

# Air System Sizing Summary for Sistema 0TE01

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

## Air System Information

Air System Name ..... **Sistema 0TE01**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **170,9** m²  
Location ..... **Sao Paulo, Brazil**

## Sizing Calculation Information

### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

## Central Cooling Coil Sizing Data

Total coil load ..... **25,8** kW  
Sensible coil load ..... **19,3** kW  
Coil L/s at Jan 1500 ..... **1309** L/s  
Max block L/s ..... **1309** L/s  
Sum of peak zone L/s ..... **1309** L/s  
Sensible heat ratio ..... **0,747**  
m²/kW ..... **6,6**  
W/m² ..... **151,0**  
Water flow @ 5,6 °K rise ..... **1,11** L/s

Load occurs at ..... **Jan 1500**  
OA DB / WB ..... **32,9 / 22,3** °C  
Entering DB / WB ..... **25,0 / 17,4** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,1** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **50** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,7** °K

## Central Heating Coil Sizing Data

Max coil load ..... **8,2** kW  
Coil L/s at Des Htg ..... **1309** L/s  
Max coil L/s ..... **1309** L/s  
Water flow @ 11,1 °K drop ..... **0,18** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **48,2**  
Ent. DB / Lvg DB ..... **17,6 / 23,4** °C

## Supply Fan Sizing Data

Actual max L/s ..... **1309** L/s  
Standard L/s ..... **1189** L/s  
Actual max L/(s-m²) ..... **7,66** L/(s-m²)

Fan motor BHP ..... **0,81** BHP  
Fan motor kW ..... **0,61** kW  
Fan static ..... **250** Pa

## Outdoor Ventilation Air Data

Design airflow L/s ..... **295** L/s  
L/(s-m²) ..... **1,73** L/(s-m²)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 0TE01

Project Name: OS6955 - MUSEU DA IMIGRACAO - T RREO  
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### Air System Information

Air System Name ..... Sistema 0TE01  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 170,9 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	14,2	1309	1309	Jan 1700	5,2	170,9	7,66

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 0TE01 - Z1 - S01	1	14,2	Jan 1700	1309	5,2	170,9	7,66

## Air System Design Load Summary for Sistema 0TE01

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,9 °C / 22,3 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	16 m²	776	-	16 m²	-	-
Wall Transmission	119 m²	2700	-	119 m²	2707	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	16 m²	872	-	16 m²	1039	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	65 m²	1128	-	65 m²	1174	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2564 W	2099	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3418 W	3127	-	0	0	-
People	43	2243	2568	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	647	128	5%	246	0
>> Total Zone Loads	-	13594	2696	-	5166	0
Zone Conditioning	-	15389	2696	-	5203	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	1309 L/s	0	-	1309 L/s	0	-
Ventilation Load	295 L/s	3290	3823	295 L/s	3643	0
Supply Fan Load	1309 L/s	606	-	1309 L/s	-606	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	19285	6520	-	8241	0
Central Cooling Coil	-	19285	6521	-	0	0
Central Heating Coil	-	0	-	-	8241	-
>> Total Conditioning	-	19285	6521	-	8241	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 0TE02

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

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### Air System Information

Air System Name ..... **Sistema 0TE02**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **194,7** m²  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **29,2** kW  
Sensible coil load ..... **21,8** kW  
Coil L/s at Jan 1500 ..... **1461** L/s  
Max block L/s ..... **1461** L/s  
Sum of peak zone L/s ..... **1461** L/s  
Sensible heat ratio ..... **0,746**  
m²/kW ..... **6,7**  
W/m² ..... **150,2**  
Water flow @ 5,6 °K rise ..... **1,26** L/s

Load occurs at ..... **Jan 1500**  
OA DB / WB ..... **32,9 / 22,3** °C  
Entering DB / WB ..... **25,2 / 17,5** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,1** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,9** °K

### Central Heating Coil Sizing Data

Max coil load ..... **8,9** kW  
Coil L/s at Des Htg ..... **1461** L/s  
Max coil L/s ..... **1461** L/s  
Water flow @ 11,1 °K drop ..... **0,19** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **45,8**  
Ent. DB / Lvg DB ..... **17,6 / 23,2** °C

### Supply Fan Sizing Data

Actual max L/s ..... **1461** L/s  
Standard L/s ..... **1327** L/s  
Actual max L/(s-m²) ..... **7,50** L/(s-m²)

Fan motor BHP ..... **0,91** BHP  
Fan motor kW ..... **0,68** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **336** L/s  
L/(s-m²) ..... **1,73** L/(s-m²)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 0TE02

Project Name: OS6955 - MUSEU DA IMIGRACAO - TERREO  
Prepared by: EPT Engenharia S/C Ltda

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### Air System Information

Air System Name ..... Sistema 0TE02  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 194,7 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	15,9	1461	1461	Jan 1700	5,2	194,7	7,50

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 0TE02 - Z1 - S01	1	15,9	Jan 1700	1461	5,2	194,7	7,50

## Air System Design Load Summary for Sistema 0TE02

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,9 °C / 22,3 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	24 m²	1360	-	24 m²	-	-
Wall Transmission	151 m²	2961	-	151 m²	3412	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	24 m²	1309	-	24 m²	1558	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2921 W	2391	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3894 W	3562	-	0	0	-
People	49	2556	2925	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	707	146	5%	249	0
>> Total Zone Loads	-	14846	3072	-	5219	0
Zone Conditioning	-	17468	3072	-	5445	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	1461 L/s	0	-	1461 L/s	0	-
Ventilation Load	336 L/s	3682	4349	336 L/s	4154	0
Supply Fan Load	1461 L/s	676	-	1461 L/s	-676	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	21827	7420	-	8923	0
Central Cooling Coil	-	21827	7422	-	0	0
Central Heating Coil	-	0	-	-	8923	-
>> Total Conditioning	-	21827	7422	-	8923	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 0TE03

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

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### Air System Information

Air System Name ..... **Sistema 0TE03**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **37,5** m²  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **5,6** kW  
Sensible coil load ..... **5,2** kW  
Coil L/s at Jan 1500 ..... **433** L/s  
Max block L/s ..... **433** L/s  
Sum of peak zone L/s ..... **433** L/s  
Sensible heat ratio ..... **0,942**  
m²/kW ..... **6,7**  
W/m² ..... **148,2**  
Water flow @ 5,6 °K rise ..... **0,24** L/s

Load occurs at ..... **Jan 1500**  
OA DB / WB ..... **32,9 / 22,3** °C  
Entering DB / WB ..... **23,6 / 16,1** °C  
Leaving DB / WB ..... **12,6 / 11,9** °C  
Coil ADP ..... **11,4** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **48** %  
Design supply temp. .... **13,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,3** °K

### Central Heating Coil Sizing Data

Max coil load ..... **2,3** kW  
Coil L/s at Des Htg ..... **433** L/s  
Max coil L/s ..... **433** L/s  
Water flow @ 11,1 °K drop ..... **0,05** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **60,2**  
Ent. DB / Lvg DB ..... **19,8 / 24,5** °C

### Supply Fan Sizing Data

Actual max L/s ..... **433** L/s  
Standard L/s ..... **393** L/s  
Actual max L/(s-m²) ..... **11,54** L/(s-m²)

Fan motor BHP ..... **0,27** BHP  
Fan motor kW ..... **0,20** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **15** L/s  
L/(s-m²) ..... **0,40** L/(s-m²)

L/s/person ..... **7,50** L/s/person

## Zone Sizing Summary for Sistema 0TE03

Project Name: OS6955 - MUSEU DA IMIGRACAO - T RREO  
Prepared by: EPT Engenharia S/C Ltda

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### Air System Information

Air System Name ..... **Sistema 0TE03**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **37,5** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	4,7	433	433	Jan 1700	2,3	37,5	11,54

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 0TE03 - Z1 - S01	1	4,7	Jan 1700	433	2,3	37,5	11,54



## Air System Design Load Summary for Sistema 0TE03

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,9 °C / 22,3 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	5 m²	188	-	5 m²	-	-
Wall Transmission	28 m²	609	-	28 m²	636	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	5 m²	260	-	5 m²	346	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	65 m²	963	-	65 m²	1174	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	563 W	461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2000 W	1830	-	0	0	-
People	2	105	120	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	221	6	5%	108	0
>> Total Zone Loads	-	4637	126	-	2265	0
Zone Conditioning	-	4874	126	-	2275	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	433 L/s	0	-	433 L/s	0	-
Ventilation Load	15 L/s	158	198	15 L/s	185	0
Supply Fan Load	433 L/s	200	-	433 L/s	-200	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	5233	324	-	2259	0
Central Cooling Coil	-	5233	324	-	0	0
Central Heating Coil	-	0	-	-	2259	-
>> Total Conditioning	-	5233	324	-	2259	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 0TE04

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

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### Air System Information

Air System Name ..... **Sistema 0TE04**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **117,0** m²  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **18,1** kW  
Sensible coil load ..... **13,6** kW  
Coil L/s at Feb 1500 ..... **944** L/s  
Max block L/s ..... **944** L/s  
Sum of peak zone L/s ..... **944** L/s  
Sensible heat ratio ..... **0,753**  
m²/kW ..... **6,5**  
W/m² ..... **154,9**  
Water flow @ 5,6 °K rise ..... **0,78** L/s

Load occurs at ..... **Feb 1500**  
OA DB / WB ..... **32,9 / 22,3** °C  
Entering DB / WB ..... **24,8 / 17,2** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,1** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **50** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,5** °K

### Central Heating Coil Sizing Data

Max coil load ..... **6,3** kW  
Coil L/s at Des Htg ..... **944** L/s  
Max coil L/s ..... **944** L/s  
Water flow @ 11,1 °K drop ..... **0,14** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **54,3**  
Ent. DB / Lvg DB ..... **17,8 / 23,9** °C

### Supply Fan Sizing Data

Actual max L/s ..... **944** L/s  
Standard L/s ..... **857** L/s  
Actual max L/(s-m²) ..... **8,06** L/(s-m²)

Fan motor BHP ..... **0,59** BHP  
Fan motor kW ..... **0,44** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **202** L/s  
L/(s-m²) ..... **1,73** L/(s-m²)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 0TE04

Project Name: OS6955 - MUSEU DA IMIGRACAO - T RREO  
Prepared by: EPT Engenharia S/C Ltda

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### Air System Information

Air System Name ..... **Sistema 0TE04**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **117,0** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	10,2	944	944	Feb 1700	4,2	117,0	8,06

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 0TE04 - Z1 - S01	1	10,2	Feb 1700	944	4,2	117,0	8,06

## Air System Design Load Summary for Sistema 0TE04

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Feb 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,9 °C / 22,3 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	19 m²	460	-	19 m²	-	-
Wall Transmission	83 m²	1638	-	83 m²	1892	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	19 m²	1018	-	19 m²	1212	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	48 m²	830	-	48 m²	864	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1755 W	1437	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2340 W	2141	-	0	0	-
People	29	1536	1758	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	453	88	5%	198	0
>> Total Zone Loads	-	9512	1846	-	4166	0
Zone Conditioning	-	10908	1846	-	4289	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	944 L/s	0	-	944 L/s	0	-
Ventilation Load	202 L/s	2292	2635	202 L/s	2497	0
Supply Fan Load	944 L/s	437	-	944 L/s	-437	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	13637	4481	-	6349	0
Central Cooling Coil	-	13637	4482	-	0	0
Central Heating Coil	-	0	-	-	6349	-
>> Total Conditioning	-	13637	4482	-	6349	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 0TE05

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

### Air System Information

Air System Name ..... **Sistema 0TE05**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **131,4** m²  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **21,1** kW  
Sensible coil load ..... **16,0** kW  
Coil L/s at Jan 1500 ..... **1101** L/s  
Max block L/s ..... **1101** L/s  
Sum of peak zone L/s ..... **1101** L/s  
Sensible heat ratio ..... **0,760**  
m²/kW ..... **6,2**  
W/m² ..... **160,4**  
Water flow @ 5,6 °K rise ..... **0,91** L/s

Load occurs at ..... **Jan 1500**  
OA DB / WB ..... **32,9 / 22,3** °C  
Entering DB / WB ..... **24,8 / 17,2** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,1** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,8** °K

### Central Heating Coil Sizing Data

Max coil load ..... **6,8** kW  
Coil L/s at Des Htg ..... **1101** L/s  
Max coil L/s ..... **1101** L/s  
Water flow @ 11,1 °K drop ..... **0,15** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **51,8**  
Ent. DB / Lvg DB ..... **17,7 / 23,3** °C

### Supply Fan Sizing Data

Actual max L/s ..... **1101** L/s  
Standard L/s ..... **1000** L/s  
Actual max L/(s-m²) ..... **8,38** L/(s-m²)

Fan motor BHP ..... **0,68** BHP  
Fan motor kW ..... **0,51** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **227** L/s  
L/(s-m²) ..... **1,73** L/(s-m²)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 0TE05

Project Name: OS6955 - MUSEU DA IMIGRACAO - T RREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

### Air System Information

Air System Name ..... **Sistema 0TE05**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **131,4** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	12,0	1101	1101	Jan 1600	4,9	131,4	8,38

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 0TE05 - Z1 - S01	1	12,0	Jan 1600	1101	4,9	131,4	8,38

## Air System Design Load Summary for Sistema 0TE05

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,9 °C / 22,3 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	21 m²	640	-	21 m²	-	-
Wall Transmission	94 m²	2670	-	94 m²	2133	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	21 m²	1163	-	21 m²	1385	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	63 m²	1083	-	63 m²	1127	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1971 W	1614	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2628 W	2404	-	0	0	-
People	33	1725	1974	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	565	99	5%	232	0
>> Total Zone Loads	-	11864	2073	-	4877	0
Zone Conditioning	-	12983	2073	-	4567	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	1101 L/s	0	-	1101 L/s	0	-
Ventilation Load	227 L/s	2522	2983	227 L/s	2749	0
Supply Fan Load	1101 L/s	510	-	1101 L/s	-510	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	16015	5056	-	6807	0
Central Cooling Coil	-	16015	5057	-	0	0
Central Heating Coil	-	0	-	-	6807	-
>> Total Conditioning	-	16015	5057	-	6807	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

# Air System Sizing Summary for Sistema 0TE06

Project Name: OS6955 - MUSEU DA IMIGRACAO - T RREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

## Air System Information

Air System Name ..... **Sistema 0TE06**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **32,5** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

## Sizing Calculation Information

### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

## Central Cooling Coil Sizing Data

Total coil load ..... **3,6** kW  
Sensible coil load ..... **3,0** kW  
Coil L/s at Feb 1500 ..... **223** L/s  
Max block L/s ..... **223** L/s  
Sum of peak zone L/s ..... **223** L/s  
Sensible heat ratio ..... **0,815**  
m<sup>2</sup>/kW ..... **8,9**  
W/m<sup>2</sup> ..... **111,9**  
Water flow @ 5,6  K rise ..... **0,16** L/s

Load occurs at ..... **Feb 1500**  
OA DB / WB ..... **32,9 / 22,3**  C  
Entering DB / WB ..... **24,7 / 17,2**  C  
Leaving DB / WB ..... **12,6 / 11,9**  C  
Coil ADP ..... **11,2**  C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **50** %  
Design supply temp. .... **13,0**  C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,2**  K

## Central Heating Coil Sizing Data

Max coil load ..... **2,1** kW  
Coil L/s at Des Htg ..... **223** L/s  
Max coil L/s ..... **223** L/s  
Water flow @ 11,1  K drop ..... **0,04** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **63,5**  
Ent. DB / Lvg DB ..... **18,4 / 26,9**  C

## Supply Fan Sizing Data

Actual max L/s ..... **223** L/s  
Standard L/s ..... **202** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **6,85** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **0,14** BHP  
Fan motor kW ..... **0,10** kW  
Fan static ..... **250** Pa

## Outdoor Ventilation Air Data

Design airflow L/s ..... **34** L/s  
L/(s-m<sup>2</sup>) ..... **1,05** L/(s-m<sup>2</sup>)

L/s/person ..... **8,55** L/s/person



## Zone Sizing Summary for Sistema 0TE06

Project Name: OS6955 - MUSEU DA IMIGRACAO - T RREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

### Air System Information

Air System Name ..... Sistema 0TE06  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 32,5 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	2,4	223	223	Feb 1700	1,7	32,5	6,85

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 0TE06 - Z1 - S01	1	2,4	Feb 1700	223	1,7	32,5	6,85

## Air System Design Load Summary for Sistema 0TE06

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Feb 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,9 °C / 22,3 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	24 m²	421	-	24 m²	542	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	60 m²	886	-	60 m²	1080	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	488 W	399	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	300 W	274	-	0	0	-
People	4	210	240	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	110	12	5%	81	0
>> Total Zone Loads	-	2300	252	-	1703	0
Zone Conditioning	-	2497	252	-	1744	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	223 L/s	0	-	223 L/s	0	-
Ventilation Load	34 L/s	363	420	34 L/s	422	0
Supply Fan Load	223 L/s	103	-	223 L/s	-103	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	2963	673	-	2062	0
Central Cooling Coil	-	2963	673	-	0	0
Central Heating Coil	-	0	-	-	2062	-
>> Total Conditioning	-	2963	673	-	2062	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

# Air System Sizing Summary for Sistema 0TE07

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

## Air System Information

Air System Name ..... **Sistema 0TE07**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **27,1** m²  
Location ..... **Sao Paulo, Brazil**

## Sizing Calculation Information

### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

## Central Cooling Coil Sizing Data

Total coil load ..... **3,3** kW  
Sensible coil load ..... **2,9** kW  
Coil L/s at Jan 1500 ..... **221** L/s  
Max block L/s ..... **221** L/s  
Sum of peak zone L/s ..... **221** L/s  
Sensible heat ratio ..... **0,858**  
m²/kW ..... **8,1**  
W/m² ..... **123,2**  
Water flow @ 5,6 °K rise ..... **0,14** L/s

Load occurs at ..... **Jan 1500**  
OA DB / WB ..... **32,9 / 22,3** °C  
Entering DB / WB ..... **24,4 / 16,8** °C  
Leaving DB / WB ..... **12,6 / 11,9** °C  
Coil ADP ..... **11,3** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **48** %  
Design supply temp. .... **13,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,4** °K

## Central Heating Coil Sizing Data

Max coil load ..... **1,5** kW  
Coil L/s at Des Htg ..... **221** L/s  
Max coil L/s ..... **221** L/s  
Water flow @ 11,1 °K drop ..... **0,03** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **56,4**  
Ent. DB / Lvg DB ..... **18,9 / 25,2** °C

## Supply Fan Sizing Data

Actual max L/s ..... **221** L/s  
Standard L/s ..... **201** L/s  
Actual max L/(s-m²) ..... **8,16** L/(s-m²)

Fan motor BHP ..... **0,14** BHP  
Fan motor kW ..... **0,10** kW  
Fan static ..... **250** Pa

## Outdoor Ventilation Air Data

Design airflow L/s ..... **23** L/s  
L/(s-m²) ..... **0,83** L/(s-m²)

L/s/person ..... **7,50** L/s/person

## Zone Sizing Summary for Sistema 0TE07

Project Name: OS6955 - MUSEU DA IMIGRACAO - T RREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

### Air System Information

Air System Name ..... Sistema 0TE07  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 27,1 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	2,4	221	221	Jan 1600	1,4	27,1	8,16

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 0TE07 - Z1 - S01	1	2,4	Jan 1600	221	1,4	27,1	8,16

## Air System Design Load Summary for Sistema 0TE07

Project Name: OS6955 - MUSEU DA IMIGRACAO - TÉRREO  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
11:28

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,9 °C / 22,3 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	5 m²	136	-	5 m²	-	-
Wall Transmission	19 m²	511	-	19 m²	439	-
Roof Transmission	0 m²	0	-	0 m²	0	-
Window Transmission	5 m²	220	-	5 m²	294	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	31 m²	463	-	31 m²	564	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	407 W	333	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	500 W	457	-	0	0	-
People	3	158	180	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	114	9	5%	65	0
>> Total Zone Loads	-	2391	189	-	1362	0
Zone Conditioning	-	2529	189	-	1356	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	221 L/s	0	-	221 L/s	0	-
Ventilation Load	23 L/s	234	284	23 L/s	276	0
Supply Fan Load	221 L/s	102	-	221 L/s	-102	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	2865	473	-	1529	0
Central Cooling Coil	-	2865	473	-	0	0
Central Heating Coil	-	0	-	-	1529	-
>> Total Conditioning	-	2865	473	-	1529	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

# Air System Sizing Summary for Sistema 1P01

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

## Air System Information

Air System Name ..... **Sistema 1P01**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **162,4** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

## Sizing Calculation Information

### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

## Central Cooling Coil Sizing Data

Total coil load ..... **31,8** kW  
Sensible coil load ..... **25,4** kW  
Coil L/s at Jan 1600 ..... **1841** L/s  
Max block L/s ..... **1841** L/s  
Sum of peak zone L/s ..... **1841** L/s  
Sensible heat ratio ..... **0,799**  
m<sup>2</sup>/kW ..... **5,1**  
W/m<sup>2</sup> ..... **195,5**  
Water flow @ 5,6 °K rise ..... **1,37** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **24,1 / 16,6** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,6** °K

## Central Heating Coil Sizing Data

Max coil load ..... **10,0** kW  
Coil L/s at Des Htg ..... **1841** L/s  
Max coil L/s ..... **1841** L/s  
Water flow @ 11,1 °K drop ..... **0,22** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **61,5**  
Ent. DB / Lvg DB ..... **18,3 / 23,2** °C

## Supply Fan Sizing Data

Actual max L/s ..... **1841** L/s  
Standard L/s ..... **1672** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **11,33** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **1,14** BHP  
Fan motor kW ..... **0,85** kW  
Fan static ..... **250** Pa

## Outdoor Ventilation Air Data

Design airflow L/s ..... **280** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P01

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P01**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **162,4** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	20,0	1841	1841	Jan 1700	7,5	162,4	11,33

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P01 - Z1 - S01	1	20,0	Jan 1700	1841	7,5	162,4	11,33

## Air System Design Load Summary for Sistema 1P01

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	136 m²	2583	-	136 m²	2883	-
Roof Transmission	162 m²	8253	-	162 m²	3713	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	33 m²	560	-	33 m²	588	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2436 W	2024	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3248 W	2990	-	0	0	-
People	41	2182	2440	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	930	122	5%	359	0
>> Total Zone Loads	-	19521	2562	-	7543	0
Zone Conditioning	-	21438	2562	-	7446	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	1841 L/s	0	-	1841 L/s	0	-
Ventilation Load	280 L/s	3076	3826	280 L/s	3397	0
Supply Fan Load	1841 L/s	852	-	1841 L/s	-852	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	25366	6388	-	9991	0
Central Cooling Coil	-	25366	6389	-	0	0
Central Heating Coil	-	0	-	-	9991	-
>> Total Conditioning	-	25366	6389	-	9991	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		



## Air System Sizing Summary for Sistema 1P02

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

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03:25

### Air System Information

Air System Name ..... **Sistema 1P02**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **171,7** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **32,9** kW  
Sensible coil load ..... **26,1** kW  
Coil L/s at Jan 1600 ..... **1892** L/s  
Max block L/s ..... **1892** L/s  
Sum of peak zone L/s ..... **1892** L/s  
Sensible heat ratio ..... **0,795**  
m<sup>2</sup>/kW ..... **5,2**  
W/m<sup>2</sup> ..... **191,3**  
Water flow @ 5,6 °K rise ..... **1,42** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **24,2 / 16,7** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,6** °K

### Central Heating Coil Sizing Data

Max coil load ..... **9,6** kW  
Coil L/s at Des Htg ..... **1892** L/s  
Max coil L/s ..... **1892** L/s  
Water flow @ 11,1 °K drop ..... **0,21** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **56,1**  
Ent. DB / Lvg DB ..... **18,2 / 22,9** °C

### Supply Fan Sizing Data

Actual max L/s ..... **1892** L/s  
Standard L/s ..... **1718** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **11,02** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **1,17** BHP  
Fan motor kW ..... **0,88** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **296** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P02

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P02**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **171,7 m²**  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m²)	Zone L/(s-m²)
Zone 1	20,5	1892	1892	Jan 1700	7,0	171,7	11,02

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m²)	Space L/(s-m²)
<b>Zone 1</b>							
Sist 1P02 - Z1 - S01	1	20,5	Jan 1700	1892	7,0	171,7	11,02

## Air System Design Load Summary for Sistema 1P02

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	102 m²	2365	-	102 m²	2150	-
Roof Transmission	172 m²	8726	-	172 m²	3926	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	33 m²	560	-	33 m²	588	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2576 W	2140	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3434 W	3161	-	0	0	-
People	43	2307	2580	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	963	129	5%	333	0
>> Total Zone Loads	-	20221	2709	-	6997	0
Zone Conditioning	-	21973	2709	-	6919	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	1892 L/s	0	-	1892 L/s	0	-
Ventilation Load	296 L/s	3261	4031	296 L/s	3597	0
Supply Fan Load	1892 L/s	876	-	1892 L/s	-876	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	26110	6740	-	9641	0
Central Cooling Coil	-	26110	6741	-	0	0
Central Heating Coil	-	0	-	-	9641	-
>> Total Conditioning	-	26110	6741	-	9641	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 1P03

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P03**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **34,7** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **7,6** kW  
Sensible coil load ..... **6,3** kW  
Coil L/s at Jan 1700 ..... **465** L/s  
Max block L/s ..... **465** L/s  
Sum of peak zone L/s ..... **465** L/s  
Sensible heat ratio ..... **0,820**  
m<sup>2</sup>/kW ..... **4,5**  
W/m<sup>2</sup> ..... **220,3**  
Water flow @ 5,6 °K rise ..... **0,33** L/s

Load occurs at ..... **Jan 1700**  
OA DB / WB ..... **32,0 / 22,1** °C  
Entering DB / WB ..... **23,9 / 16,4** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **48** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,7** °K

### Central Heating Coil Sizing Data

Max coil load ..... **3,0** kW  
Coil L/s at Des Htg ..... **465** L/s  
Max coil L/s ..... **465** L/s  
Water flow @ 11,1 °K drop ..... **0,06** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **85,4**  
Ent. DB / Lvg DB ..... **18,8 / 24,6** °C

### Supply Fan Sizing Data

Actual max L/s ..... **465** L/s  
Standard L/s ..... **422** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **13,40** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **0,29** BHP  
Fan motor kW ..... **0,22** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **60** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P03

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... Sistema 1P03  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 34,7 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	5,0	465	465	Jan 1700	2,4	34,7	13,40

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P03 - Z1 - S01	1	5,0	Jan 1700	465	2,4	34,7	13,40

## Air System Design Load Summary for Sistema 1P03

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1700 COOLING OA DB / WB 32,0 °C / 22,1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	71 m²	1458	-	71 m²	1501	-
Roof Transmission	35 m²	1792	-	35 m²	793	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	521 W	438	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	694 W	642	-	0	0	-
People	9	477	521	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	240	26	5%	115	0
>> Total Zone Loads	-	5047	547	-	2409	0
Zone Conditioning	-	5438	547	-	2435	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	465 L/s	0	-	465 L/s	0	-
Ventilation Load	60 L/s	613	831	60 L/s	744	0
Supply Fan Load	465 L/s	215	-	465 L/s	-215	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	6266	1378	-	2964	0
Central Cooling Coil	-	6266	1378	-	0	0
Central Heating Coil	-	0	-	-	2964	-
>> Total Conditioning	-	6266	1378	-	2964	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 1P04

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P04**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **182,2** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **38,1** kW  
Sensible coil load ..... **30,9** kW  
Coil L/s at Jan 1600 ..... **2283** L/s  
Max block L/s ..... **2283** L/s  
Sum of peak zone L/s ..... **2283** L/s  
Sensible heat ratio ..... **0,811**  
m<sup>2</sup>/kW ..... **4,8**  
W/m<sup>2</sup> ..... **209,4**  
Water flow @ 5,6 °K rise ..... **1,64** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **23,9 / 16,5** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,5** °K

### Central Heating Coil Sizing Data

Max coil load ..... **12,1** kW  
Coil L/s at Des Htg ..... **2283** L/s  
Max coil L/s ..... **2283** L/s  
Water flow @ 11,1 °K drop ..... **0,26** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **66,5**  
Ent. DB / Lvg DB ..... **18,4 / 23,2** °C

### Supply Fan Sizing Data

Actual max L/s ..... **2283** L/s  
Standard L/s ..... **2074** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **12,53** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **1,42** BHP  
Fan motor kW ..... **1,06** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **314** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P04

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
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### Air System Information

Air System Name ..... **Sistema 1P04**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **182,2** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	24,8	2283	2283	Jan 1700	9,5	182,2	12,53

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P04 - Z1 - S01	1	24,8	Jan 1700	2283	9,5	182,2	12,53



## Air System Design Load Summary for Sistema 1P04

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	30 m²	1690	-	30 m²	-	-
Wall Transmission	117 m²	2177	-	117 m²	2466	-
Roof Transmission	182 m²	9259	-	182 m²	4166	-
Window Transmission	30 m²	1600	-	30 m²	1921	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	29 m²	490	-	29 m²	514	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2733 W	2270	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3644 W	3354	-	0	0	-
People	46	2448	2738	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1164	137	5%	453	0
>> Total Zone Loads	-	24453	2874	-	9520	0
Zone Conditioning	-	26402	2874	-	9367	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	2283 L/s	0	-	2283 L/s	0	-
Ventilation Load	314 L/s	3477	4334	314 L/s	3800	0
Supply Fan Load	2283 L/s	1057	-	2283 L/s	-1057	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	30936	7208	-	12109	0
Central Cooling Coil	-	30936	7210	-	0	0
Central Heating Coil	-	0	-	-	12109	-
>> Total Conditioning	-	30936	7210	-	12109	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 1P05

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P05**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **189,1** m²  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **40,4** kW  
Sensible coil load ..... **32,9** kW  
Coil L/s at Jan 1600 ..... **2426** L/s  
Max block L/s ..... **2426** L/s  
Sum of peak zone L/s ..... **2426** L/s  
Sensible heat ratio ..... **0,815**  
m²/kW ..... **4,7**  
W/m² ..... **213,7**  
Water flow @ 5,6 °K rise ..... **1,74** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **23,9 / 16,5** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **48** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,6** °K

### Central Heating Coil Sizing Data

Max coil load ..... **12,8** kW  
Coil L/s at Des Htg ..... **2426** L/s  
Max coil L/s ..... **2426** L/s  
Water flow @ 11,1 °K drop ..... **0,28** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **67,7**  
Ent. DB / Lvg DB ..... **18,4 / 23,2** °C

### Supply Fan Sizing Data

Actual max L/s ..... **2426** L/s  
Standard L/s ..... **2204** L/s  
Actual max L/(s-m²) ..... **12,83** L/(s-m²)

Fan motor BHP ..... **1,51** BHP  
Fan motor kW ..... **1,12** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **326** L/s  
L/(s-m²) ..... **1,73** L/(s-m²)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P05

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P05**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **189,1** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	26,3	2426	2426	Jan 1700	10,2	189,1	12,83

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P05 - Z1 - S01	1	26,3	Jan 1700	2426	10,2	189,1	12,83

## Air System Design Load Summary for Sistema 1P05

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	33 m²	1383	-	33 m²	-	-
Wall Transmission	126 m²	3260	-	126 m²	2666	-
Roof Transmission	189 m²	9610	-	189 m²	4323	-
Window Transmission	33 m²	1760	-	33 m²	2113	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	32 m²	552	-	32 m²	579	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2837 W	2356	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3782 W	3481	-	0	0	-
People	47	2541	2841	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1247	142	5%	484	0
>> Total Zone Loads	-	26190	2983	-	10165	0
Zone Conditioning	-	28200	2983	-	9992	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	2426 L/s	0	-	2426 L/s	0	-
Ventilation Load	326 L/s	3590	4511	326 L/s	3939	0
Supply Fan Load	2426 L/s	1123	-	2426 L/s	-1123	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	32913	7494	-	12807	0
Central Cooling Coil	-	32913	7494	-	0	0
Central Heating Coil	-	0	-	-	12807	-
>> Total Conditioning	-	32913	7494	-	12807	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 1P06

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P06**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **121,8** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **26,7** kW  
Sensible coil load ..... **21,9** kW  
Coil L/s at Jan 1600 ..... **1632** L/s  
Max block L/s ..... **1632** L/s  
Sum of peak zone L/s ..... **1632** L/s  
Sensible heat ratio ..... **0,819**  
m<sup>2</sup>/kW ..... **4,6**  
W/m<sup>2</sup> ..... **219,4**  
Water flow @ 5,6 °K rise ..... **1,15** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **23,8 / 16,4** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,5** °K

### Central Heating Coil Sizing Data

Max coil load ..... **8,7** kW  
Coil L/s at Des Htg ..... **1632** L/s  
Max coil L/s ..... **1632** L/s  
Water flow @ 11,1 °K drop ..... **0,19** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **71,4**  
Ent. DB / Lvg DB ..... **18,6 / 23,4** °C

### Supply Fan Sizing Data

Actual max L/s ..... **1632** L/s  
Standard L/s ..... **1482** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **13,39** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **1,01** BHP  
Fan motor kW ..... **0,76** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **210** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P06

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P06**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **121,8** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	17,7	1632	1632	Jan 1700	7,2	121,8	13,39

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P06 - Z1 - S01	1	17,7	Jan 1700	1632	7,2	121,8	13,39

## Air System Design Load Summary for Sistema 1P06

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	28 m²	1550	-	28 m²	-	-
Wall Transmission	71 m²	1389	-	71 m²	1500	-
Roof Transmission	122 m²	6190	-	122 m²	2785	-
Window Transmission	28 m²	1488	-	28 m²	1787	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	41 m²	703	-	41 m²	738	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	1827 W	1518	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2436 W	2242	-	0	0	-
People	30	1637	1830	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	836	92	5%	340	0
>> Total Zone Loads	-	17552	1922	-	7150	0
Zone Conditioning	-	18804	1922	-	6895	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	1632 L/s	0	-	1632 L/s	0	-
Ventilation Load	210 L/s	2332	2914	210 L/s	2553	0
Supply Fan Load	1632 L/s	755	-	1632 L/s	-755	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	21891	4836	-	8693	0
Central Cooling Coil	-	21891	4837	-	0	0
Central Heating Coil	-	0	-	-	8693	-
>> Total Conditioning	-	21891	4837	-	8693	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 1P07

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P07**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **45,6** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **7,4** kW  
Sensible coil load ..... **6,9** kW  
Coil L/s at Jan 1600 ..... **545** L/s  
Max block L/s ..... **545** L/s  
Sum of peak zone L/s ..... **545** L/s  
Sensible heat ratio ..... **0,925**  
m<sup>2</sup>/kW ..... **6,2**  
W/m<sup>2</sup> ..... **162,4**  
Water flow @ 5,6 °K rise ..... **0,32** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **23,0 / 15,5** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,3** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **47** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,5** °K

### Central Heating Coil Sizing Data

Max coil load ..... **3,5** kW  
Coil L/s at Des Htg ..... **545** L/s  
Max coil L/s ..... **545** L/s  
Water flow @ 11,1 °K drop ..... **0,08** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **77,1**  
Ent. DB / Lvg DB ..... **19,6 / 25,5** °C

### Supply Fan Sizing Data

Actual max L/s ..... **545** L/s  
Standard L/s ..... **495** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **11,96** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **0,34** BHP  
Fan motor kW ..... **0,25** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **29** L/s  
L/(s-m<sup>2</sup>) ..... **0,63** L/(s-m<sup>2</sup>)

L/s/person ..... **14,42** L/s/person



## Zone Sizing Summary for Sistema 1P07

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... Sistema 1P07  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 45,6 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	5,9	545	545	Jan 1600	3,3	45,6	11,96

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P07 - Z1 - S01	1	5,9	Jan 1600	545	3,3	45,6	11,96

## Air System Design Load Summary for Sistema 1P07

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	13 m²	543	-	13 m²	-	-
Wall Transmission	33 m²	849	-	33 m²	695	-
Roof Transmission	46 m²	2317	-	46 m²	1043	-
Window Transmission	13 m²	691	-	13 m²	830	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	33 m²	560	-	33 m²	588	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	684 W	568	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	2	107	120	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	282	6	5%	158	0
>> Total Zone Loads	-	5919	126	-	3313	0
Zone Conditioning	-	6277	126	-	3410	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	545 L/s	0	-	545 L/s	0	-
Ventilation Load	29 L/s	321	430	29 L/s	358	0
Supply Fan Load	545 L/s	252	-	545 L/s	-252	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	6850	556	-	3516	0
Central Cooling Coil	-	6850	556	-	0	0
Central Heating Coil	-	0	-	-	3516	-
>> Total Conditioning	-	6850	556	-	3516	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 1P08

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P08**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **188,5** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **39,3** kW  
Sensible coil load ..... **31,9** kW  
Coil L/s at Jan 1600 ..... **2345** L/s  
Max block L/s ..... **2345** L/s  
Sum of peak zone L/s ..... **2345** L/s  
Sensible heat ratio ..... **0,810**  
m<sup>2</sup>/kW ..... **4,8**  
W/m<sup>2</sup> ..... **208,7**  
Water flow @ 5,6 °K rise ..... **1,69** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **24,0 / 16,5** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,6** °K

### Central Heating Coil Sizing Data

Max coil load ..... **12,4** kW  
Coil L/s at Des Htg ..... **2345** L/s  
Max coil L/s ..... **2345** L/s  
Water flow @ 11,1 °K drop ..... **0,27** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **66,0**  
Ent. DB / Lvg DB ..... **18,6 / 23,4** °C

### Supply Fan Sizing Data

Actual max L/s ..... **2345** L/s  
Standard L/s ..... **2130** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **12,44** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **1,46** BHP  
Fan motor kW ..... **1,09** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **325** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P08

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... Sistema 1P08  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 188,5 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	25,5	2345	2345	Jan 1700	9,5	188,5	12,44

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P08 - Z1 - S01	1	25,5	Jan 1700	2345	9,5	188,5	12,44

## Air System Design Load Summary for Sistema 1P08

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	33 m²	1859	-	33 m²	-	-
Wall Transmission	125 m²	2344	-	125 m²	2656	-
Roof Transmission	189 m²	9579	-	189 m²	4310	-
Window Transmission	33 m²	1760	-	33 m²	2113	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2828 W	2349	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3770 W	3470	-	0	0	-
People	47	2533	2832	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1195	142	5%	454	0
>> Total Zone Loads	-	25089	2974	-	9532	0
Zone Conditioning	-	27212	2974	-	9538	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	2345 L/s	0	-	2345 L/s	0	-
Ventilation Load	325 L/s	3584	4482	325 L/s	3996	0
Supply Fan Load	2345 L/s	1086	-	2345 L/s	-1086	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	31881	7456	-	12449	0
Central Cooling Coil	-	31881	7457	-	0	0
Central Heating Coil	-	0	-	-	12449	-
>> Total Conditioning	-	31881	7457	-	12449	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for Sistema 1P09

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P09**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **188,5** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **39,8** kW  
Sensible coil load ..... **32,3** kW  
Coil L/s at Jan 1600 ..... **2368** L/s  
Max block L/s ..... **2368** L/s  
Sum of peak zone L/s ..... **2368** L/s  
Sensible heat ratio ..... **0,812**  
m<sup>2</sup>/kW ..... **4,7**  
W/m<sup>2</sup> ..... **210,9**  
Water flow @ 5,6 °K rise ..... **1,71** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **24,0 / 16,5** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **48** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,6** °K

### Central Heating Coil Sizing Data

Max coil load ..... **12,5** kW  
Coil L/s at Des Htg ..... **2368** L/s  
Max coil L/s ..... **2368** L/s  
Water flow @ 11,1 °K drop ..... **0,27** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **66,5**  
Ent. DB / Lvg DB ..... **18,6 / 23,5** °C

### Supply Fan Sizing Data

Actual max L/s ..... **2368** L/s  
Standard L/s ..... **2151** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **12,56** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **1,47** BHP  
Fan motor kW ..... **1,10** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **325** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P09

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... Sistema 1P09  
Equipment Class ..... CW AHU  
Air System Type ..... SZCAV

Number of zones ..... 1  
Floor Area ..... 188,5 m<sup>2</sup>  
Location ..... Sao Paulo, Brazil

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... Sum of space airflow rates  
Space L/s ..... Individual peak space loads

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	25,7	2368	2368	Jan 1700	9,5	188,5	12,56

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P09 - Z1 - S01	1	25,7	Jan 1700	2368	9,5	188,5	12,56

## Air System Design Load Summary for Sistema 1P09

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	33 m²	1383	-	33 m²	-	-
Wall Transmission	125 m²	3247	-	125 m²	2656	-
Roof Transmission	189 m²	9579	-	189 m²	4310	-
Window Transmission	33 m²	1760	-	33 m²	2113	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2828 W	2349	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3770 W	3470	-	0	0	-
People	47	2533	2832	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1216	142	5%	454	0
>> Total Zone Loads	-	25537	2974	-	9532	0
Zone Conditioning	-	27627	2974	-	9605	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	2368 L/s	0	-	2368 L/s	0	-
Ventilation Load	325 L/s	3564	4489	325 L/s	4025	0
Supply Fan Load	2368 L/s	1096	-	2368 L/s	-1096	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	32287	7463	-	12534	0
Central Cooling Coil	-	32287	7463	-	0	0
Central Heating Coil	-	0	-	-	12534	-
>> Total Conditioning	-	32287	7463	-	12534	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		



## Air System Sizing Summary for Sistema 1P10

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P10**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **186,6** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Central Cooling Coil Sizing Data

Total coil load ..... **37,5** kW  
Sensible coil load ..... **30,1** kW  
Coil L/s at Jan 1600 ..... **2203** L/s  
Max block L/s ..... **2203** L/s  
Sum of peak zone L/s ..... **2203** L/s  
Sensible heat ratio ..... **0,804**  
m<sup>2</sup>/kW ..... **5,0**  
W/m<sup>2</sup> ..... **200,7**  
Water flow @ 5,6 °K rise ..... **1,61** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **24,0 / 16,6** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,6** °K

### Central Heating Coil Sizing Data

Max coil load ..... **11,7** kW  
Coil L/s at Des Htg ..... **2203** L/s  
Max coil L/s ..... **2203** L/s  
Water flow @ 11,1 °K drop ..... **0,25** L/s

Load occurs at ..... **Des Htg**  
W/m<sup>2</sup> ..... **62,6**  
Ent. DB / Lvg DB ..... **18,5 / 23,3** °C

### Supply Fan Sizing Data

Actual max L/s ..... **2203** L/s  
Standard L/s ..... **2001** L/s  
Actual max L/(s-m<sup>2</sup>) ..... **11,81** L/(s-m<sup>2</sup>)

Fan motor BHP ..... **1,37** BHP  
Fan motor kW ..... **1,02** kW  
Fan static ..... **250** Pa

### Outdoor Ventilation Air Data

Design airflow L/s ..... **322** L/s  
L/(s-m<sup>2</sup>) ..... **1,73** L/(s-m<sup>2</sup>)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P10

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

### Air System Information

Air System Name ..... **Sistema 1P10**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **186,6** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	23,9	2203	2203	Jan 1700	8,6	186,6	11,81

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P10 - Z1 - S01	1	23,9	Jan 1700	2203	8,6	186,6	11,81

## Air System Design Load Summary for Sistema 1P10

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	18 m²	1158	-	18 m²	-	-
Wall Transmission	103 m²	1955	-	103 m²	2190	-
Roof Transmission	187 m²	9483	-	187 m²	4266	-
Window Transmission	18 m²	960	-	18 m²	1152	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	32 m²	552	-	32 m²	579	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2799 W	2325	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3732 W	3435	-	0	0	-
People	47	2507	2804	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1119	140	5%	409	0
>> Total Zone Loads	-	23494	2944	-	8596	0
Zone Conditioning	-	25522	2944	-	8731	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	2203 L/s	0	-	2203 L/s	0	-
Ventilation Load	322 L/s	3554	4413	322 L/s	3965	0
Supply Fan Load	2203 L/s	1020	-	2203 L/s	-1020	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	30096	7356	-	11676	0
Central Cooling Coil	-	30096	7358	-	0	0
Central Heating Coil	-	0	-	-	11676	-
>> Total Conditioning	-	30096	7358	-	11676	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

# Air System Sizing Summary for Sistema 1P11

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

11/13/2020  
03:25

## Air System Information

Air System Name ..... **Sistema 1P11**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **186,6** m²  
Location ..... **Sao Paulo, Brazil**

## Sizing Calculation Information

### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

## Central Cooling Coil Sizing Data

Total coil load ..... **40,2** kW  
Sensible coil load ..... **32,8** kW  
Coil L/s at Jan 1600 ..... **2426** L/s  
Max block L/s ..... **2426** L/s  
Sum of peak zone L/s ..... **2426** L/s  
Sensible heat ratio ..... **0,816**  
m²/kW ..... **4,6**  
W/m² ..... **215,2**  
Water flow @ 5,6 °K rise ..... **1,73** L/s

Load occurs at ..... **Jan 1600**  
OA DB / WB ..... **32,6 / 22,2** °C  
Entering DB / WB ..... **23,9 / 16,4** °C  
Leaving DB / WB ..... **11,6 / 10,9** °C  
Coil ADP ..... **10,2** °C  
Bypass Factor ..... **0,100**  
Resulting RH ..... **49** %  
Design supply temp. .... **12,0** °C  
Zone T-stat Check ..... **0 of 1** OK  
Max zone temperature deviation ..... **0,6** °K

## Central Heating Coil Sizing Data

Max coil load ..... **13,0** kW  
Coil L/s at Des Htg ..... **2426** L/s  
Max coil L/s ..... **2426** L/s  
Water flow @ 11,1 °K drop ..... **0,28** L/s

Load occurs at ..... **Des Htg**  
W/m² ..... **69,9**  
Ent. DB / Lvg DB ..... **18,5 / 23,4** °C

## Supply Fan Sizing Data

Actual max L/s ..... **2426** L/s  
Standard L/s ..... **2203** L/s  
Actual max L/(s-m²) ..... **13,00** L/(s-m²)

Fan motor BHP ..... **1,51** BHP  
Fan motor kW ..... **1,12** kW  
Fan static ..... **250** Pa

## Outdoor Ventilation Air Data

Design airflow L/s ..... **322** L/s  
L/(s-m²) ..... **1,73** L/(s-m²)

L/s/person ..... **6,90** L/s/person

## Zone Sizing Summary for Sistema 1P11

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

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03:25

### Air System Information

Air System Name ..... **Sistema 1P11**  
Equipment Class ..... **CW AHU**  
Air System Type ..... **SZCAV**

Number of zones ..... **1**  
Floor Area ..... **186,6** m<sup>2</sup>  
Location ..... **Sao Paulo, Brazil**

### Sizing Calculation Information

#### Zone and Space Sizing Method:

Zone L/s ..... **Sum of space airflow rates**  
Space L/s ..... **Individual peak space loads**

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

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m <sup>2</sup> )	Zone L/(s-m <sup>2</sup> )
Zone 1	26,3	2426	2426	Jan 1700	10,7	186,6	13,00

### Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

### Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m <sup>2</sup> )	Space L/(s-m <sup>2</sup> )
<b>Zone 1</b>							
Sist 1P11 - Z1 - S01	1	26,3	Jan 1700	2426	10,7	186,6	13,00

## Air System Design Load Summary for Sistema 1P11

Project Name: OS6955 - MUSEU DA IMIGRACAO - 1 ANDAR  
Prepared by: EPT Engenharia S/C Ltda

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03:25

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32,6 °C / 22,2 °C			HEATING OA DB / WB 8,9 °C / 7,2 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	30 m²	1228	-	30 m²	-	-
Wall Transmission	161 m²	3707	-	161 m²	3398	-
Roof Transmission	187 m²	9483	-	187 m²	4266	-
Window Transmission	30 m²	1600	-	30 m²	1921	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	0 m²	0	-	0 m²	0	-
Floor Transmission	0 m²	0	-	0 m²	0	-
Partitions	32 m²	552	-	32 m²	579	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	2799 W	2325	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3732 W	3435	-	0	0	-
People	47	2507	2804	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1242	140	5%	508	0
>> Total Zone Loads	-	26079	2944	-	10671	0
Zone Conditioning	-	28078	2944	-	10259	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	2426 L/s	0	-	2426 L/s	0	-
Ventilation Load	322 L/s	3557	4455	322 L/s	3902	0
Supply Fan Load	2426 L/s	1123	-	2426 L/s	-1123	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	32758	7398	-	13038	0
Central Cooling Coil	-	32758	7399	-	0	0
Central Heating Coil	-	0	-	-	13038	-
>> Total Conditioning	-	32758	7399	-	13038	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		