

# Air System Sizing Summary for Default System

Project Name: 19146 - Denison Daycare Heritage House  
 Prepared by: RDZ Engineers Ltd

06-02-2020  
 11:56AM

## Air System Information

Air System Name ..... <b>Default System</b>	Number of zones ..... <b>1</b>
Equipment Class ..... <b>SPLT AHU</b>	Floor Area ..... <b>1904.1</b> ft <sup>2</sup>
Air System Type ..... <b>SZCAV</b>	Location ..... <b>Newmarket, Ontario</b>

## Sizing Calculation Information

Calculation Months ..... <b>Jan to Dec</b>	Zone CFM Sizing ..... <b>Sum of space airflow rates</b>
Sizing Data ..... <b>Calculated</b>	Space CFM Sizing ..... <b>Individual peak space loads</b>

## Central Cooling Coil Sizing Data

Total coil load ..... <b>2.3</b> Tons	Load occurs at ..... <b>Jul 1500</b>
Total coil load ..... <b>28.2</b> MBH	OA DB / WB ..... <b>86.0 / 73.4</b> °F
Sensible coil load ..... <b>21.5</b> MBH	Entering DB / WB ..... <b>77.8 / 66.3</b> °F
Coil CFM at Jul 1500 ..... <b>1061</b> CFM	Leaving DB / WB ..... <b>58.6 / 57.6</b> °F
Max block CFM ..... <b>1061</b> CFM	Coil ADP ..... <b>56.5</b> °F
Sum of peak zone CFM ..... <b>1061</b> CFM	Bypass Factor ..... <b>0.100</b>
Sensible heat ratio ..... <b>0.762</b>	Resulting RH ..... <b>54</b> %
ft <sup>2</sup> /Ton ..... <b>811.4</b>	Design supply temp. .... <b>55.0</b> °F
BTU/(hr-ft <sup>2</sup> ) ..... <b>14.8</b>	Zone T-stat Check ..... <b>1 of 1</b> OK
Water flow @ 10.0 °F rise ..... <b>N/A</b>	Max zone temperature deviation ..... <b>0.0</b> °F

## Central Heating Coil Sizing Data

Max coil load ..... <b>44.7</b> MBH	Load occurs at ..... <b>Des Htg</b>
Coil CFM at Des Htg ..... <b>1061</b> CFM	BTU/(hr-ft <sup>2</sup> ) ..... <b>23.5</b>
Max coil CFM ..... <b>1061</b> CFM	Ent. DB / Lvg DB ..... <b>53.4 / 93.3</b> °F
Water flow @ 20.0 °F drop ..... <b>N/A</b>	

## Supply Fan Sizing Data

Actual max CFM ..... <b>1061</b> CFM	Fan motor BHP ..... <b>0.00</b> BHP
Standard CFM ..... <b>1038</b> CFM	Fan motor kW ..... <b>0.00</b> kW
Actual max CFM/ft <sup>2</sup> ..... <b>0.56</b> CFM/ft <sup>2</sup>	Fan static ..... <b>0.00</b> in wg

## Outdoor Ventilation Air Data

Design airflow CFM ..... <b>210</b> CFM	CFM/person ..... <b>16.17</b> CFM/person
CFM/ft <sup>2</sup> ..... <b>0.11</b> CFM/ft <sup>2</sup>	



## Zone Sizing Summary for Default System

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### Air System Information

Air System Name ..... **Default System**  
 Equipment Class ..... **SPLT AHU**  
 Air System Type ..... **SZCAV**

Number of zones ..... **1**  
 Floor Area ..... **1904.1** ft<sup>2</sup>  
 Location ..... **Newmarket, Ontario**

### Sizing Calculation Information

Calculation Months ..... **Jan to Dec**  
 Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**  
 Space CFM Sizing ..... **Individual peak space loads**

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft <sup>2</sup> )	Zone CFM/ft <sup>2</sup>
Zone 1	20.2	1061	1061	Jul 1500	26.6	1904.1	0.56

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft <sup>2</sup> )	Space CFM/ft <sup>2</sup>
<b>Zone 1</b>							
102-LOUNGE AREA	1	2.1	Jul 1500	135	125	360.0	0.35
103-OFFICE	1	1.8	Jul 1500	90	90	121.5	0.74
106-BOARD ROOM	1	3.0	Sep 1500	185	143	229.0	0.62
107-DECK FOYER	1	0.7	Sep 1400	50	54	71.0	0.76
109-KITCHEN	1	3.0	Jul 1500	140	141	260.0	0.54
201-BOARD ROOM	1	4.5	Jul 1500	220	213	392.0	0.54
202-OFFICE 1	1	2.5	Jul 1500	120	118	167.0	0.71
203-OFFICE 2	1	2.0	Sep 1400	90	94	166.6	0.57
104-UNIVERSAL WASHROOM	1	0.4	Jul 1500	45	43	70.0	0.61
108-POWDER	1	0.7	Sep 1400	45	32	42.0	0.77
204-POWDER	1	0.1	Jul 1500	40	6	25.0	0.24

GROUND STORAGE

40

TOTAL = 1200 CFM

## Ventilation Sizing Summary for Default System

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### 1. Summary

Ventilation Sizing Method ..... **ASHRAE Std 62.1-2010**  
 Design Condition ..... **Heating operation**  
 Occupant Diversity (D) ..... **1.000**  
 Uncorrected Outdoor Air Intake (Vou) ..... **179** CFM  
 System Ventilation Efficiency (Ev) ..... **0.853**  
 Outdoor Air Intake (Vot) ..... **210** CFM

### 2. Space Ventilation Analysis Table

Zone Name / Space Name	Mult.	Supply Air (CFM) (Vpz)	Space Floor Area (ft²) (Az)	Area Outdoor Air Rate (CFM/ft²) (Ra)	Time Averaged Occupancy (Occupants) (Pz)	People Outdoor Air Rate (CFM/person) (Rp)	Air Distribution Effectiveness (Ez)	Space Outdoor Air (CFM) (Voz)	Breathing Zone Outdoor Air (CFM) (Vbz)	Space Ventilation Efficiency (Evz)
<b>Zone 1</b>										
102-LOUNGE AREA	1	125	360.0	0.06	2.0	5.00	0.80	<b>40</b>	32	0.853
103-OFFICE	1	90	121.5	0.06	1.0	5.00	0.80	<b>15</b>	12	0.999
106-BOARD ROOM	1	143	229.0	0.06	4.0	5.00	0.80	<b>42</b>	34	0.874
107-DECK FOYER	1	54	71.0	0.06	0.0	5.00	0.80	<b>5</b>	4	1.071
109-KITCHEN	1	141	260.0	0.06	0.0	5.00	0.80	<b>20</b>	16	1.031
201-BOARD ROOM	1	213	392.0	0.06	4.0	5.00	0.80	<b>54</b>	44	0.914
202-OFFICE 1	1	118	167.0	0.06	1.0	5.00	0.80	<b>19</b>	15	1.010
203-OFFICE 2	1	94	166.6	0.06	1.0	5.00	0.80	<b>19</b>	15	0.971
104-UNIVERSAL WASHROOM	1	43	70.0	0.06	0.0	5.00	0.80	<b>5</b>	4	1.047
108-POWDER	1	32	42.0	0.06	0.0	5.00	0.80	<b>3</b>	3	1.071
204-POWDER	1	6	25.0	0.06	0.0	5.00	0.80	<b>2</b>	2	0.858
<b>Totals (incl. Space Multipliers)</b>		<b>1061</b>							<b>179</b>	<b>0.853</b>

## Air System Design Load Summary for Default System

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 86.0 °F / 73.4 °F			HEATING OA DB / WB -11.2 °F / -11.2 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	214 ft²	4881	-	214 ft²	-	-
Wall Transmission	1376 ft²	753	-	1376 ft²	6152	-
Roof Transmission	1124 ft²	2552	-	1124 ft²	3209	-
Window Transmission	214 ft²	790	-	214 ft²	8688	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	33 ft²	72	-	33 ft²	794	-
Floor Transmission	1154 ft²	0	-	1154 ft²	5380	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1833 W	4909	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1280 W	3949	-	0	0	-
People	13	2264	2155	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	10%	2422	0
<b>&gt;&gt; Total Zone Loads</b>	<b>-</b>	<b>20169</b>	<b>2155</b>	<b>-</b>	<b>26646</b>	<b>0</b>
Zone Conditioning	-	19176	2155	-	26780	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	1061 CFM	0	-	1061 CFM	0	-
Ventilation Load	210 CFM	2278	4550	210 CFM	17897	0
Supply Fan Load	1061 CFM	0	-	1061 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
<b>&gt;&gt; Total System Loads</b>	<b>-</b>	<b>21454</b>	<b>6705</b>	<b>-</b>	<b>44677</b>	<b>0</b>
Central Cooling Coil	-	21454	6706	-	0	0
Central Heating Coil	-	0	-	-	44677	-
<b>&gt;&gt; Total Conditioning</b>	<b>-</b>	<b>21454</b>	<b>6706</b>	<b>-</b>	<b>44677</b>	<b>0</b>
<b>Key:</b>	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		