no insulation

Sensible BTUh Gain for Exterior CMU wall = 620 BTUh

Sensible BTUh Gain for interior demising wall = 0 BTUh

Wall Heat Gain total = 620 BTUh

Zone 1 area Ceiling Factor

Sensible BTUh Gain for Ceiling R-19 Insulation 2,600 BTUh

17 Estimate on number of occupants to account for Sensible Heat Load

Sensible BTUh Gain for People = 3,750 BTUh

Sensible BTUh Gain for Appliances:

- Coffee brewer/warmer 0 BTUh
- Computer Terminal 0 BTUh
- Cold Drink 0 BTUh
- Hot Drink 0 BTUh
- Refrigerator 0 BTUh

Sensible BTUh Gain for Appliances : 0 BTUh

Square Feet of Ducts Running Outside Conditioned Spaces Factors.

0 s.f. of duct outside of conditioned space

Sensible BTUh Gain for Ducts Out of Conditioned Spaces = 0 BTUh

Sensible BTUh Gain for for Lighting = 1,500 BTUh

Zone 1 total Sensible Heat Loads, BTUh = 24,897 BTUh

Zone # Nail Salon (Latent Heat Loads)

Fresh air requirements:

Az 500 s.f. - 15 % Non Occupiable floor area = 425 s.f. Occupiable Floor Area

Pz 425 s.f. 25 Occupants per 1000 s.f. = 11 Occupants

Rp 20 from Table 403.3.1.1

Ra 0.12 from Table 403.3.1.1

Formula = $Vbz = RpPz + RaAz = 263.5$ cfm required fresh air

Salons also have a minimum exhaust airflow rate = $0.6 \text{ cfm/ft}^2 = 300$ cfm exhaust

Table 403.3.1.1 note h states that nail salons shall exhaust 50 cfm per manicure and pedicure stations
This nail salon expects 2 ea manicure and 2 each pedicure stations therefore a minimum exhaust for these stations = $4 \times 50 \text{ cfm} = 200$ cfm exhaust

The note also states that this exhaust system shall be permitted to be applied to the exhaust flow rate for Salons above when this exhaust system is operated continuously. Therefore the stations will exhaust a total of: 300 cfm exhaust which also means it will draw this much fresh air from outside sources.

BTUh gain for Fresh Air; 97 Deg outside temp, 72 Deg inside temp; 97%

Humidity

97 Degree Outside 75 Degree Inside = 22 tRise

97 % Humidity changes Load Factor = 1.1

The volume of Zone 1 = $5,000 \text{ ft}^3$

0.6 ACH from Building results in cfm = 50 cfm

The traffic rate estimated through the single door = 0 Entrances / hr

Door infiltration estimated = 10 cfm Total Infiltration = 60 cfm

Total amount of outside air to cool 300 cfm but requires supplemental air from other sources
240 cfm from other sources than infiltration
cfm x Load Factor (where Normal Humidity = 1.08) x tRise = BTUh

7,260 BTUh

11 Estimate on number of occupants to account for Sensible Heat
Load

Latent BTUh Gain for People = 3,453 BTUh

Latent BTUh Gain for Appliances:

Coffee brewer/warmer 0 BTUh

Hot Drink 0 BTUh

Appliance BTUh Gain = 0 BTUh

Zone 1 total Latent Heat Loads, BTUh = 10,713 BTUh

Zone 1 Estimate Tonnage of HVAC = 3.0 tons hvac
