# *Gemaire Distributors*
# *HVAC Load Analysis*

for

Gemaire Distributors
659 NW Enterprise Drive
Port St. Lucie, Florida

Elite Software

CHVAC Commercial HVAC Loads

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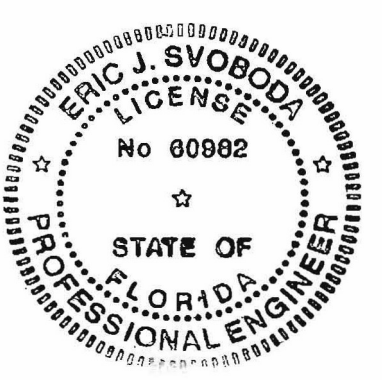
Date: 2021.09.23 08:55:54 -04'00'
Adobe Acrobat version: 2021.007.20091




Prepared By:

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Thursday, September 2, 2021

# General Project Data Input

## General Project Information

| | |
|---|---|
| Project file name: | Gemaire Distributors Heat Load.CH8 |
| Project title: | Gemaire Distributors |
| Designed by: | Eric J. Svoboda, PE |
| Project date: | Monday, July 07, 2008 |
| Weather reference city: | FORT PIERCE, FLORIDA, USA |
| Client name: | Gemaire Distributors |
| Client address: | 659 NW Enterprise Drive |
| Client city: | Port St. Lucie, Florida |
| Company name: | Fort Pierce Engineering, Inc. |
| Company representative: | Eric J. Svoboda, PE |
| Company address: | 315 South 7th Street |
| Company city: | Fort Pierce, FL 34950 |
| Company phone: | 772-672-4636 |
| Company fax: | 772-672-4637 |

| | | |
|---|---|---|
| Barometric pressure: | 29.894 | in.Hg. |
| Altitude: | 25 | feet |
| Latitude: | 27 | Degrees |
| Mean daily temperature range: | 15 | Degrees |
| Starting & ending time for HVAC load calculations: | 7am - 10pm | |
| Number of unique rooms in this project: | 2 | |

## Building Default Values

| | | |
|---|---|---|
| Calculations performed: | Both heating and cooling loads | |
| Lighting requirements: | 2.00 | Watts per square foot |
| Equipment requirements: | 1.00 | Watts per square foot |
| People sensible load multiplier: | 250 | Btuh per person |
| People latent load multiplier: | 200 | Btuh per person |
| Room sensible safety factor: | 0 | % |
| Room latent safety factor: | 0 | % |
| Room heating safety factor: | 0 | % |
| People diversity factor: | 100 | % |
| Lighting profile number: | 0 | |
| Equipment profile number: | 0 | |
| People profile number: | 0 | |
| Building default ceiling height: | 10.00 | feet |
| Building default wall height: | 14.00 | feet |

## Internal Operating Load Profiles (C = 100)

| | hr 1 | hr 2 | hr 3 | hr 4 | hr 5 | hr 6 | hr 7 | hr 8 | hr 9 | hr 10 | hr 11 | hr 12 | hr 13 | hr 14 | hr 15 | hr 16 | hr 17 | hr 18 | hr 19 | hr 20 | hr 21 | hr 22 | hr 23 | hr 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 2 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 3 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 4 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 5 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 6 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 7 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 8 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 9 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 10 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |

# General Project Data Input (cont'd)

## Building-Level Design Conditions

| Design Month | Outdoor Dry Bulb | Outdoor Wet Bulb | Indoor Rel.Hum | Indoor Dry Bulb | Grains Diff | In/Outdoor Correction |
|---|---|---|---|---|---|---|
| August | 95 | 80 | 50% | 75 | 66.33 | 6 |
| Winter | 42 | | | 75 | | |

## Master Roofs

| Roof No. | ASHRAE Roof# | Roof U-Fac | Dark Color | Susp. Ceil |
|---|---|---|---|---|
| 1 | 1 | 0.050 | No | No |

Roof #1 Description: Metal Roof, R-20

## Master Walls

| Wall No. | ASHRAE Group | Wall U-Fac | Wall Color |
|---|---|---|---|
| 1 | D | 0.086 | D |

Wall #1 Description: Frame wall, wood/insulated metal framing, face brick exterior, interior finish, R-11 batt insulation

## Master Partitions

| Partition No. | Partition U-Factor | Cool T-D | Heat T-D |
|---|---|---|---|
| 1 | 0.073 | 0 | 0 |

Partition #1 Description: Frame partition, hollow metal framing, siding exterior, interior finish, R-13 batt insulation

# Building Summary Loads

Building peaks in August at 2pm.

| Bldg Load Descriptions | Area Quan | Sen Loss | %Tot Loss | Lat Gain | Sen Gain | Net Gain | %Net Gain |
|---|---|---|---|---|---|---|---|
| Roof | 252 | 416 | 28.02 | 0 | 565 | 565 | 9.27 |
| Wall | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Glass | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Floor Slab | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Skin Loads | | 416 | 28.02 | 0 | 565 | 565 | 9.27 |
| Lighting | 504 | 0 | 0.00 | 0 | 1,720 | 1,720 | 28.22 |
| Equipment | 252 | 0 | 0.00 | 0 | 860 | 860 | 14.11 |
| Pool Latent | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| People | 2 | 0 | 0.00 | 400 | 500 | 900 | 14.77 |
| Partition | 448 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Cool. Pret. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Heat. Pret. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Cool. Vent. | 30 | 0 | 0.00 | 1,352 | 659 | 2,011 | 33.01 |
| Heat. Vent. | 30 | 1,068 | 71.98 | 0 | 0 | 0 | 0.00 |
| Cool. Infil. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Heat. Infil. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Draw-Thru Fan | 0 | 0 | 0.00 | 0 | 38 | 38 | 0.63 |
| Blow-Thru Fan | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Reserve Cap. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Reheat Cap. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Supply Duct | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Return Duct | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Misc. Supply | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Misc. Return | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Building Totals | | 1,484 | 100.00 | 1,752 | 4,342 | 6,094 | 100.00 |

| Building Summary | Sen Loss | %Tot Loss | Lat Gain | Sen Gain | Net Gain | %Net Gain |
|---|---|---|---|---|---|---|
| Ventilation | 1,068 | 71.98 | 1,352 | 659 | 2,011 | 33.01 |
| Infiltration | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Pretreated Air | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Room Loads | 416 | 28.02 | 400 | 3,644 | 4,044 | 66.37 |
| Plenum Loads | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Fan/Duct/Misc Loads | 0 | 0.00 | 0 | 38 | 38 | 0.63 |
| Building Totals | 1,484 | 100.00 | 1,752 | 4,342 | 6,094 | 100.00 |

## Check Figures

| | | |
|---|---|---|
| Total Building Supply Air (based on a 21° TD): | 160 | CFM |
| Total Building Vent. Air (18.80% of Supply): | 30 | CFM |
| Total Conditioned Air Space: | 252 | Sq.ft |
| Supply Air Per Unit Area: | 0.6331 | CFM/Sq.ft |
| Area Per Cooling Capacity: | 496.2 | Sq.ft/Ton |
| Cooling Capacity Per Area: | 0.0020 | Tons/Sq.ft |
| Heating Capacity Per Area: | 5.89 | Btuh/Sq.ft |
| Total Heating Required With Outside Air: | 1,484 | Btuh |
| Total Cooling Required With Outside Air: | 0.51 | Tons |

# *Air Handler #1 - AHU 1 - Summary Loads*

| Rm No | Description<br>Room Peak Time | Area<br>People<br>Volume | Htg.Loss<br>Htg.CFM<br>CFM/Sqft | Sen.Gain<br>Clg.CFM<br>CFM/Sqft | Lat.Gain<br>S.Exh<br>W.Exh | Htg.O.A.<br>Req.CFM<br>Act.CFM | Clg.O.A.<br>Req.CFM<br>Act.CFM |
|---|---|---|---|---|---|---|---|
| 1 | Office 1 | 126 | 208 | 1,822 | 200 | Direct | Direct |
| | 2pm August | 1 | 15 | 80 | 0 | 15 | 15 |
| | | 1,260 | 0.12 | 0.63 | 0 | 15 | 15 |
| 2 | Office 2 | 126 | 208 | 1,822 | 200 | Direct | Direct |
| | 2pm August | 1 | 15 | 80 | 0 | 15 | 15 |
| | | 1,260 | 0.12 | 0.63 | 0 | 15 | 15 |
| | Room Peak Totals: | 252 | 416 | 3,644 | 400 | | |
| | Total Rooms: 2 | 2 | 30 | 160 | 0 | 30 | 30 |
| | Unique Rooms: 2 | 2,520 | 0.12 | 0.63 | 0 | 30 | 30 |

# Air Handler #1 - AHU 1 - Total Load Summary

| | |
|---|---|
| Air Handler Description: | AHU 1 Constant Volume - Proportion |
| Supply Air Fan: | Draw-Thru with program estimated horsepower of 0.02 HP |
| Fan Input: | 0% motor and fan efficiency with 0 in. water across the fan |
| Sensible Heat Ratio: | 0.90 --- This system occurs 1 time(s) in the building. --- |

| | |
|---|---|
| Air System Peak Time: | 2pm in August. |
| Outdoor Conditions: | Clg: 95° DB, 80° WB, 131.77 grains, Htg: 42° DB |
| Indoor Conditions: | Clg: 75° DB, 50% RH, Htg: 75° DB |

Summer: Ventilation controls outside air, ----- Winter: Ventilation controls outside air.

| | | | |
|---|---|---|---|
| Room Space sensible loss: | 416 Btuh | | |
| Infiltration sensible loss: | 0 Btuh | 0 CFM | |
| Outside Air sensible loss: | 1,068 Btuh | 30 CFM | |
| Supply Duct sensible loss: | 0 Btuh | | |
| Return Duct sensible loss: | 0 Btuh | | |
| Return Plenum sensible loss: | 0 Btuh | | |
| Total System sensible loss: | | | 1,484 Btuh |
| Heating Supply Air: 416 / (.999 X 1.08 X 13) = | | 30 CFM | |
| Winter Vent Outside Air (100.0% of supply) = | | 30 CFM | |
| Room space sensible gain: | 3,644 Btuh | | |
| Infiltration sensible gain: | 0 Btuh | | |
| Draw-thru fan sensible gain: | 38 Btuh | | |
| Supply duct sensible gain: | 0 Btuh | | |
| Reserve sensible gain: | 0 Btuh | | |
| Total sensible gain on supply side of coil: | | | 3,682 Btuh |
| Cooling Supply Air: 3,682 / (.999 X 1.1 X 21) = | | 160 CFM | |
| Summer Vent Outside Air (18.8% of supply) = | | 30 CFM | |
| Return duct sensible gain: | 0 Btuh | | |
| Return plenum sensible gain: | 0 Btuh | | |
| Outside air sensible gain: | 659 Btuh | 30 CFM | |
| Blow-thru fan sensible gain: | 0 Btuh | | |
| Total sensible gain on return side of coil: | | | 659 Btuh |
| Total sensible gain on air handling system: | | | 4,342 Btuh |
| Room space latent gain: | 400 Btuh | | |
| Infiltration latent gain: | 0 Btuh | | |
| Outside air latent gain: | 1,352 Btuh | | |
| Total latent gain on air handling system: | | | 1,752 Btuh |
| Total system sensible and latent gain: | | | 6,094 Btuh |

## Check Figures

| | | |
|---|---|---|
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| Total Air Handler Vent. Air (18.80% of Supply): | 30 | CFM |
| Total Conditioned Air Space: | 252 | Sq.ft |
| Supply Air Per Unit Area: | 0.6331 | CFM/Sq.ft |
| Area Per Cooling Capacity: | 496.2 | Sq.ft/Ton |
| Cooling Capacity Per Area: | 0.0020 | Tons/Sq.ft |
| Heating Capacity Per Area: | 5.89 | Btuh/Sq.ft |
| Total Heating Required With Outside Air: | 1,484 | Btuh |
| Total Cooling Required With Outside Air: | 0.51 | Tons |