

GENERAL REQUIREMENTS

HVAC HEAT GAIN & LOSS CALCULATIONS

Air System Sizing Summary for AHU-1 (Metal Fab)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:27AM

Air System Information

Air System Name **AHU-1 (Metal Fab)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **6178.2** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **24.5** Tons
Total coil load **293.6** MBH
Sensible coil load **293.6** MBH
Coil CFM at Jul 1400 **20000** CFM
Max block CFM **20000** CFM
Sum of peak zone CFM **20000** CFM
Sensible heat ratio **1.000**
CFM/Ton **817.4**
ft²/Ton **252.5**
BTU/(hr·ft²) **47.5**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **87.0 / 74.0** °F
Leaving DB / WB **73.4 / 70.1** °F
Coil ADP **71.9** °F
Bypass Factor **0.100**
Resulting RH **70** %
Design supply temp. **55.0** °F
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

Max coil load **1383.6** MBH
Coil CFM at Des Htg **20000** CFM
Max coil CFM **20000** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **224.0**
Ent. DB / Lvg DB **7.0 / 71.1** °F

Supply Fan Sizing Data

Actual max CFM **20000** CFM
Standard CFM **19978** CFM
Actual max CFM/ft² **3.24** CFM/ft²

Fan motor BHP **27.51** BHP
Fan motor kW **21.83** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **20000** CFM
Standard CFM **19978** CFM
Actual max CFM/ft² **3.24** CFM/ft²

Fan motor BHP **13.76** BHP
Fan motor kW **10.91** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **20000** CFM
CFM/ft² **3.24** CFM/ft²

CFM/person **376.65** CFM/person

Zone Sizing Summary for AHU-1 (Metal Fab)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:27AM

Air System Information

Air System Name **AHU-1 (Metal Fab)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **6178.2** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	20000	20000	3.24	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	48.2	Jul 1400	52.3	6178.2

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C004 METAL FABRICATION	1	49.3	Jul 1400	19505	46.2	5716.6	3.41
C004A - OFF	1	2.7	Jul 1100	200	2.1	127.6	1.57
C004D TOOL CRIB	1	0.0	Jan 0000	75	0.6	81.3	0.92
C004E STORAGE	1	0.0	Jan 0000	220	3.2	252.7	0.87

Ventilation Sizing Summary for AHU-1 (Metal Fab)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:27AM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **20000** CFM

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
C004 METAL FABRICATION	1	5716.6	55.0	19505.0	0.00	0.00	19505.0	0.0	19505.0
C004A - OFF	1	127.6	4.0	200.0	0.00	0.00	200.0	0.0	200.0
C004D TOOL CRIB	1	81.3	0.0	75.0	0.00	0.00	75.0	0.0	75.0
C004E STORAGE	1	252.7	0.0	220.0	0.00	0.00	220.0	0.0	220.0
Totals (incl. Space Multipliers)				20000.0					20000.0

Air System Design Load Summary for AHU-1 (Metal Fab)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:27AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	469 ft²	6421	-	469 ft²	-	-
Wall Transmission	2342 ft²	600	-	2342 ft²	9444	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	469 ft²	628	-	469 ft²	9752	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	354 ft²	528	-	354 ft²	5415	-
Floor Transmission	6118 ft²	0	-	6118 ft²	6733	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	798 ft²	-4308	-	798 ft²	3159	-
Overhead Lighting	3954 W	11566	-	0	0	-
Task Lighting	64 W	185	-	0	0	-
Electric Equipment	7340 W	23503	-	0	0	-
People	47	9085	7476	0	0	0
Infiltration	-	0	0	-	17750	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	48209	7476	-	52252	0
Zone Conditioning	-	60925	7476	-	52350	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	20000 CFM	37238	-	20000 CFM	-37238	-
Ventilation Load	20000 CFM	120974	-7476	20000 CFM	1443002	0
Supply Fan Load	20000 CFM	74476	-	20000 CFM	-74476	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	293614	0	-	1383638	0
Central Cooling Coil	-	293614	0	-	0	0
Central Heating Coil	-	0	-	-	1383638	-
>> Total Conditioning	-	293614	0	-	1383638	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 AHU-2 (Auto Collision)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
10:05AM

Air System Information

Air System Name **AHU-2 (Auto Collision)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **5551.7** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **18.4** Tons
Total coil load **220.7** MBH
Sensible coil load **220.7** MBH
Coil CFM at Aug 1400 **15465** CFM
Max block CFM **15465** CFM
Sum of peak zone CFM **15465** CFM
Sensible heat ratio **1.000**
CFM/Ton **840.7**
ft²/Ton **301.8**
BTU/(hr·ft²) **39.8**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Aug 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **87.0 / 74.0** °F
Leaving DB / WB **73.8 / 70.2** °F
Coil ADP **72.3** °F
Bypass Factor **0.100**
Resulting RH **69** %
Design supply temp. **55.0** °F
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

Max coil load **1061.4** MBH
Coil CFM at Des Htg **15465** CFM
Max coil CFM **15465** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **191.2**
Ent. DB / Lvg DB **7.0 / 70.6** °F

Supply Fan Sizing Data

Actual max CFM **15465** CFM
Standard CFM **15448** CFM
Actual max CFM/ft² **2.79** CFM/ft²

Fan motor BHP **21.28** BHP
Fan motor kW **16.88** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **15465** CFM
Standard CFM **15448** CFM
Actual max CFM/ft² **2.79** CFM/ft²

Fan motor BHP **10.64** BHP
Fan motor kW **8.44** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **15465** CFM
CFM/ft² **2.79** CFM/ft²

CFM/person **419.11** CFM/person

Zone Sizing Summary for AHU-2 (Auto Collision)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
10:05AM

Air System Information

Air System Name **AHU-2 (Auto Collision)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **5551.7** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	15465	15465	2.79	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	35.2	Jul 1400	36.2	5551.7

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C022 Auto Collision	1	30.2	Jul 1400	14905	32.8	4976.0	3.00
C022B Tool Crib	1	0.4	Jan 1400	110	0.0	127.9	0.86
C022E OFF	1	4.2	Jul 1400	250	3.4	225.0	1.11
C022F STOR	1	0.4	Jan 1100	200	0.0	222.8	0.90

Ventilation Sizing Summary for AHU-2 (Auto Collision)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
10:05AM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **15465** CFM

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
C022 Auto Collision	1	4976.0	37.0	14905.0	0.00	0.00	14905.0	0.0	14905.0
C022B Tool Crib	1	127.9	0.0	110.0	0.00	0.00	110.0	0.0	110.0
C022E OFF	1	225.0	4.0	250.0	0.00	0.00	250.0	0.0	250.0
C022F STOR	1	222.8	0.0	200.0	0.00	0.00	200.0	0.0	200.0
Totals (incl. Space Multipliers)				15465.0					15465.0

Air System Design Load Summary for AHU-2 (Auto Collision)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
10:05AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	110 ft²	1018	-	110 ft²	-	-
Wall Transmission	550 ft²	81	-	550 ft²	2219	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	110 ft²	147	-	110 ft²	2288	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	903 ft²	948	-	903 ft²	12558	-
Floor Transmission	5552 ft²	0	-	5552 ft²	3624	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	3553 W	10393	-	0	0	-
Task Lighting	154 W	448	-	0	0	-
Electric Equipment	4581 W	14668	-	0	0	-
People	33	7127	8648	0	0	0
Infiltration	-	0	0	-	15509	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	34832	8648	-	36198	0
Zone Conditioning	-	44037	8648	-	36392	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	15465 CFM	28794	-	15465 CFM	-28794	-
Ventilation Load	15465 CFM	90321	-8648	15465 CFM	1111409	0
Supply Fan Load	15465 CFM	57589	-	15465 CFM	-57589	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	220741	0	-	1061418	0
Central Cooling Coil	-	220741	0	-	0	0
Central Heating Coil	-	0	-	-	1061418	-
>> Total Conditioning	-	220741	0	-	1061418	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 AHU-3 (Auto Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:31AM

Air System Information

Air System Name **AHU-3 (Auto Tech)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **11267.0** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **26.4** Tons
Total coil load **316.8** MBH
Sensible coil load **290.9** MBH
Coil CFM at Aug 1400 **15745** CFM
Max block CFM **15745** CFM
Sum of peak zone CFM **15745** CFM
Sensible heat ratio **0.918**
CFM/Ton **596.3**
ft²/Ton **426.7**
BTU/(hr·ft²) **28.1**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Aug 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **87.0 / 74.0** °F
Leaving DB / WB **69.9 / 68.6** °F
Coil ADP **68.0** °F
Bypass Factor **0.100**
Resulting RH **68** %
Design supply temp. **55.0** °F
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

Max coil load **1146.0** MBH
Coil CFM at Des Htg **15745** CFM
Max coil CFM **15745** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **101.7**
Ent. DB / Lvg DB **7.0 / 74.5** °F

Supply Fan Sizing Data

Actual max CFM **15745** CFM
Standard CFM **15728** CFM
Actual max CFM/ft² **1.40** CFM/ft²

Fan motor BHP **21.66** BHP
Fan motor kW **17.18** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **15745** CFM
Standard CFM **15728** CFM
Actual max CFM/ft² **1.40** CFM/ft²

Fan motor BHP **10.83** BHP
Fan motor kW **8.59** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **15745** CFM
CFM/ft² **1.40** CFM/ft²

CFM/person **190.16** CFM/person

Zone Sizing Summary for AHU-3 (Auto Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:31AM

Air System Information

Air System Name **AHU-3 (Auto Tech)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **11267.0** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	15745	15745	1.40	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	95.0	Jul 1100	106.8	11267.0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
D003 AUTO TECHNOLOGY	1	83.8	Jul 1100	13625	96.7	9245.1	1.47
D003A OFF	1	2.5	Jan 1400	100	0.0	164.4	0.61
D003F - TOOL CRIB	1	0.5	Jan 1100	70	0.0	267.3	0.26
D003G Stor	1	0.6	Jan 1100	75	0.9	283.6	0.26
D003H Small Engines	1	7.9	Jan 1400	1625	5.2	1200.1	1.35
D003J STOR	1	0.5	Jul 1500	250	4.0	106.5	2.35

Ventilation Sizing Summary for AHU-3 (Auto Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:31AM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **15745** CFM

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
D003 AUTO TECHNOLOGY	1	9245.1	69.0	13625.0	0.00	0.00	13625.0	0.0	13625.0
D003A OFF	1	164.4	3.0	100.0	0.00	0.00	100.0	0.0	100.0
D003F - TOOL CRIB	1	267.3	0.0	70.0	0.00	0.00	70.0	0.0	70.0
D003G Stor	1	283.6	0.0	75.0	0.00	0.00	75.0	0.0	75.0
D003H Small Engines	1	1200.1	20.0	1625.0	0.00	0.00	1625.0	0.0	1625.0
D003J STOR	1	106.5	0.0	250.0	0.00	0.00	250.0	0.0	250.0
Totals (incl. Space Multipliers)				15745.0					15745.0

Air System Design Load Summary for AHU-3 (Auto Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
08:31AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	672 ft²	11176	-	672 ft²	-	-
Wall Transmission	2586 ft²	1334	-	2586 ft²	10429	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	672 ft²	901	-	672 ft²	13982	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	462 ft²	579	-	462 ft²	6825	-
Floor Transmission	11267 ft²	0	-	11267 ft²	28139	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	7211 W	21092	-	0	0	-
Task Lighting	4364 W	12612	-	0	0	-
Electric Equipment	8026 W	25651	-	0	0	-
People	74	14166	11528	0	0	0
Infiltration	-	0	0	-	37737	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	4376	576	10%	9711	0
>> Total Zone Loads	-	91887	12104	-	106823	0
Zone Conditioning	-	114387	12104	-	107502	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	15745 CFM	29316	-	15745 CFM	-29316	-
Ventilation Load	15745 CFM	88546	13847	15745 CFM	1126460	0
Supply Fan Load	15745 CFM	58631	-	15745 CFM	-58631	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	290879	25951	-	1146015	0
Central Cooling Coil	-	290879	25951	-	0	0
Central Heating Coil	-	0	-	-	1146014	-
>> Total Conditioning	-	290879	25951	-	1146014	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 AHU-4 (Electrical Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:50AM

Air System Information

Air System Name **AHU-4 (Electrical Tech)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **10373.6** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **17.3** Tons
Total coil load **207.7** MBH
Sensible coil load **175.2** MBH
Coil CFM at Jul 1300 **9405** CFM
Max block CFM **9405** CFM
Sum of peak zone CFM **9405** CFM
Sensible heat ratio **0.843**
CFM/Ton **543.3**
ft²/Ton **599.2**
BTU/(hr·ft²) **20.0**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Jul 1300**
OA DB / WB **85.0 / 73.5** °F
Entering DB / WB **82.6 / 70.6** °F
Leaving DB / WB **65.3 / 64.2** °F
Coil ADP **63.4** °F
Bypass Factor **0.100**
Resulting RH **58** %
Design supply temp. **55.0** °F
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

Max coil load **135.1** MBH
Coil CFM at Des Htg **9405** CFM
Max coil CFM **9405** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **13.0**
Ent. DB / Lvg DB **59.6 / 72.9** °F

Supply Fan Sizing Data

Actual max CFM **9405** CFM
Standard CFM **9395** CFM
Actual max CFM/ft² **0.91** CFM/ft²

Fan motor BHP **12.94** BHP
Fan motor kW **10.26** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **9405** CFM
Standard CFM **9395** CFM
Actual max CFM/ft² **0.91** CFM/ft²

Fan motor BHP **6.47** BHP
Fan motor kW **5.13** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **1951** CFM
CFM/ft² **0.19** CFM/ft²

CFM/person **25.21** CFM/person

Zone Sizing Summary for AHU-4 (Electrical Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:50AM

Air System Information

Air System Name **AHU-4 (Electrical Tech)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **10373.6** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	9405	9405	0.91	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	94.1	Jul 1400	50.7	10373.6

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B104 ELECTRICAL TECH	1	89.2	Jul 1400	8905	50.7	9236.7	0.96
B104C TOOL CRIB	1	1.2	Jan 1100	119	0.0	588.0	0.20
B104D TOOL CRIB	1	0.6	Jan 1100	56	0.0	276.4	0.20
B104H OFF	1	3.3	Jan 1100	326	0.0	272.5	1.20

Ventilation Sizing Summary for AHU-4 (Electrical Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:50AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Heating operation**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **1838** CFM
System Ventilation Efficiency (Ev) **0.942**
Outdoor Air Intake (Vot) **1951** CFM

2. Space Ventilation Analysis

		Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
B104 ELECTRICAL TECH	1	8905	9236.7	0.12	69.7	10.00	0.8	2257	<i>1805</i>	0.942
B104C TOOL CRIB	1	119	588.0	0.00	0.0	0.00	0.8	0	<i>0</i>	1.195
B104D TOOL CRIB	1	56	276.4	0.00	0.0	0.00	0.8	0	<i>0</i>	1.195
B104H OFF	1	326	272.5	0.06	3.3	5.00	0.8	41	<i>33</i>	1.070
Totals (incl. Space Multipliers)		9405							1838	0.942

Air System Design Load Summary for AHU-4 (Electrical Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:50AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1300 COOLING OA DB / WB 85.0 °F / 73.5 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	388 ft²	4457	-	388 ft²	-	-
Wall Transmission	1327 ft²	331	-	1327 ft²	5351	-
Roof Transmission	1762 ft²	589	-	1762 ft²	3012	-
Window Transmission	388 ft²	308	-	388 ft²	8075	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	242 ft²	304	-	242 ft²	3959	-
Floor Transmission	10374 ft²	0	-	10374 ft²	5119	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	6639 W	18979	-	0	0	-
Task Lighting	4755 W	12218	-	0	0	-
Electric Equipment	11564 W	36698	-	0	0	-
People	69	12750	10824	0	0	0
Infiltration	-	0	0	-	20579	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	4332	541	10%	4609	0
>> Total Zone Loads	-	90967	11365	-	50703	0
Zone Conditioning	-	115723	11365	-	48000	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	589	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	9405 CFM	17511	-	9405 CFM	-17511	-
Ventilation Load	1951 CFM	6367	21159	1951 CFM	139653	0
Supply Fan Load	9405 CFM	35022	-	9405 CFM	-35022	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	175213	32524	-	135120	0
Central Cooling Coil	-	175213	32529	-	0	0
Central Heating Coil	-	0	-	-	135120	-
>> Total Conditioning	-	175213	32529	-	135120	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 AHU-5 (HVAC Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:33AM

Air System Information

Air System Name **AHU-5 (HVAC Tech)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **7331.9** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **15.0** Tons
Total coil load **180.4** MBH
Sensible coil load **147.1** MBH
Coil CFM at Aug 1400 **7275** CFM
Max block CFM **7275** CFM
Sum of peak zone CFM **7275** CFM
Sensible heat ratio **0.815**
CFM/Ton **483.9**
ft²/Ton **487.7**
BTU/(hr·ft²) **24.6**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Aug 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **83.5 / 70.8** °F
Leaving DB / WB **64.7 / 63.5** °F
Coil ADP **62.7** °F
Bypass Factor **0.100**
Resulting RH **57** %
Design supply temp. **55.0** °F
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

Max coil load **154.2** MBH
Coil CFM at Des Htg **7275** CFM
Max coil CFM **7275** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **21.0**
Ent. DB / Lvg DB **55.5 / 75.1** °F

Supply Fan Sizing Data

Actual max CFM **7275** CFM
Standard CFM **7267** CFM
Actual max CFM/ft² **0.99** CFM/ft²

Fan motor BHP **10.01** BHP
Fan motor kW **7.94** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **7275** CFM
Standard CFM **7267** CFM
Actual max CFM/ft² **0.99** CFM/ft²

Fan motor BHP **5.00** BHP
Fan motor kW **3.97** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **1970** CFM
CFM/ft² **0.27** CFM/ft²

CFM/person **29.98** CFM/person

Zone Sizing Summary for AHU-5 (HVAC Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:33AM

Air System Information

Air System Name **AHU-5 (HVAC Tech)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **7331.9** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	7275	7275	0.99	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	77.9	Aug 1400	51.8	7331.9

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B103 HVAC TECHNOLOGY	1	73.2	Aug 1400	6885	51.3	6631.6	1.04
B103F TOOL CRIB	1	1.0	Jul 1100	82	0.3	150.0	0.54
B103G TOOL CRIB	1	0.3	Jul 1400	28	0.2	150.0	0.19
B103H TOOL CRIB	1	0.3	Jan 1100	27	0.0	163.9	0.16
B103I OFF	1	3.1	Jan 1100	253	0.0	236.4	1.07

Ventilation Sizing Summary for AHU-5 (HVAC Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:33AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Heating operation**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **1823** CFM
System Ventilation Efficiency (Ev) **0.925**
Outdoor Air Intake (Vot) **1970** CFM

2. Space Ventilation Analysis

		Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
B103 HVAC TECHNOLOGY	1	6885	6631.6	0.18	59.8	10.00	0.8	2240	<i>1792</i>	0.925
B103F TOOL CRIB	1	82	150.0	0.00	0.0	0.00	0.8	0	<i>0</i>	1.251
B103G TOOL CRIB	1	28	150.0	0.00	0.0	0.00	0.8	0	<i>0</i>	1.251
B103H TOOL CRIB	1	27	163.9	0.00	0.0	0.00	0.8	0	<i>0</i>	1.251
B103I OFF	1	253	236.4	0.06	3.3	5.00	0.8	39	<i>31</i>	1.098
Totals (incl. Space Multipliers)		7275							1823	0.925

Air System Design Load Summary for AHU-5 (HVAC Tech)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:33AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	575 ft²	10444	-	575 ft²	-	-
Wall Transmission	1056 ft²	228	-	1056 ft²	4258	-
Roof Transmission	1603 ft²	570	-	1603 ft²	2741	-
Window Transmission	575 ft²	771	-	575 ft²	11956	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	242 ft²	436	-	242 ft²	3959	-
Floor Transmission	7332 ft²	0	-	7332 ft²	4466	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	4692 W	13726	-	0	0	-
Task Lighting	3434 W	9172	-	0	0	-
Electric Equipment	8618 W	27595	-	0	0	-
People	58	11241	9212	0	0	0
Infiltration	-	0	0	-	19691	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	3709	461	10%	4707	0
>> Total Zone Loads	-	77891	9673	-	51778	0
Zone Conditioning	-	95636	9673	-	53500	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	570	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	7275 CFM	13545	-	7275 CFM	-13545	-
Ventilation Load	1970 CFM	10259	23626	1970 CFM	141330	0
Supply Fan Load	7275 CFM	27091	-	7275 CFM	-27091	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	147101	33298	-	154194	0
Central Cooling Coil	-	147101	33304	-	0	0
Central Heating Coil	-	0	-	-	154194	-
>> Total Conditioning	-	147101	33304	-	154194	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 AHU-6 (Plumbing and Pipefitting)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:16AM

Air System Information

Air System Name .. **AHU-6 (Plumbing and Pipefitting)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **7312.9** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **14.9** Tons
Total coil load **179.3** MBH
Sensible coil load **140.0** MBH
Coil CFM at Jul 1400 **6570** CFM
Max block CFM **6570** CFM
Sum of peak zone CFM **6570** CFM
Sensible heat ratio **0.781**
CFM/Ton **439.6**
ft²/Ton **489.3**
BTU/(hr·ft²) **24.5**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **83.7 / 70.7** °F
Leaving DB / WB **63.9 / 62.7** °F
Coil ADP **61.7** °F
Bypass Factor **0.100**
Resulting RH **55** %
Design supply temp. **58.0** °F
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

Max coil load **154.8** MBH
Coil CFM at Des Htg **6570** CFM
Max coil CFM **6570** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **21.2**
Ent. DB / Lvg DB **52.6 / 74.4** °F

Supply Fan Sizing Data

Actual max CFM **6570** CFM
Standard CFM **6563** CFM
Actual max CFM/ft² **0.90** CFM/ft²

Fan motor BHP **9.04** BHP
Fan motor kW **7.17** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **6570** CFM
Standard CFM **6563** CFM
Actual max CFM/ft² **0.90** CFM/ft²

Fan motor BHP **4.52** BHP
Fan motor kW **3.59** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **2068** CFM
CFM/ft² **0.28** CFM/ft²

CFM/person **25.53** CFM/person

Zone Sizing Summary for AHU-6 (Plumbing and Pipefitting)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:16AM

Air System Information

Air System Name .. **AHU-6 (Plumbing and Pipefitting)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **7312.9** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	6570	6570	0.90	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	72.7	Jul 1400	40.6	7312.9

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B101 PLUMBING - PIPEFITT	1	67.6	Jul 1400	6088	40.2	6138.5	0.99
B101F OFF	1	3.3	Jan 1100	297	0.0	237.4	1.25
B101G TOOL CRIB	1	0.8	Jan 1100	73	0.0	398.8	0.18
B101H TOOL CRIB	1	0.7	Jan 1100	59	0.0	324.3	0.18
B101j TOOL CRIB	1	0.5	Jul 1400	53	0.4	214.0	0.25

Ventilation Sizing Summary for AHU-6 (Plumbing and Pipefitting)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:16AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Heating operation**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **1877** CFM
System Ventilation Efficiency (Ev) **0.908**
Outdoor Air Intake (Vot) **2068** CFM

2. Space Ventilation Analysis

		Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
B101 PLUMBING - PIPEFITT	1	6088	6138.5	0.18	73.7	10.00	0.8	2302	<i>1842</i>	0.908
B101F OFF	1	297	237.4	0.06	4.2	5.00	0.8	44	<i>35</i>	1.138
B101G TOOL CRIB	1	73	398.8	0.00	0.0	0.00	0.8	0	<i>0</i>	1.286
B101H TOOL CRIB	1	59	324.3	0.00	0.0	0.00	0.8	0	<i>0</i>	1.286
B101j TOOL CRIB	1	53	214.0	0.00	0.0	0.00	0.8	0	<i>0</i>	1.286
Totals (incl. Space Multipliers)		6570							1877	0.908

Air System Design Load Summary for AHU-6 (Plumbing and Pipefitting)

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/07/2023

08:16AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	450 ft²	6439	-	450 ft²	-	-
Wall Transmission	803 ft²	196	-	803 ft²	3239	-
Roof Transmission	280 ft²	356	-	280 ft²	881	-
Window Transmission	450 ft²	604	-	450 ft²	9367	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	242 ft²	462	-	242 ft²	3959	-
Floor Transmission	7313 ft²	0	-	7313 ft²	3745	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	4680 W	13690	-	0	0	-
Task Lighting	3188 W	8515	-	0	0	-
Electric Equipment	7846 W	25124	-	0	0	-
People	72	13858	11360	0	0	0
Infiltration	-	0	0	-	15725	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	3462	568	10%	3692	0
>> Total Zone Loads	-	72706	11928	-	40607	0
Zone Conditioning	-	92097	11928	-	43080	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	356	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	6570 CFM	12233	-	6570 CFM	-12233	-
Ventilation Load	2068 CFM	10850	27409	2068 CFM	148457	0
Supply Fan Load	6570 CFM	24465	-	6570 CFM	-24465	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	140000	39337	-	154839	0
Central Cooling Coil	-	140001	39342	-	0	0
Central Heating Coil	-	0	-	-	154839	-
>> Total Conditioning	-	140001	39342	-	154839	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 AHU-7 Carpentry

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:10AM

Air System Information

Air System Name **AHU-7 Carpentry**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **9180.2** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **15.6** Tons
Total coil load **187.8** MBH
Sensible coil load **156.3** MBH
Coil CFM at Jul 1400 **8265** CFM
Max block CFM **8265** CFM
Sum of peak zone CFM **8265** CFM
Sensible heat ratio **0.833**
CFM/Ton **528.2**
ft²/Ton **586.7**
BTU/(hr·ft²) **20.5**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **83.7 / 71.4** °F
Leaving DB / WB **66.1 / 65.0** °F
Coil ADP **64.2** °F
Bypass Factor **0.100**
Resulting RH **59** %
Design supply temp. **55.0** °F
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

Max coil load **166.8** MBH
Coil CFM at Des Htg **8265** CFM
Max coil CFM **8265** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **18.2**
Ent. DB / Lvg DB **54.4 / 73.1** °F

Supply Fan Sizing Data

Actual max CFM **8265** CFM
Standard CFM **8256** CFM
Actual max CFM/ft² **0.90** CFM/ft²

Fan motor BHP **11.37** BHP
Fan motor kW **9.02** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **8265** CFM
Standard CFM **8256** CFM
Actual max CFM/ft² **0.90** CFM/ft²

Fan motor BHP **5.69** BHP
Fan motor kW **4.51** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **2396** CFM
CFM/ft² **0.26** CFM/ft²

CFM/person **35.97** CFM/person

Zone Sizing Summary for AHU-7 Carpentry

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:10AM

Air System Information

Air System Name **AHU-7 Carpentry**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **9180.2** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	8265	8265	0.90	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	83.0	Jul 1400	40.6	9180.2

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
A141 CARPENTRY	1	77.7	Jul 1400	7719	40.6	8103.8	0.95
A141E STOR	1	0.7	Jan 1100	69	0.0	342.7	0.20
A141F OFF	1	3.9	Jan 1100	384	0.0	275.0	1.40
A141G TOOL CRIB	1	0.9	Jan 1100	92	0.0	458.8	0.20

Ventilation Sizing Summary for AHU-7 Carpentry

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:10AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Heating operation**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **2115** CFM
System Ventilation Efficiency (Ev) **0.883**
Outdoor Air Intake (Vot) **2396** CFM

2. Space Ventilation Analysis

		Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
A141 CARPENTRY	1	7719	8103.8	0.18	59.8	10.00	0.8	2571	2057	0.923
A141E STOR	1	69	342.7	0.06	0.0	5.00	0.8	26	21	0.883
A141F OFF	1	384	275.0	0.06	4.3	5.00	0.8	48	38	1.132
A141G TOOL CRIB	1	92	458.8	0.00	0.0	0.00	0.8	0	0	1.256
Totals (incl. Space Multipliers)		8265							2115	0.883

Air System Design Load Summary for AHU-7 Carpentry

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
08:10AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	351 ft²	5017	-	351 ft²	-	-
Wall Transmission	1036 ft²	255	-	1036 ft²	4179	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	351 ft²	470	-	351 ft²	7298	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	242 ft²	462	-	242 ft²	3959	-
Floor Transmission	9180 ft²	0	-	9180 ft²	4331	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	5875 W	17186	-	0	0	-
Task Lighting	4189 W	11189	-	0	0	-
Electric Equipment	10325 W	33060	-	0	0	-
People	59	11395	9376	0	0	0
Infiltration	-	0	0	-	17130	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	3952	469	10%	3690	0
>> Total Zone Loads	-	82985	9845	-	40585	0
Zone Conditioning	-	97994	9845	-	40576	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	8265 CFM	15389	-	8265 CFM	-15389	-
Ventilation Load	2396 CFM	12186	21584	2396 CFM	172376	0
Supply Fan Load	8265 CFM	30777	-	8265 CFM	-30777	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	156347	31429	-	166786	0
Central Cooling Coil	-	156347	31410	-	0	0
Central Heating Coil	-	0	-	-	166786	-
>> Total Conditioning	-	156347	31410	-	166786	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 AHU-8 (Cafeteria)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
12:33PM

Air System Information

Air System Name **AHU-8 (Cafeteria)**
Equipment Class **SPLT AHU**
Air System Type **VAV**

Number of zones **7**
Floor Area **10899.9** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **36.9** Tons
Total coil load **442.3** MBH
Sensible coil load **319.8** MBH
Coil CFM at Jul 1400 **10480** CFM
Max block CFM at Jul 1400 **11091** CFM
Sum of peak zone CFM **11235** CFM
Sensible heat ratio **0.723**
CFM/Ton **284.3**
ft²/Ton **295.7**
BTU/(hr-ft²) **40.6**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **79.7 / 65.1** °F
Leaving DB / WB **51.4 / 50.2** °F
Coil ADP **48.3** °F
Bypass Factor **0.100**
Resulting RH **45** %
Design supply temp. **55.0** °F
Zone T-stat Check **5 of 7** OK
Max zone temperature deviation **0.7** °F

Preheat Coil Sizing Data

No heating coil loads occurred during this calculation.

Supply Fan Sizing Data

Actual max CFM at Jul 1400 **11091** CFM
Standard CFM **11078** CFM
Actual max CFM/ft² **1.02** CFM/ft²

Fan motor BHP **17.16** BHP
Fan motor kW **13.62** kW
Fan static **4.50** in wg

Return Fan Sizing Data

Actual max CFM at Jul 1400 **11091** CFM
Standard CFM **11078** CFM
Actual max CFM/ft² **1.02** CFM/ft²

Fan motor BHP **7.63** BHP
Fan motor kW **6.05** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **7001** CFM
CFM/ft² **0.64** CFM/ft²

CFM/person **13.74** CFM/person

Zone Sizing Summary for AHU-8 (Cafeteria)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
12:33PM

Air System Information

Air System Name **AHU-8 (Cafeteria)**
Equipment Class **SPLT AHU**
Air System Type **VAV**

Number of zones **7**
Floor Area **10899.9** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	3212	1285	1.91	103.2	-	0.0	-	3212
Zone 2	5886	5297	0.91	228.6	-	0.0	-	0
Zone 3	894	268	1.45	27.1	-	0.0	-	894
Zone 4	140	28	0.98	4.0	-	0.0	-	140
Zone 5	751	300	0.69	13.0	-	0.0	-	0
Zone 6	263	88	0.59	8.2	-	0.0	-	263
Zone 7	90	90	0.20	3.9	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	54.8	Jul 1400	79.7	1679.8
Zone 2	127.0	Sep 1400	28.1	6469.6
Zone 3	13.8	Jul 1400	22.2	616.9
Zone 4	1.9	Jul 1400	3.5	143.0
Zone 5	16.2	Jul 1100	1.2	1091.8
Zone 6	3.8	Jul 1400	6.5	449.8
Zone 7	0.9	Jan 1100	0.0	449.0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
A114 CAFE EXT	1	54.8	Jul 1400	3152	79.7	1679.8	1.88
Zone 2							
A114 CAFETERIA	1	127.0	Sep 1400	5886	28.1	6469.6	0.91
Zone 3							
A111 STAFF LUNCH RM	1	13.8	Jul 1400	877	22.2	616.9	1.42
Zone 4							
A104 OFF	1	1.9	Jul 1400	137	3.5	143.0	0.96
Zone 5							
A112 SERVERY	1	16.2	Jul 1100	751	1.2	1091.8	0.69
Zone 6							
A110 RECEIVING	1	3.8	Jul 1400	259	6.5	449.8	0.57
Zone 7							
A117 CHAIR STORAGE	1	0.5	Jan 1100	45	0.0	223.7	0.20
A117A CHAIR STORAGE	1	0.5	Jan 1100	45	0.0	225.3	0.20

Ventilation Sizing Summary for AHU-8 (Cafeteria)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
12:33PM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Minimum flow (heating)**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **5589** CFM
System Ventilation Efficiency (Ev) **0.798**
Outdoor Air Intake (Vot) **7001** CFM

2. Space Ventilation Analysis

		Minimum Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
A114 CAFE EXT	1	1261	1679.8	0.18	90.0	7.50	0.8	1222	977	0.910
Zone 2										
A114 CAFETERIA	1	5297	6469.6	0.18	389.7	7.50	0.8	5109	4087	0.798
Zone 3										
A111 STAFF LUNCH RM	1	263	616.9	0.12	22.5	5.00	0.8	233	187	1.001
Zone 4										
A104 OFF	1	27	143.0	0.06	1.7	5.00	0.8	22	17	1.104
Zone 5										
A112 SERVERY	1	300	1091.8	0.18	3.5	7.50	0.8	278	223	0.837
Zone 6										
A110 RECEIVING	1	88	449.8	0.12	1.7	10.00	0.8	88	71	0.894
Zone 7										
A117 CHAIR STORAGE	1	45	223.7	0.06	0.0	5.00	0.8	17	13	1.388
A117A CHAIR STORAGE	1	45	225.3	0.06	0.0	5.00	0.8	17	14	1.388
Totals (incl. Space Multipliers)		7327							5589	0.798

Air System Design Load Summary for AHU-8 (Cafeteria)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
12:33PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	2038 ft²	24173	-	2038 ft²	-	-
Wall Transmission	2672 ft²	7032	-	2672 ft²	18157	-
Roof Transmission	6706 ft²	6111	-	6706 ft²	11466	-
Window Transmission	2038 ft²	5993	-	2038 ft²	42390	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	126 ft²	1714	-	126 ft²	6279	-
Floor Transmission	10899 ft²	0	-	10899 ft²	7019	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	6976 W	20468	-	0	0	-
Task Lighting	1433 W	4449	-	0	0	-
Electric Equipment	16596 W	53092	-	0	0	-
People	453	81938	54984	0	0	0
Infiltration	-	0	0	-	43043	-15
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	10249	2749	10%	12835	-1
>> Total Zone Loads	-	215219	57733	-	141190	-16
Zone Conditioning	-	237677	57733	-	140149	-16
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	10480 CFM	18037	-	7356 CFM	-7763	-
Ventilation Load	7001 CFM	20701	64785	7001 CFM	148118	0
Supply Fan Load	10480 CFM	40583	-	7356 CFM	-17467	-
Space Fan Coil Fans	-	1805	-	-	-1805	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	318803	122518	-	261233	-16
Central Cooling Coil	-	319802	122542	-	0	0
Preheat Coil	-	0	-	-	0	-
Terminal Reheat Coils	-	-558	-	-	259887	-
>> Total Conditioning	-	319244	122542	-	259887	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 AHU-9 Prefunction Corridor

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
09:42AM

Air System Information

Air System Name **AHU-9 Prefunction Corridor**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **12404.0** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **18.3** Tons
Total coil load **220.1** MBH
Sensible coil load **157.3** MBH
Coil CFM at Jul 1000 **6397** CFM
Max block CFM **6397** CFM
Sum of peak zone CFM **6397** CFM
Sensible heat ratio **0.715**
CFM/Ton **348.8**
ft²/Ton **676.3**
BTU/(hr·ft²) **17.7**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Jul 1000**
OA DB / WB **76.1 / 70.9** °F
Entering DB / WB **77.3 / 65.2** °F
Leaving DB / WB **54.5 / 53.5** °F
Coil ADP **52.0** °F
Bypass Factor **0.100**
Resulting RH **54** %
Design supply temp. **58.0** °F
Zone T-stat Check **0 of 1** OK
Max zone temperature deviation **0.1** °F

Central Heating Coil Sizing Data

Max coil load **1.1** MBH
Coil CFM at Des Htg **6397** CFM
Max coil CFM **6397** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr·ft²) **0.1**
Ent. DB / Lvg DB **70.8 / 71.0** °F

Preheat Coil Sizing Data

No heating coil loads occurred during this calculation.

Supply Fan Sizing Data

Actual max CFM **6397** CFM
Standard CFM **6390** CFM
Actual max CFM/ft² **0.52** CFM/ft²

Fan motor BHP **8.80** BHP
Fan motor kW **6.98** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **6397** CFM
Standard CFM **6390** CFM
Actual max CFM/ft² **0.52** CFM/ft²

Fan motor BHP **4.40** BHP
Fan motor kW **3.49** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **908** CFM
CFM/ft² **0.07** CFM/ft²

CFM/person **2.02** CFM/person

Zone Sizing Summary for AHU-9 Prefunction Corridor

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
09:42AM

Air System Information

Air System Name **AHU-9 Prefunction Corridor**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **12404.0** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	6205	6205	0.50	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	108.2	Jul 1400	18.6	12404.0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C105 CORRIDOR South	1	35.4	Jan 1400	1933	0.0	2591.1	0.75
C201 CORRIDOR South	1	13.1	Jul 1400	781	12.6	2263.4	0.35
C206 CORRIDOR	1	3.0	Jul 1100	361	1.4	1445.6	0.25
D201 CORRIDOR	1	11.9	Jan 1400	649	0.0	1303.4	0.50
C105 CORRIDOR North	1	35.8	Jul 1400	1951	0.6	2682.2	0.73
C201 CORRIDOR North	1	9.0	Jul 1400	530	4.0	2118.3	0.25

Ventilation Sizing Summary for AHU-9 Prefunction Corridor

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
09:42AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Heating operation**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **744** CFM
System Ventilation Efficiency (Ev) **0.820**
Outdoor Air Intake (Vot) **908** CFM

2. Space Ventilation Analysis

		Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
C105 CORRIDOR South	1	1933	2591.1	0.06	106.9	0.00	0.8	194	155	1.019
C201 CORRIDOR South	1	781	2263.4	0.06	9.0	0.00	0.8	170	136	0.903
C206 CORRIDOR	1	361	1445.6	0.06	0.0	0.00	0.8	108	87	0.820
D201 CORRIDOR	1	649	1303.4	0.06	18.0	0.00	0.8	98	78	0.969
C105 CORRIDOR North	1	1951	2682.2	0.06	106.9	0.00	0.8	201	161	1.017
C201 CORRIDOR North	1	530	2118.3	0.06	9.0	0.00	0.8	159	127	0.820
Totals (incl. Space Multipliers)		6205							744	0.820

Air System Design Load Summary for AHU-9 Prefunction Corridor

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
09:42AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1000 COOLING OA DB / WB 76.1 °F / 70.9 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	227 ft²	2750	-	227 ft²	-	-
Wall Transmission	297 ft²	176	-	297 ft²	1199	-
Roof Transmission	4688 ft²	728	-	4688 ft²	8015	-
Window Transmission	227 ft²	61	-	227 ft²	4722	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	2069 ft²	0	-	2069 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	9427 W	22768	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	619 W	1846	-	0	0	-
People	450	63514	54000	0	0	0
Infiltration	-	0	0	-	2941	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	4592	2700	10%	1688	0
>> Total Zone Loads	-	96436	56700	-	18564	0
Zone Conditioning	-	121180	56700	-	17290	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	50%	728	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	6397 CFM	11910	-	6397 CFM	-11910	-
Ventilation Load	908 CFM	-368	6120	908 CFM	19575	0
Supply Fan Load	6397 CFM	23821	-	6397 CFM	-23821	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	157271	62820	-	1133	0
Central Cooling Coil	-	157271	62827	-	0	0
Central Heating Coil	-	0	-	-	1133	-
Preheat Coil	-	0	-	-	0	-
>> Total Conditioning	-	157271	62827	-	1133	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 AHU-10 (Multi Use Space)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:41PM

Air System Information

Air System Name **AHU-10 (Multi Use Space)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **9847.9** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **39.7** Tons
Total coil load **476.6** MBH
Sensible coil load **347.6** MBH
Coil CFM at Jul 1400 **9470** CFM
Max block CFM **9470** CFM
Sum of peak zone CFM **9470** CFM
Sensible heat ratio **0.729**
CFM/Ton **238.4**
ft²/Ton **247.9**
BTU/(hr-ft²) **48.4**
Water flow @ 12.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **85.6 / 67.4** °F
Leaving DB / WB **51.5 / 50.1** °F
Coil ADP **47.8** °F
Bypass Factor **0.100**
Resulting RH **47** %
Design supply temp. **55.0** °F
Zone T-stat Check **0 of 1** OK
Max zone temperature deviation **0.5** °F

Central Heating Coil Sizing Data

Max coil load **212.8** MBH
Coil CFM at Des Htg **9470** CFM
Max coil CFM **9470** CFM
Water flow @ 30.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr-ft²) **21.6**
Ent. DB / Lvg DB **60.8 / 81.6** °F

Preheat Coil Sizing Data

No heating coil loads occurred during this calculation.

Supply Fan Sizing Data

Actual max CFM **9470** CFM
Standard CFM **9460** CFM
Actual max CFM/ft² **0.96** CFM/ft²

Fan motor BHP **13.03** BHP
Fan motor kW **10.34** kW
Fan static **4.00** in wg

Return Fan Sizing Data

Actual max CFM **9470** CFM
Standard CFM **9460** CFM
Actual max CFM/ft² **0.96** CFM/ft²

Fan motor BHP **6.51** BHP
Fan motor kW **5.17** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **6591** CFM
CFM/ft² **0.67** CFM/ft²

CFM/person **9.15** CFM/person

Zone Sizing Summary for AHU-10 (Multi Use Space)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:41PM

Air System Information

Air System Name **AHU-10 (Multi Use Space)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **9847.9** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 30.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 30.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	9470	9470	0.96	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	200.2	Jul 1400	148.2	9847.9

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C117 MULTIPURPOSE ROOM	1	199.6	Jul 1400	9253	144.7	9588.7	0.96
C117C STORAGE	1	0.2	Jul 1400	66	1.1	72.4	0.91
C117D STORAGE	1	0.4	Jul 1400	151	2.4	186.8	0.81

Ventilation Sizing Summary for AHU-10 (Multi Use Space)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:41PM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **6591** CFM

2. Space Ventilation Analysis

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
C117 MULTIPURPOSE ROOM	1	9588.7	800.0	9252.9	7.50	0.06	0.0	0.0	6575.3
C117C STORAGE	1	72.4	0.0	66.1	5.00	0.06	0.0	0.0	4.3
C117D STORAGE	1	186.8	0.0	151.2	5.00	0.06	0.0	0.0	11.2
Totals (incl. Space Multipliers)				9470.2					6590.9

Air System Design Load Summary for AHU-10 (Multi Use Space)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:41PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	686 ft²	8493	-	686 ft²	-	-
Wall Transmission	4294 ft²	2745	-	4294 ft²	17320	-
Roof Transmission	9589 ft²	25607	-	9589 ft²	75166	-
Window Transmission	686 ft²	2018	-	686 ft²	14277	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	11672 W	23900	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3835 W	12282	-	0	0	-
People	640	115644	76800	0	0	0
Infiltration	-	0	0	-	27942	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	9534	3840	10%	13471	0
>> Total Zone Loads	-	200224	80640	-	148177	0
Zone Conditioning	-	219833	80640	-	144276	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	70%	59749	-	0	0	-
Plenum Lighting Load	30%	11948	-	0	0	-
Return Fan Load	9470 CFM	17633	-	9470 CFM	-17633	-
Ventilation Load	6591 CFM	3216	48323	6591 CFM	121412	0
Supply Fan Load	9470 CFM	35265	-	9470 CFM	-35265	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	347644	128963	-	212790	0
Central Cooling Coil	-	347644	128968	-	0	0
Central Heating Coil	-	0	-	-	212790	-
Preheat Coil	-	0	-	-	0	-
>> Total Conditioning	-	347644	128968	-	212790	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/13/2023

01:43PM

Air System Information

Air System Name **ERU-1 (Admin Area A)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **15**
Floor Area **7133.3** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **0.5** Tons
Total coil load **6.6** MBH
Total coil load **1420.5** CFM/Ton
Sensible coil load **6.6** MBH
Coil CFM at Jul 1400 **780** CFM
Max coil CFM **780** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.2 / 72.1** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **10.8** MBH
Coil CFM at Des Htg **780** CFM
Max coil CFM **780** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.5 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **780** CFM
Standard CFM **779** CFM
Actual max CFM/ft² **0.11** CFM/ft²

Fan motor BHP **0.80** BHP
Fan motor kW **0.64** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **780** CFM
Standard CFM **779** CFM
Actual max CFM/ft² **0.11** CFM/ft²

Fan motor BHP **0.54** BHP
Fan motor kW **0.43** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **780** CFM
CFM/ft² **0.11** CFM/ft²

CFM/person **16.35** CFM/person

Zone Sizing Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:43PM

Air System Information

Air System Name **ERU-1 (Admin Area A)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **15**
Floor Area **7133.3** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	14.5	14.5	75.3 / 65.3	62.2 / 60.8	-	Sep 1600	2.01
Zone 2	10.0	4.5	75.2 / 70.2	55.0 / 54.8	-	Aug 1200	0.09
Zone 3	17.9	14.6	75.5 / 65.3	59.2 / 58.2	-	Aug 1500	0.91
Zone 4	7.2	4.1	75.6 / 67.1	55.0 / 54.4	-	Jul 1200	0.46
Zone 5	8.3	6.1	75.6 / 66.4	60.0 / 59.2	-	Jul 0900	1.22
Zone 6	2.9	2.6	75.4 / 65.4	60.3 / 59.3	-	Aug 1500	1.26
Zone 7	3.0	2.7	75.4 / 65.0	59.8 / 58.8	-	Sep 1500	1.27
Zone 8	5.5	4.9	75.7 / 65.5	60.8 / 59.8	-	Sep 1500	1.19
Zone 9	3.3	2.9	75.7 / 65.4	60.2 / 59.2	-	Sep 1200	1.22
Zone 10	3.2	2.8	75.7 / 65.1	59.8 / 58.8	-	Sep 1300	1.25
Zone 11	6.6	5.7	75.6 / 64.5	58.5 / 57.4	-	Sep 1100	1.15
Zone 12	7.1	6.0	75.7 / 64.4	57.9 / 56.8	-	Jul 0900	1.02
Zone 13	9.6	6.6	76.1 / 65.2	55.0 / 54.1	-	Aug 1000	0.29
Zone 14	2.8	1.2	75.0 / 70.7	55.0 / 54.9	-	Jul 1200	0.19
Zone 15	4.5	4.0	75.4 / 65.0	59.9 / 58.9	-	Jul 0900	1.61

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @ 20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	18.7	69.3 / 86.2	-	1028	0.000	0.000	0
Zone 2	0.0	0.0 / 0.0	0.00	207	0.000	0.000	185
Zone 3	11.6	69.3 / 82.3	-	824	0.000	0.000	125
Zone 4	0.7	69.8 / 73.3	-	186	0.000	0.000	95
Zone 5	6.6	69.3 / 86.1	-	364	0.000	0.000	90
Zone 6	2.8	68.9 / 85.5	-	156	0.000	0.000	15
Zone 7	2.8	68.9 / 85.5	-	158	0.000	0.000	15
Zone 8	5.5	69.0 / 85.5	-	307	0.000	0.000	25
Zone 9	3.1	69.1 / 86.1	-	172	0.000	0.000	15
Zone 10	2.9	68.9 / 85.5	-	164	0.000	0.000	15
Zone 11	5.6	69.2 / 85.9	-	312	0.000	0.000	30
Zone 12	5.7	69.0 / 85.7	-	313	0.000	0.000	30
Zone 13	0.0	0.0 / 0.0	0.00	292	0.000	0.000	70
Zone 14	0.0	0.0 / 0.0	0.00	55	0.000	0.000	55
Zone 15	4.3	69.1 / 85.8	-	239	0.000	0.000	15

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	74.2	6.2	70.4
Estimated Piping / Line Losses	0.0	0.0	0.0

Zone Sizing Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:43PM

Total Required ODU Capacity	74.2	6.2	70.4
------------------------------------	------	-----	------

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	13.9	Sep 1600	18.9	510.7
Zone 2	4.5	Jan 1100	0.0	2203.1
Zone 3	12.1	Aug 1500	11.9	908.8
Zone 4	4.0	Jul 1400	0.8	407.7
Zone 5	5.5	Jul 1400	6.7	299.0
Zone 6	2.5	Sep 1500	2.9	123.7
Zone 7	2.5	Sep 1500	2.9	125.0
Zone 8	4.7	Sep 1500	5.6	258.8
Zone 9	2.7	Sep 1300	3.1	141.2
Zone 10	2.6	Sep 1300	3.0	131.3
Zone 11	5.0	Sep 1100	5.7	270.2
Zone 12	5.0	Jul 1100	5.7	307.4
Zone 13	6.3	Jan 1100	0.0	1015.1
Zone 14	1.2	Jan 1400	0.0	282.7
Zone 15	3.4	Jul 1000	4.4	148.6

Zone Sizing Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:43PM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
A118 VEST	1	13.9	Sep 1600	1028	18.9	510.7	2.01
Zone 2							
A119 LOBBY	1	4.5	Jan 1100	207	0.0	2203.1	0.09
Zone 3							
A120 WAITING	1	1.4	Jul 1400	67	0.3	193.0	0.35
A121 RECEPTION	1	2.8	Jul 1400	128	0.2	196.0	0.66
A122 ATTENDANCE	1	2.4	Sep 1600	171	3.1	105.6	1.62
A123 SECRETARY	1	4.1	Jul 1700	268	4.9	166.1	1.61
A124 OFFICE-MAIN	1	2.5	Aug 1700	178	3.3	138.1	1.29
A139 MAIL	1	0.3	Jul 1400	12	0.1	110.0	0.11
Zone 4							
A140 CONF	1	4.0	Jul 1400	186	0.8	407.7	0.46
Zone 5							
A138 SPED CONF	1	5.5	Jul 1400	364	6.7	299.0	1.22
Zone 6							
A126 SRO	1	2.5	Sep 1500	156	2.9	123.7	1.26
Zone 7							
A127 PRINCIPALS SECRETAR	1	2.5	Sep 1500	158	2.9	125.0	1.27
Zone 8							
A128 PRIN OFF	1	4.7	Sep 1500	307	5.6	258.8	1.19
Zone 9							
A129 COOP COORD	1	2.7	Sep 1300	172	3.1	141.2	1.22
Zone 10							
A129a - COOP COORD	1	2.6	Sep 1300	164	3.0	131.3	1.25
Zone 11							
A130 ADULT ED	1	5.0	Sep 1100	312	5.7	270.2	1.15
Zone 12							
A135 SPED OFF	1	2.6	Aug 1100	149	2.7	161.3	0.92
A136 SPED OFF	1	2.5	Jul 1100	164	3.0	146.1	1.12
Zone 13							
A131 DUPLICATING	1	4.8	Jan 1100	221	0.0	265.0	0.83
A125 CORRIDOR	1	1.5	Jan 1100	70	0.0	750.1	0.09
Zone 14							
A132 RECORDS	1	1.2	Jan 1400	55	0.0	282.7	0.19
Zone 15							
A137 SPED DIR	1	3.4	Jul 1000	239	4.4	148.6	1.61

Ventilation Sizing Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:43PM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **780** CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
A118 VEST	1	510.7	0.0	1027.9	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				1027.9					0.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
A119 LOBBY	1	2203.1	0.0	206.5	0.00	0.00	185.0	0.0	185.0
Totals (incl. Space Multipliers)				206.5					185.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
A120 WAITING	1	193.0	6.0	67.2	0.00	0.00	45.0	0.0	45.0
A121 RECEPTION	1	196.0	3.0	128.4	0.00	0.00	25.0	0.0	25.0
A122 ATTENDANCE	1	105.6	2.0	170.6	0.00	0.00	15.0	0.0	15.0
A123 SECRETARY	1	166.1	1.0	268.1	0.00	0.00	15.0	0.0	15.0
A124 OFFICE-MAIN	1	138.1	1.0	178.1	0.00	0.00	15.0	0.0	15.0
A139 MAIL	1	110.0	0.0	12.0	0.00	0.00	10.0	0.0	10.0
Totals (incl. Space Multipliers)				824.4					125.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
A140 CONF	1	407.7	14.0	185.5	0.00	0.00	95.0	0.0	95.0
Totals (incl. Space Multipliers)				185.5					95.0

Ventilation Sizing Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:43PM

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
A138 SPED CONF	1	299.0	14.0	364.3	0.00	0.00	90.0	0.0	90.0
Totals (incl. Space Multipliers)				364.3					90.0

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
A126 SRO	1	123.7	1.0	156.3	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				156.3					15.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
A127 PRINCIPALS SECRETAR	1	125.0	1.0	158.2	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				158.2					15.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
A128 PRIN OFF	1	258.8	1.0	307.4	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				307.4					25.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
A129 COOP COORD	1	141.2	1.0	171.7	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				171.7					15.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
A129a - COOP COORD	1	131.3	1.0	164.4	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				164.4					15.0

Ventilation Sizing Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:43PM

2.11 Zone: Zone 11

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 11									
A130 ADULT ED	1	270.2	2.0	311.6	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				311.6					30.0

2.12 Zone: Zone 12

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 12									
A135 SPED OFF	1	161.3	1.0	148.8	0.00	0.00	15.0	0.0	15.0
A136 SPED OFF	1	146.1	1.0	164.2	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				313.0					30.0

2.13 Zone: Zone 13

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 13									
A131 DUPLICATING	1	265.0	1.0	221.3	0.00	0.00	25.0	0.0	25.0
A125 CORRIDOR	1	750.1	0.0	70.3	0.00	0.00	45.0	0.0	45.0
Totals (incl. Space Multipliers)				291.6					70.0

2.14 Zone: Zone 14

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 14									
A132 RECORDS	1	282.7	1.0	55.0	0.00	0.00	55.0	0.0	55.0
Totals (incl. Space Multipliers)				55.0					55.0

2.15 Zone: Zone 15

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 15									
A137 SPED DIR	1	148.6	1.0	239.2	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				239.2					15.0

Air System Design Load Summary for ERU-1 (Admin Area A)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:43PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	944 ft²	18432	-	944 ft²	-	-
Wall Transmission	2738 ft²	2282	-	2738 ft²	10703	-
Roof Transmission	2363 ft²	1988	-	2363 ft²	3915	-
Window Transmission	944 ft²	2775	-	944 ft²	19027	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	84 ft²	2346	-	84 ft²	4234	-
Floor Transmission	7133 ft²	0	-	7133 ft²	4659	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	4565 W	13354	-	0	0	-
Task Lighting	1683 W	5260	-	0	0	-
Electric Equipment	2950 W	9364	-	0	0	-
People	42	7850	6368	0	0	0
Infiltration	-	0	0	-	22570	0
Miscellaneous	-	1200	0	-	0	0
Safety Factor	5% / 5%	3243	318	10%	6511	0
>> Total Zone Loads	-	68095	6686	-	71618	0
Zone Conditioning	-	75158	6686	-	70800	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	780 CFM	1452	-	780 CFM	-1452	-
Ventilation Load	780 CFM	2000	16429	780 CFM	14056	0
Ventilation Fan Load	780 CFM	2178	-	780 CFM	-2178	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	80789	23115	-	81225	0
Cooling Coil	-	6584	0	-	0	0
Heating Coil	-	0	-	-	10831	-
Terminal Unit Cooling	-	74205	22634	-	0	0
Terminal Unit Heating	-	0	-	-	70379	-
>> Total Conditioning	-	80789	22634	-	81210	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for ERU-2 (Dept Staff)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:53AM

Air System Information

Air System Name **ERU-2 (Dept Staff)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **5**
Floor Area **2091.2** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **0.2** Tons
Total coil load **2.3** MBH
Total coil load **1359.5** CFM/Ton
Sensible coil load **2.3** MBH
Coil CFM at Jul 1400 **255** CFM
Max coil CFM **255** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.6 / 72.2** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **3.4** MBH
Coil CFM at Des Htg **255** CFM
Max coil CFM **255** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.9 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **255** CFM
Standard CFM **255** CFM
Actual max CFM/ft² **0.12** CFM/ft²

Fan motor BHP **0.26** BHP
Fan motor kW **0.21** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **255** CFM
Standard CFM **255** CFM
Actual max CFM/ft² **0.12** CFM/ft²

Fan motor BHP **0.18** BHP
Fan motor kW **0.14** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **255** CFM
CFM/ft² **0.12** CFM/ft²

CFM/person **11.81** CFM/person

Zone Sizing Summary for ERU-2 (Dept Staff)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:53AM

Air System Information

Air System Name **ERU-2 (Dept Staff)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **5**
Floor Area **2091.2** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	3.2	2.1	76.5 / 65.9	55.0 / 54.1	-	Jul 1000	0.62
Zone 2	2.4	1.7	76.7 / 65.0	55.0 / 54.0	-	Jul 1000	0.48
Zone 3	15.5	10.5	76.5 / 65.6	55.0 / 54.1	-	Jul 1000	0.35
Zone 4	1.3	0.6	75.5 / 69.6	55.0 / 54.7	-	Jul 1000	0.12
Zone 5	5.8	3.3	75.9 / 67.6	55.0 / 54.4	-	Jul 1000	0.56

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	0.0	0.0 / 0.0	0.00	92	0.000	0.000	30
Zone 2	0.0	0.0 / 0.0	0.00	73	0.000	0.000	15
Zone 3	0.0	0.0 / 0.0	0.00	453	0.000	0.000	110
Zone 4	0.0	0.0 / 0.0	0.00	28	0.000	0.000	20
Zone 5	0.0	0.0 / 0.0	0.00	146	0.000	0.000	80

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	18.3	1.5	0.0
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	18.3	1.5	0.0

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	2.0	Jan 1100	0.0	150.1
Zone 2	1.6	Jan 1100	0.0	152.3
Zone 3	9.8	Jan 1100	0.0	1301.8
Zone 4	0.6	Jan 1400	0.0	227.0
Zone 5	3.1	Jan 1400	0.0	259.9

Zone Sizing Summary for ERU-2 (Dept Staff)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:53AM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B219 ACAD PROG	1	2.0	Jan 1100	92	0.0	150.1	0.62
Zone 2							
B226 AP1	1	1.6	Jan 1100	73	0.0	152.3	0.48
Zone 3							
B218G DEPART HEADS	1	9.8	Jan 1100	453	0.0	1301.8	0.35
Zone 4							
B227 RECORDS	1	0.6	Jan 1400	28	0.0	227.0	0.12
Zone 5							
B229 CONF	1	3.1	Jan 1400	146	0.0	259.9	0.56

Ventilation Sizing Summary for ERU-2 (Dept Staff)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:53AM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows
Design Ventilation Airflow Rate 255 CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
B219 ACAD PROG	1	150.1	4.0	92.4	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				92.4					30.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
B226 AP1	1	152.3	1.0	73.2	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				73.2					15.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
B218G DEPART HEADS	1	1301.8	6.0	452.6	0.00	0.00	110.0	0.0	110.0
Totals (incl. Space Multipliers)				452.6					110.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
B227 RECORDS	1	227.0	1.0	28.2	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				28.2					20.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
B229 CONF	1	259.9	12.0	145.7	0.00	0.00	80.0	0.0	80.0
Totals (incl. Space Multipliers)				145.7					80.0

Air System Design Load Summary for ERU-2 (Dept Staff)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:53AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1000 COOLING OA DB / WB 76.1 °F / 70.9 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	0 ft²	0	-	0 ft²	-	-
Wall Transmission	0 ft²	0	-	0 ft²	0	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	0 ft²	0	-	0 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1589 W	3838	-	0	0	-
Task Lighting	885 W	2531	-	0	0	-
Electric Equipment	2071 W	6176	-	0	0	-
People	22	3248	3348	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	790	167	10%	0	0
>> Total Zone Loads	-	16583	3515	-	0	0
Zone Conditioning	-	18825	3515	-	0	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	255 CFM	475	-	255 CFM	-475	-
Ventilation Load	255 CFM	-717	6462	255 CFM	4630	0
Ventilation Fan Load	255 CFM	712	-	255 CFM	-712	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	19295	9977	-	3443	0
Cooling Coil	-	1025	0	-	0	0
Heating Coil	-	0	-	-	3443	-
Terminal Unit Cooling	-	18270	9982	-	0	0
Terminal Unit Heating	-	0	-	-	0	-
>> Total Conditioning	-	19295	9982	-	3443	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for ERU-3 (Child Dev)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
10:28AM

Air System Information

Air System Name **ERU-3 (Child Dev)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **7**
Floor Area **3644.5** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **0.8** Tons
Total coil load **10.2** MBH
Total coil load **1457.2** CFM/Ton
Sensible coil load **10.2** MBH
Coil CFM at Jul 1400 **1235** CFM
Max coil CFM **1235** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.0 / 72.1** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **17.5** MBH
Coil CFM at Des Htg **1235** CFM
Max coil CFM **1235** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.2 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **1235** CFM
Standard CFM **1234** CFM
Actual max CFM/ft² **0.34** CFM/ft²

Fan motor BHP **1.27** BHP
Fan motor kW **1.01** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **1235** CFM
Standard CFM **1234** CFM
Actual max CFM/ft² **0.34** CFM/ft²

Fan motor BHP **0.85** BHP
Fan motor kW **0.67** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **1235** CFM
CFM/ft² **0.34** CFM/ft²

CFM/person **16.94** CFM/person

Zone Sizing Summary for ERU-3 (Child Dev)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
10:28AM

Air System Information

Air System Name **ERU-3 (Child Dev)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **7**
Floor Area **3644.5** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	4.7	3.6	75.6 / 64.2	55.9 / 54.9	-	Aug 1400	1.39
Zone 2	20.7	13.8	75.1 / 68.7	63.9 / 63.3	-	Jul 0800	1.36
Zone 3	1.3	0.6	75.0 / 70.6	57.0 / 56.8	-	Jul 1400	0.16
Zone 4	19.9	9.9	75.3 / 68.8	55.0 / 54.6	-	Aug 1400	0.81
Zone 5	8.0	5.1	75.4 / 66.4	56.6 / 55.8	-	Jul 1300	1.06
Zone 6	7.7	6.6	75.2 / 69.8	67.6 / 67.1	-	Aug 1400	3.35
Zone 7	10.6	5.1	75.2 / 70.3	61.9 / 61.5	-	Jul 1300	0.24

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	2.9	69.3 / 85.0	-	171	0.000	0.000	25
Zone 2	19.9	69.3 / 85.5	-	1141	0.000	0.000	415
Zone 3	0.4	70.0 / 81.9	-	30	0.000	0.000	30
Zone 4	6.2	69.8 / 82.5	-	453	0.000	0.000	330
Zone 5	4.5	69.5 / 86.1	-	250	0.000	0.000	90
Zone 6	14.7	69.4 / 86.2	-	811	0.000	0.000	90
Zone 7	6.1	69.7 / 85.7	-	354	0.000	0.000	255

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	43.3	3.6	54.7
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	43.3	3.6	54.7

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	3.7	Sep 1500	2.9	123.3
Zone 2	12.8	Jul 1400	20.9	836.2
Zone 3	0.6	Jul 1400	0.3	188.7
Zone 4	9.8	Sep 1400	6.2	559.0
Zone 5	4.8	Jul 1400	4.6	235.6

Zone Sizing Summary for ERU-3 (Child Dev)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
10:28AM

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 6	6.6	Jul 1400	14.9	242.1
Zone 7	4.5	Jul 1400	6.5	1459.6

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
C106F KITCHEN	1	3.7	Sep 1500	171	2.9	123.3	1.39
Zone 2							
C106 EARLY CHILDHOOD EDU	1	12.8	Jul 1400	1141	20.9	836.2	1.36
Zone 3							
C106A CUBBIES	1	0.6	Jul 1400	30	0.3	188.7	0.16
Zone 4							
C106B RELATED CR	1	9.8	Sep 1400	453	6.2	559.0	0.81
Zone 5							
C109 DRESSING	1	4.8	Jul 1400	250	4.6	235.6	1.06
Zone 6							
C110 DRESSING	1	6.6	Jul 1400	811	14.9	242.1	3.35
Zone 7							
C111 CORRIDOR	1	4.5	Jul 1400	354	6.5	1459.6	0.24

Ventilation Sizing Summary for ERU-3 (Child Dev)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
10:28AM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows
Design Ventilation Airflow Rate 1235 CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
C106F KITCHEN	1	123.3	1.0	171.0	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				171.0					25.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
C106 EARLY CHILDHOOD EDU	1	836.2	25.0	1141.1	0.00	0.00	415.0	0.0	415.0
Totals (incl. Space Multipliers)				1141.1					415.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
C106A CUBBIES	1	188.7	0.0	30.0	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				30.0					30.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
C106B RELATED CR	1	559.0	25.0	452.5	0.00	0.00	330.0	0.0	330.0
Totals (incl. Space Multipliers)				452.5					330.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
C109 DRESSING	1	235.6	15.0	250.2	0.00	0.00	90.0	0.0	90.0
Totals (incl. Space Multipliers)				250.2					90.0

Ventilation Sizing Summary for ERU-3 (Child Dev)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
10:28AM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
C110 DRESSING	1	242.1	15.0	810.7	0.00	0.00	90.0	0.0	90.0
Totals (incl. Space Multipliers)				810.7					90.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
C111 CORRIDOR	1	1459.6	0.0	353.5	0.00	0.00	255.0	0.0	255.0
Totals (incl. Space Multipliers)				353.5					255.0

Air System Design Load Summary for ERU-3 (Child Dev)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

12/20/2022
10:28AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	251 ft²	4086	-	251 ft²	-	-
Wall Transmission	2464 ft²	2698	-	2464 ft²	15702	-
Roof Transmission	3644 ft²	3321	-	3644 ft²	6039	-
Window Transmission	251 ft²	737	-	251 ft²	5056	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	77 ft²	1149	-	77 ft²	3660	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	2456 W	7177	-	0	0	-
Task Lighting	1270 W	3969	-	0	0	-
Electric Equipment	885 W	2834	-	0	0	-
People	65	12473	10084	0	0	0
Infiltration	-	0	0	-	20809	0
Miscellaneous	-	1200	0	-	0	0
Safety Factor	5% / 5%	1982	504	10%	5127	0
>> Total Zone Loads	-	41626	10588	-	56393	0
Zone Conditioning	-	44425	10588	-	55827	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	1235 CFM	2299	-	1235 CFM	-2299	-
Ventilation Load	1235 CFM	3256	15911	1235 CFM	22114	0
Ventilation Fan Load	1235 CFM	3449	-	1235 CFM	-3449	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	53429	26499	-	72193	0
Cooling Coil	-	10170	0	-	0	0
Heating Coil	-	0	-	-	17549	-
Terminal Unit Cooling	-	43269	26491	-	0	0
Terminal Unit Heating	-	0	-	-	54727	-
>> Total Conditioning	-	53439	26491	-	72276	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for ERU-4 (Media Center)

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/13/2023

10:54AM

Air System Information

Air System Name **ERU-4 (Media Center)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **10**
Floor Area **6710.6** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **1.3** Tons
Total coil load **16.0** MBH
Total coil load **1418.1** CFM/Ton
Sensible coil load **16.0** MBH
Coil CFM at Jul 1400 **1885** CFM
Max coil CFM **1885** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.3 / 72.1** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **26.4** MBH
Coil CFM at Des Htg **1885** CFM
Max coil CFM **1885** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.4 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **1885** CFM
Standard CFM **1883** CFM
Actual max CFM/ft² **0.28** CFM/ft²

Fan motor BHP **1.94** BHP
Fan motor kW **1.54** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **1885** CFM
Standard CFM **1883** CFM
Actual max CFM/ft² **0.28** CFM/ft²

Fan motor BHP **1.30** BHP
Fan motor kW **1.03** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **1885** CFM
CFM/ft² **0.28** CFM/ft²

CFM/person **13.09** CFM/person

Zone Sizing Summary for ERU-4 (Media Center)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:54AM

Air System Information

Air System Name **ERU-4 (Media Center)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **10**
Floor Area **6710.6** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft²
Zone 1	144.9	113.6	75.8 / 65.7	59.2 / 58.3	-	Aug 1400	2.05
Zone 2	25.7	14.4	75.5 / 67.4	55.0 / 54.4	-	Jul 1000	0.62
Zone 3	3.6	2.0	75.7 / 67.9	55.0 / 54.4	-	Aug 1000	0.64
Zone 4	3.0	2.2	75.6 / 66.7	60.3 / 59.5	-	Jul 1400	1.26
Zone 5	3.0	2.2	75.4 / 66.7	60.3 / 59.5	-	Jul 1300	1.24
Zone 6	2.0	1.2	76.5 / 66.8	55.0 / 54.2	-	Aug 1000	0.35
Zone 7	6.8	3.9	76.2 / 67.5	55.0 / 54.4	-	Aug 1000	0.49
Zone 8	17.9	10.7	75.9 / 66.9	55.0 / 54.3	-	Jul 1000	0.49
Zone 9	1.2	0.5	75.3 / 70.8	55.0 / 54.9	-	Aug 1000	0.09
Zone 10	13.2	9.3	76.4 / 65.1	55.0 / 54.0	-	Aug 1000	0.83

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	115.3	69.5 / 86.3	-	6368	0.000	0.000	1055
Zone 2	11.5	69.6 / 86.0	-	652	0.000	0.000	330
Zone 3	0.0	0.0 / 0.0	0.00	88	0.000	0.000	50
Zone 4	2.4	69.3 / 86.1	-	133	0.000	0.000	30
Zone 5	2.4	69.4 / 86.3	-	133	0.000	0.000	30
Zone 6	0.0	0.0 / 0.0	0.00	53	0.000	0.000	15
Zone 7	0.0	0.0 / 0.0	0.00	170	0.000	0.000	80
Zone 8	5.2	69.6 / 79.8	-	473	0.000	0.000	185
Zone 9	0.0	0.0 / 0.0	0.00	24	0.000	0.000	20
Zone 10	0.0	0.0 / 0.0	0.00	403	0.000	0.000	90

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	159.7	13.3	136.9
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	159.7	13.3	136.9

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

	Zone Cooling Sensible	Time of Peak Sensible	Zone Heating Load	Zone Floor Area
--	-----------------------	-----------------------	-------------------	-----------------

Zone Sizing Summary for ERU-4 (Media Center)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:54AM

Zone Name	(MBH)	Cooling Load	(MBH)	(ft²)
Zone 1	112.4	Aug 1400	116.8	3106.7
Zone 2	14.1	Jul 1400	11.9	1048.4
Zone 3	1.9	Jan 1400	0.0	136.6
Zone 4	2.2	Nov 1400	2.4	105.6
Zone 5	2.2	Nov 1400	2.4	107.9
Zone 6	1.1	Jan 1100	0.0	150.4
Zone 7	3.7	Jan 1400	0.0	350.1
Zone 8	10.2	Jul 1400	5.5	959.8
Zone 9	0.5	Jan 1100	0.0	259.0
Zone 10	8.7	Jan 1100	0.0	486.1

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
A221 MEDIA CENTER	1	112.4	Aug 1400	6368	116.8	3106.7	2.05
Zone 2							
A221a MEDIA CENTER	1	14.1	Jul 1400	652	11.9	1048.4	0.62
Zone 3							
A219 MC Small Group	1	1.9	Jan 1400	88	0.0	136.6	0.64
Zone 4							
A220 Small Group	1	2.2	Nov 1400	133	2.4	105.6	1.26
Zone 5							
A217 Small Group	1	2.2	Nov 1400	133	2.4	107.9	1.24
Zone 6							
A222 MC Office	1	1.1	Jan 1100	53	0.0	150.4	0.35
Zone 7							
A216 MC Workroom	1	3.7	Jan 1400	170	0.0	350.1	0.49
Zone 8							
A214 Career Center	1	10.2	Jul 1400	473	5.5	959.8	0.49
Zone 9							
A218 CORRIDOR	1	0.5	Jan 1100	24	0.0	259.0	0.09
Zone 10							
A215 TV Studio	1	8.7	Jan 1100	403	0.0	486.1	0.83

Ventilation Sizing Summary for ERU-4 (Media Center)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:54AM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **1885** CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
A221 MEDIA CENTER	1	3106.7	68.0	6368.3	0.00	0.00	1055.0	0.0	1055.0
Totals (incl. Space Multipliers)				6368.3					1055.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
A221a MEDIA CENTER	1	1048.4	32.0	651.7	0.00	0.00	330.0	0.0	330.0
Totals (incl. Space Multipliers)				651.7					330.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
A219 MC Small Group	1	136.6	8.0	87.6	0.00	0.00	50.0	0.0	50.0
Totals (incl. Space Multipliers)				87.6					50.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
A220 Small Group	1	105.6	4.0	132.7	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				132.7					30.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
A217 Small Group	1	107.9	4.0	133.3	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				133.3					30.0

Ventilation Sizing Summary for ERU-4 (Media Center)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:54AM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
A222 MC Office	1	150.4	1.0	52.6	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				52.6					15.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
A216 MC Workroom	1	350.1	12.0	170.3	0.00	0.00	80.0	0.0	80.0
Totals (incl. Space Multipliers)				170.3					80.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
A214 Career Center	1	959.8	25.0	473.0	0.00	0.00	185.0	0.0	185.0
Totals (incl. Space Multipliers)				473.0					185.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
A218 CORRIDOR	1	259.0	0.0	24.3	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				24.3					20.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
A215 TV Studio	1	486.1	6.0	403.4	0.00	0.00	90.0	0.0	90.0
Totals (incl. Space Multipliers)				403.4					90.0

Air System Design Load Summary for ERU-4 (Media Center)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:54AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	2965 ft²	51807	-	2965 ft²	-	-
Wall Transmission	2201 ft²	1680	-	2201 ft²	8604	-
Roof Transmission	3978 ft²	26290	-	3978 ft²	25048	-
Window Transmission	2965 ft²	8718	-	2965 ft²	59771	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	88 ft²	1471	-	88 ft²	4435	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	5539 W	16203	-	0	0	-
Task Lighting	2983 W	9322	-	0	0	-
Electric Equipment	3020 W	9670	-	0	0	-
People	128	23544	16632	0	0	0
Infiltration	-	0	0	-	28567	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	7435	832	10%	12643	0
>> Total Zone Loads	-	156139	17464	-	139068	0
Zone Conditioning	-	161964	17464	-	138097	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	1885 CFM	3510	-	1885 CFM	-3510	-
Ventilation Load	1885 CFM	4834	43198	1885 CFM	33903	0
Ventilation Fan Load	1885 CFM	5265	-	1885 CFM	-5265	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	175572	60661	-	163226	0
Cooling Coil	-	15910	0	-	0	0
Heating Coil	-	0	-	-	26358	-
Terminal Unit Cooling	-	159662	60634	-	0	0
Terminal Unit Heating	-	0	-	-	136909	-
>> Total Conditioning	-	175572	60634	-	163267	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for ERU-5 (Consessions Building)

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/14/2023

08:44AM

Air System Information

Air System Name **ERU-5 (Consessions Building)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **3**
Floor Area **908.9** ft²
Location **Boston, Massachusetts**

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**

Heating Coil Sizing Data

Max coil load **29.8** MBH
Coil CFM at Des Htg **1545** CFM
Max coil CFM **1545** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **51.1 / 69.0** °F

Ventilation Fan Sizing Data

Actual max CFM **1545** CFM
Standard CFM **1543** CFM
Actual max CFM/ft² **1.70** CFM/ft²

Fan motor BHP **0.63** BHP
Fan motor kW **0.50** kW
Fan static **1.50** in wg

Exhaust Fan Sizing Data

Actual max CFM **1545** CFM
Standard CFM **1543** CFM
Actual max CFM/ft² **1.70** CFM/ft²

Fan motor BHP **0.42** BHP
Fan motor kW **0.34** kW
Fan static **1.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **1545** CFM
CFM/ft² **1.70** CFM/ft²

CFM/person **515.00** CFM/person

Zone Sizing Summary for ERU-5 (Consessions Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
08:44AM

Air System Information

Air System Name **ERU-5 (Consessions Building)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **3**
Floor Area **908.9** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	5.6	5.6	77.1 / 71.5	70.7 / 69.6	-	Jul 1400	2.75
Zone 2	7.6	7.6	78.3 / 71.8	70.9 / 69.7	-	Jul 1500	3.07
Zone 3	6.8	6.8	79.7 / 72.2	70.4 / 69.5	-	Jul 1400	2.23

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	14.3	69.4 / 85.9	-	805	0.000	0.000	315
Zone 2	17.0	69.8 / 86.4	-	954	0.000	0.000	615
Zone 3	11.9	69.9 / 86.2	-	680	0.000	0.000	615

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	19.2	1.6	43.3
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	19.2	1.6	43.3

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	3.3	Aug 1400	14.8	293.1
Zone 2	3.4	Jul 1900	17.5	310.6
Zone 3	2.6	Jul 1400	12.5	305.2

Zone Sizing Summary for ERU-5 (Consessions Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
08:44AM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
1-CB101 CONSESSIONS	1	3.3	Aug 1400	805	14.8	293.1	2.75
Zone 2							
1-CB103 WOMENS TOILET	1	3.4	Jul 1900	954	17.5	310.6	3.07
Zone 3							
1-CB104 Mens Toilet	1	2.6	Jul 1400	680	12.5	305.2	2.23

Ventilation Sizing Summary for ERU-5 (Consessions Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
08:44AM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **1545** CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
1-CB101 CONSESSIONS	1	293.1	3.0	804.6	0.00	0.00	315.0	0.0	315.0
Totals (incl. Space Multipliers)				804.6					315.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
1-CB103 WOMENS TOILET	1	310.6	0.0	953.5	0.00	0.00	615.0	0.0	615.0
Totals (incl. Space Multipliers)				953.5					615.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
1-CB104 Mens Toilet	1	305.2	0.0	680.1	0.00	0.00	615.0	0.0	615.0
Totals (incl. Space Multipliers)				680.1					615.0

Air System Design Load Summary for ERU-5 (Consessions Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
08:44AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	0 ft²	0	-	0 ft²	-	-
Wall Transmission	1587 ft²	4431	-	1587 ft²	16621	-
Roof Transmission	909 ft²	774	-	909 ft²	1506	-
Window Transmission	0 ft²	0	-	0 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	98 ft²	470	-	98 ft²	3219	-
Floor Transmission	904 ft²	0	-	904 ft²	2122	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	679 W	1987	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	117 W	375	-	0	0	-
People	3	554	600	0	0	0
Infiltration	-	0	0	-	17183	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	430	30	10%	4065	0
>> Total Zone Loads	-	9020	630	-	44717	0
Zone Conditioning	-	10761	630	-	44495	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	1545 CFM	1145	-	1545 CFM	-1145	-
Ventilation Load	1545 CFM	5607	-603	1545 CFM	31506	0
Ventilation Fan Load	1545 CFM	1718	-	1545 CFM	-1718	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	19232	27	-	73138	0
Heating Coil	-	0	-	-	29776	-
Terminal Unit Cooling	-	19232	0	-	0	0
Terminal Unit Heating	-	0	-	-	43319	-
>> Total Conditioning	-	19232	0	-	73095	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for ERU-6 (Locker Building)

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/14/2023

11:30AM

Air System Information

Air System Name **ERU-6 (Locker Building)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **10**
Floor Area **3184.3** ft²
Location **Boston, Massachusetts**

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**

Heating Coil Sizing Data

Max coil load **31.6** MBH
Coil CFM at Des Htg **1630** CFM
Max coil CFM **1630** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **51.0 / 69.0** °F

Ventilation Fan Sizing Data

Actual max CFM **1630** CFM
Standard CFM **1628** CFM
Actual max CFM/ft² **0.51** CFM/ft²

Fan motor BHP **0.67** BHP
Fan motor kW **0.53** kW
Fan static **1.50** in wg

Exhaust Fan Sizing Data

Actual max CFM **1630** CFM
Standard CFM **1628** CFM
Actual max CFM/ft² **0.51** CFM/ft²

Fan motor BHP **0.45** BHP
Fan motor kW **0.35** kW
Fan static **1.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **1630** CFM
CFM/ft² **0.51** CFM/ft²

CFM/person **34.17** CFM/person

Zone Sizing Summary for ERU-6 (Locker Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:30AM

Air System Information

Air System Name **ERU-6 (Locker Building)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **10**
Floor Area **3184.3** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	1.8	1.5	75.3 / 69.1	66.2 / 65.6	-	Sep 0800	1.18
Zone 2	13.9	10.0	78.7 / 69.4	63.6 / 62.7	-	Aug 1200	0.82
Zone 3	3.2	3.2	74.9 / 67.8	69.6 / 66.1	-	Aug 0700	5.57
Zone 4	2.0	2.0	75.9 / 69.4	72.1 / 68.2	-	Jul 1400	4.82
Zone 5	12.5	8.6	80.2 / 70.1	62.9 / 61.9	-	Aug 1400	0.74
Zone 6	1.3	0.8	79.4 / 69.3	58.0 / 57.2	-	Aug 1400	0.31
Zone 7	1.3	0.8	79.4 / 69.3	58.0 / 57.2	-	Aug 1400	0.31
Zone 8	3.2	2.5	75.3 / 69.4	66.5 / 65.9	-	Jul 0800	1.02
Zone 9	12.6	8.6	80.2 / 70.0	62.7 / 61.8	-	Aug 1400	0.74
Zone 10	13.3	12.2	75.8 / 68.8	66.1 / 65.4	-	Jul 1300	3.02

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	2.8	69.2 / 86.2	-	152	0.000	0.000	0
Zone 2	10.7	69.9 / 86.1	-	612	0.000	0.000	500
Zone 3	9.9	69.3 / 86.1	-	545	0.000	0.000	40
Zone 4	8.8	69.2 / 85.8	-	489	0.000	0.000	100
Zone 5	8.0	69.9 / 86.1	-	458	0.000	0.000	420
Zone 6	0.2	69.9 / 75.3	-	35	0.000	0.000	25
Zone 7	0.2	69.9 / 75.3	-	35	0.000	0.000	25
Zone 8	4.8	68.8 / 85.6	-	264	0.000	0.000	0
Zone 9	8.0	69.9 / 86.1	-	458	0.000	0.000	420
Zone 10	21.5	69.3 / 86.3	-	1177	0.000	0.000	100

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	47.8	4.0	74.9
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	47.8	4.0	74.9

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

	Zone Cooling Sensible	Time of Peak Sensible	Zone Heating Load	Zone Floor Area

Zone Sizing Summary for ERU-6 (Locker Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:30AM

Zone Name	(MBH)	Cooling Load	(MBH)	(ft²)
Zone 1	0.8	Aug 0900	2.8	129.1
Zone 2	6.2	Aug 1400	11.2	750.6
Zone 3	2.6	Aug 0100	10.0	97.8
Zone 4	1.1	Jul 1400	9.0	101.6
Zone 5	5.5	Aug 1400	8.4	618.7
Zone 6	0.6	Jul 1400	0.2	109.8
Zone 7	0.6	Jul 1400	0.2	109.8
Zone 8	1.8	Aug 1900	4.8	258.8
Zone 9	5.5	Aug 1400	8.4	618.7
Zone 10	11.3	Jul 1400	21.6	389.4

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
1-E7 TLT / SHOWER	1	0.8	Aug 0900	152	2.8	129.1	1.18
Zone 2							
1-LR102 TEAM ROOM	1	6.2	Aug 1400	612	11.2	750.6	0.82
Zone 3							
1-LR103 STOR	1	2.6	Aug 0100	545	10.0	97.8	5.57
Zone 4							
1-LR102 TEAM ROOM Hall	1	1.1	Jul 1400	489	9.0	101.6	4.82
Zone 5							
1-LR206 TEAM ROOM	1	5.5	Aug 1400	458	8.4	618.7	0.74
Zone 6							
1-LR204 COACH/OFFICIAL	1	0.6	Jul 1400	35	0.2	109.8	0.31
Zone 7							
1-LR205 COACH/OFFICIAL	1	0.6	Jul 1400	35	0.2	109.8	0.31
Zone 8							
1-LR207 TLT / SHOWER	1	1.2	Sep 1900	140	2.6	129.4	1.08
1-LR208 TLT / SHOWER	1	0.7	Aug 1100	124	2.3	129.4	0.96
Zone 9							
1-LR203 TEAM ROOM	1	5.5	Aug 1400	458	8.4	618.7	0.74
Zone 10							
1-LR202 Corridor	1	11.3	Jul 1400	1177	21.6	389.4	3.02

Ventilation Sizing Summary for ERU-6 (Locker Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:30AM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **1630** CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
1-E7 TLT / SHOWER	1	129.1	0.0	152.3	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				152.3					0.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
1-LR102 TEAM ROOM	1	750.6	20.0	612.3	0.00	0.00	500.0	0.0	500.0
Totals (incl. Space Multipliers)				612.3					500.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
1-LR103 STOR	1	97.8	0.0	545.2	0.00	0.00	40.0	0.0	40.0
Totals (incl. Space Multipliers)				545.2					40.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
1-LR102 TEAM ROOM Hall	1	101.6	0.0	489.3	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				489.3					100.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
1-LR206 TEAM ROOM	1	618.7	15.0	457.8	0.00	0.00	420.0	0.0	420.0
Totals (incl. Space Multipliers)				457.8					420.0

Ventilation Sizing Summary for ERU-6 (Locker Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:30AM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
1-LR204 COACH/OFFICIAL	1	109.8	1.0	34.5	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				34.5					25.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
1-LR205 COACH/OFFICIAL	1	109.8	1.0	34.5	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				34.5					25.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
1-LR207 TLT / SHOWER	1	129.4	0.0	140.1	0.00	0.00	0.0	0.0	0.0
1-LR208 TLT / SHOWER	1	129.4	0.0	124.1	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				264.1					0.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
1-LR203 TEAM ROOM	1	618.7	15.0	457.8	0.00	0.00	420.0	0.0	420.0
Totals (incl. Space Multipliers)				457.8					420.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
1-LR202 Corridor	1	389.4	1.0	1176.7	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				1176.7					100.0

Air System Design Load Summary for ERU-6 (Locker Building)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:30AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	589 ft²	7287	-	589 ft²	-	-
Wall Transmission	2706 ft²	7444	-	2706 ft²	32009	-
Roof Transmission	2105 ft²	1918	-	2105 ft²	3489	-
Window Transmission	589 ft²	1732	-	589 ft²	11874	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	21 ft²	135	-	21 ft²	926	-
Floor Transmission	1079 ft²	0	-	1079 ft²	1750	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	2038 W	5961	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	88 W	281	-	0	0	-
People	42	8328	8480	0	0	0
Infiltration	-	0	0	-	19599	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1654	424	10%	6965	0
>> Total Zone Loads	-	34741	8904	-	76612	0
Zone Conditioning	-	39192	8904	-	76268	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	1630 CFM	1208	-	1630 CFM	-1208	-
Ventilation Load	1630 CFM	5607	5249	1630 CFM	33163	0
Ventilation Fan Load	1630 CFM	1813	-	1630 CFM	-1813	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	47820	14153	-	106410	0
Heating Coil	-	0	-	-	31593	-
Terminal Unit Cooling	-	47831	14056	-	0	0
Terminal Unit Heating	-	0	-	-	74877	-
>> Total Conditioning	-	47831	14056	-	106470	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for ERU-7 (Admin Area A4)

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/13/2023

01:17PM

Air System Information

Air System Name ERU-7 (Admin Area A4)
Equipment Class TERM
Air System Type VRF

Number of zones 10
Floor Area 2058.2 ft²
Location Boston, Massachusetts

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

Cooling Coil Sizing Data

Total coil load 0.2 Tons
Total coil load 2.1 MBH
Total coil load 1462.3 CFM/Ton
Sensible coil load 2.1 MBH
Coil CFM at Aug 1500 255 CFM
Max coil CFM 255 CFM
Sensible heat ratio 1.000
Water flow @ 10.0 °F rise N/A

Load occurs at Aug 1500
OA DB / WB 87.0 / 74.0 °F
Entering DB / WB 80.0 / 72.1 °F
Leaving DB / WB 72.4 / 69.8 °F
Bypass Factor 0.100

Heating Coil Sizing Data

Max coil load 3.6 MBH
Coil CFM at Des Htg 255 CFM
Max coil CFM 255 CFM
Water flow @ 20.0 °F drop N/A

Load occurs at Des Htg
Ent. DB / Lvg DB 54.2 / 67.4 °F

Ventilation Fan Sizing Data

Actual max CFM 255 CFM
Standard CFM 255 CFM
Actual max CFM/ft² 0.12 CFM/ft²

Fan motor BHP 0.26 BHP
Fan motor kW 0.21 kW
Fan static 3.00 in wg

Exhaust Fan Sizing Data

Actual max CFM 255 CFM
Standard CFM 255 CFM
Actual max CFM/ft² 0.12 CFM/ft²

Fan motor BHP 0.18 BHP
Fan motor kW 0.14 kW
Fan static 2.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM 255 CFM
CFM/ft² 0.12 CFM/ft²

CFM/person 11.81 CFM/person

Zone Sizing Summary for ERU-7 (Admin Area A4)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:17PM

Air System Information

Air System Name **ERU-7 (Admin Area A4)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **10**
Floor Area **2058.2** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft²
Zone 1	7.1	5.9	75.6 / 64.3	57.4 / 56.4	-	Jul 1400	0.91
Zone 2	1.3	0.8	76.0 / 66.4	56.1 / 55.3	-	Jul 1000	0.14
Zone 3	6.7	5.1	75.9 / 64.3	55.0 / 54.0	-	Sep 1400	0.83
Zone 4	2.5	2.0	75.5 / 66.4	61.3 / 60.4	-	Jul 1400	1.02
Zone 5	2.7	2.2	75.5 / 66.0	60.5 / 59.6	-	Jul 1400	0.91
Zone 6	2.7	2.1	75.4 / 66.0	60.5 / 59.6	-	Jul 1300	0.91
Zone 7	2.7	2.1	75.4 / 66.0	60.5 / 59.6	-	Jul 1300	0.91
Zone 8	5.9	4.3	75.4 / 65.9	58.9 / 58.0	-	Aug 1400	1.06
Zone 9	2.5	2.0	75.3 / 66.3	61.3 / 60.4	-	Jul 1300	1.08
Zone 10	5.2	3.6	75.6 / 65.3	55.6 / 54.7	-	Jul 1400	0.64

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	5.4	69.2 / 86.1	-	298	0.000	0.000	30
Zone 2	0.5	69.3 / 82.3	-	38	0.000	0.000	0
Zone 3	3.3	69.5 / 83.0	-	225	0.000	0.000	50
Zone 4	2.4	69.0 / 85.7	-	133	0.000	0.000	15
Zone 5	2.5	69.2 / 86.2	-	134	0.000	0.000	15
Zone 6	2.5	69.2 / 86.2	-	134	0.000	0.000	15
Zone 7	2.5	69.2 / 86.2	-	134	0.000	0.000	15
Zone 8	4.2	69.1 / 85.4	-	241	0.000	0.000	55
Zone 9	2.4	69.1 / 85.4	-	133	0.000	0.000	15
Zone 10	3.0	69.4 / 86.1	-	165	0.000	0.000	45

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	29.6	2.5	28.6
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	29.6	2.5	28.6

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

	Zone Cooling Sensible	Time of Peak Sensible	Zone Heating Load	Zone Floor Area

Zone Sizing Summary for ERU-7 (Admin Area A4)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:17PM

Zone Name	(MBH)	Cooling Load	(MBH)	(ft ²)
Zone 1	5.4	Jul 1400	5.5	329.0
Zone 2	0.8	Jul 1400	0.5	277.4
Zone 3	4.8	Oct 1400	3.3	270.2
Zone 4	1.8	Jul 1400	2.4	129.9
Zone 5	1.9	Jul 1400	2.5	146.8
Zone 6	1.9	Jul 1400	2.5	146.8
Zone 7	1.9	Jul 1400	2.5	146.8
Zone 8	4.0	Jul 1400	4.4	227.7
Zone 9	1.8	Jul 1400	2.4	123.3
Zone 10	3.2	Jul 1400	3.0	260.2

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
A404E SUPT ASSIST	1	5.4	Jul 1400	298	5.5	329.0	0.91
Zone 2							
A404B CORRIDOR	1	0.5	Jul 1400	25	0.4	177.0	0.14
A415 CORRIDOR	1	0.3	Jul 1400	14	0.2	100.4	0.14
Zone 3							
A404A WAITING	1	4.8	Oct 1400	225	3.3	270.2	0.83
Zone 4							
A407 ACCT REC	1	1.8	Jul 1400	133	2.4	129.9	1.02
Zone 5							
A408 TREAS OFF	1	1.9	Jul 1400	134	2.5	146.8	0.91
Zone 6							
A409 HR OFF	1	1.9	Jul 1400	134	2.5	146.8	0.91
Zone 7							
A410 BUS MGR OFF	1	1.9	Jul 1400	134	2.5	146.8	0.91
Zone 8							
A412 CONF	1	4.0	Jul 1400	241	4.4	227.7	1.06
Zone 9							
A413 SUPT ASSIST	1	1.8	Jul 1400	133	2.4	123.3	1.08
Zone 10							
A414 SUPT OFF	1	3.2	Jul 1400	165	3.0	260.2	0.64

Ventilation Sizing Summary for ERU-7 (Admin Area A4)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:17PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows
Design Ventilation Airflow Rate 255 CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
A404E SUPT ASSIST	1	329.0	2.0	298.3	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				298.3					30.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
A404B CORRIDOR	1	177.0	0.0	24.8	0.00	0.00	0.0	0.0	0.0
A415 CORRIDOR	1	100.4	0.0	13.6	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				38.4					0.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
A404A WAITING	1	270.2	3.0	224.7	0.00	0.00	50.0	0.0	50.0
Totals (incl. Space Multipliers)				224.7					50.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
A407 ACCT REC	1	129.9	1.0	132.5	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				132.5					15.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
A408 TREAS OFF	1	146.8	1.0	134.2	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				134.2					15.0

Ventilation Sizing Summary for ERU-7 (Admin Area A4)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:17PM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
A409 HR OFF	1	146.8	1.0	134.2	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				134.2					15.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
A410 BUS MGR OFF	1	146.8	1.0	134.2	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				134.2					15.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
A412 CONF	1	227.7	8.0	241.0	0.00	0.00	55.0	0.0	55.0
Totals (incl. Space Multipliers)				241.0					55.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
A413 SUPT ASSIST	1	123.3	1.0	133.1	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				133.1					15.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
A414 SUPT OFF	1	260.2	6.0	165.3	0.00	0.00	45.0	0.0	45.0
Totals (incl. Space Multipliers)				165.3					45.0

Air System Design Load Summary for ERU-7 (Admin Area A4)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:17PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	528 ft²	6232	-	528 ft²	-	-
Wall Transmission	1007 ft²	676	-	1007 ft²	3934	-
Roof Transmission	2077 ft²	1750	-	2077 ft²	3441	-
Window Transmission	528 ft²	1553	-	528 ft²	10644	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1317 W	3853	-	0	0	-
Task Lighting	712 W	2238	-	0	0	-
Electric Equipment	1811 W	5799	-	0	0	-
People	19	3696	2976	0	0	0
Infiltration	-	0	0	-	8344	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1290	149	10%	2636	0
>> Total Zone Loads	-	27086	3125	-	29000	0
Zone Conditioning	-	29764	3125	-	28823	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	255 CFM	475	-	255 CFM	-475	-
Ventilation Load	255 CFM	683	5846	255 CFM	4565	0
Ventilation Fan Load	255 CFM	712	-	255 CFM	-712	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	31634	8971	-	32201	0
Cooling Coil	-	2071	0	-	0	0
Heating Coil	-	0	-	-	3628	-
Terminal Unit Cooling	-	29563	8959	-	0	0
Terminal Unit Heating	-	0	-	-	28573	-
>> Total Conditioning	-	31634	8959	-	32201	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for Heating Only Spaces - Area A & B

Project Name: 60-20-409 NEMT

02/13/2023

Prepared by: TMP Consulting Engineers, Inc.

01:46PM

Air System Information

Air System Name . **Heating Only Spaces - Area A & B**
Equipment Class **TERM**
Air System Type **2P-FC**

Number of zones **1**
Floor Area **6952.7** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for Heating Only Spaces - Area A & B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:46PM

Air System Information

Air System Name **Heating Only Spaces - Area A & B**
Equipment Class **TERM**
Air System Type **2P-FC**

Number of zones **1**
Floor Area **6952.7** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	0.0	0.0	-1.0 / -1.0	-1.0 / -1.0	0.00	Des 0000	0.28

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @30.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	59.2	70.2 / 100.0	3.95	1935	0.286	0.227	38

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	33.4	Aug 1500	58.0	6952.7

Zone Sizing Summary for Heating Only Spaces - Area A & B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:46PM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B105 FIRE PUMP ROOM	1	0.7	Jul 1400	145	4.4	151.0	0.96
B106 PLUMB - WATER SERVI	1	0.7	Jul 1400	152	4.6	139.5	1.09
B107 PLUMB - WATER HEATE	1	0.3	Jan 1100	0	0.0	139.5	0.00
A103 DRY STOR	1	1.3	Jul 2100	299	9.0	294.3	1.02
A105 STAFF LOCKER RM	1	0.6	Jul 1700	117	3.5	109.8	1.07
A106 TLT	1	0.3	Aug 1900	54	1.6	58.9	0.92
A107 TLT	1	0.2	Jul 1400	4	0.1	58.5	0.07
A133 TLT	1	0.1	Jan 1100	0	0.0	73.3	0.00
A134 TLT	1	0.1	Jan 1100	0	0.0	73.3	0.00
A141H TLT	1	0.1	Jan 1100	0	0.0	56.8	0.00
A142 TLT	1	0.3	Jan 1100	0	0.0	147.2	0.00
A143 TLT	1	0.3	Jan 1100	0	0.0	160.3	0.00
A141B LOCKER	1	0.5	Jan 1100	0	0.0	269.8	0.00
B116 TLT	1	0.1	Jan 1100	0	0.0	59.8	0.00
B117 TLT	1	0.1	Jan 1100	0	0.0	55.2	0.00
B101B LOCKER	1	3.2	Jul 1400	90	2.7	301.3	0.30
B101C TLT	1	0.2	Jul 1400	5	0.1	76.0	0.07
B103B LOCKER	1	3.1	Jul 1400	85	2.6	285.2	0.30
B103C TLT	1	0.9	Jul 1400	24	0.7	80.4	0.30
B103D STOR	1	0.3	Jul 1400	10	0.2	91.4	0.11
B121A LOCKER	1	0.3	Jan 1100	0	0.0	147.0	0.00
B121B TLT	1	0.1	Jan 1100	0	0.0	61.6	0.00
B104B LOCKER	1	1.1	Jan 1100	0	0.0	579.4	0.00
B104E TLT	1	0.1	Jan 1100	0	0.0	69.9	0.00
B104F STOR	1	0.3	Jan 1100	10	0.0	156.5	0.06
A201 MECHANICAL	1	18.0	Sep 1500	784	23.7	2037.0	0.39
A417 CUST	1	0.1	Jul 1400	3	0.1	39.8	0.07
A405 TLT	1	0.2	Jul 1400	4	0.1	62.4	0.07
A422 TLT	1	0.8	Jul 1400	18	0.5	276.7	0.07
A423 TLT	1	0.7	Jul 1400	17	0.5	266.5	0.07
B414 CUST	1	0.4	Jul 1700	104	3.1	56.2	1.84
A117C Toilet	1	0.2	Jan 1100	0	0.0	68.9	0.00
A117D Toilet	1	0.2	Jan 1100	0	0.0	69.7	0.00
A117B Custodian	1	0.2	Jan 1100	0	0.0	73.3	0.00
A116 IDF	1	0.2	Jan 1100	0	0.0	92.6	0.00
A115 ELECT - MAIN KITCHE	1	0.2	Jan 1100	0	0.0	90.2	0.00
A109 RECYCLING ROOM	1	0.3	Jul 1400	8	0.2	123.8	0.07

Ventilation Sizing Summary for Heating Only Spaces - Area A & B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:46PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
B105 FIRE PUMP ROOM	1	151.0	0.0	145.3	0.00	0.00	0.0	0.0	0.0
B106 PLUMB - WATER SERVI	1	139.5	0.0	152.5	0.00	0.00	0.0	0.0	0.0
B107 PLUMB - WATER HEATE	1	139.5	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A103 DRY STOR	1	294.3	0.0	299.4	5.00	0.06	0.0	0.0	17.7
A105 STAFF LOCKER RM	1	109.8	0.0	117.4	0.00	0.00	0.0	0.0	0.0
A106 TLT	1	58.9	0.0	54.1	0.00	0.00	0.0	0.0	0.0
A107 TLT	1	58.5	0.0	3.8	0.00	0.00	0.0	0.0	0.0
A133 TLT	1	73.3	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A134 TLT	1	73.3	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A141H TLT	1	56.8	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A142 TLT	1	147.2	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A143 TLT	1	160.3	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A141B LOCKER	1	269.8	0.0	0.0	0.00	0.00	0.0	0.0	0.0
B116 TLT	1	59.8	0.0	0.0	0.00	0.00	0.0	0.0	0.0
B117 TLT	1	55.2	0.0	0.0	0.00	0.00	0.0	0.0	0.0
B101B LOCKER	1	301.3	0.0	89.9	0.00	0.00	0.0	0.0	0.0
B101C TLT	1	76.0	0.0	4.9	0.00	0.00	0.0	0.0	0.0
B103B LOCKER	1	285.2	0.0	85.1	0.00	0.00	0.0	0.0	0.0
B103C TLT	1	80.4	0.0	24.0	0.00	0.00	0.0	0.0	0.0
B103D STOR	1	91.4	0.0	10.0	0.00	0.00	10.0	0.0	10.0
B121A LOCKER	1	147.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0
B121B TLT	1	61.6	0.0	0.0	0.00	0.00	0.0	0.0	0.0
B104B LOCKER	1	579.4	0.0	0.0	0.00	0.00	0.0	0.0	0.0
B104E TLT	1	69.9	0.0	0.0	0.00	0.00	0.0	0.0	0.0
B104F STOR	1	156.5	0.0	10.0	0.00	0.00	10.0	0.0	10.0
A201 MECHANICAL	1	2037.0	0.0	784.4	0.00	0.00	0.0	0.0	0.0
A417 CUST	1	39.8	0.0	2.6	0.00	0.00	0.0	0.0	0.0
A405 TLT	1	62.4	0.0	4.1	0.00	0.00	0.0	0.0	0.0
A422 TLT	1	276.7	0.0	18.0	0.00	0.00	0.0	0.0	0.0
A423 TLT	1	266.5	0.0	17.3	0.00	0.00	0.0	0.0	0.0
B414 CUST	1	56.2	0.0	103.6	0.00	0.00	0.0	0.0	0.0
A117C Toilet	1	68.9	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A117D Toilet	1	69.7	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A117B Custodian	1	73.3	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A116 IDF	1	92.6	0.0	0.0	0.00	0.00	0.0	0.0	0.0

Ventilation Sizing Summary for Heating Only Spaces - Area A & B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:46PM

A115 ELECT - MAIN KITCHEN	1	90.2	0.0	0.0	0.00	0.00	0.0	0.0	0.0
A109 RECYCLING ROOM	1	123.8	0.0	8.1	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				1934.6					37.7

Air System Design Load Summary for Heating Only Spaces - Area A & B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:46PM

	DESIGN COOLING			DESIGN HEATING		
	NO COOLING DATA NO COOLING OA DB / WB			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	315 ft²	-	-	315 ft²	-	-
Wall Transmission	2468 ft²	-	-	2468 ft²	9952	-
Roof Transmission	3180 ft²	-	-	3180 ft²	9524	-
Window Transmission	315 ft²	-	-	315 ft²	6552	-
Skylight Transmission	0 ft²	-	-	0 ft²	0	-
Door Loads	104 ft²	-	-	104 ft²	4732	-
Floor Transmission	4214 ft²	-	-	4214 ft²	1446	-
Partitions	0 ft²	-	-	0 ft²	0	-
Ceiling	0 ft²	-	-	0 ft²	0	-
Overhead Lighting	-	-	-	0	0	-
Task Lighting	-	-	-	0	0	-
Electric Equipment	-	-	-	0	0	-
People	-	-	-	0	0	0
Infiltration	-	-	-	-	18240	0
Miscellaneous	-	-	-	-	0	0
Safety Factor	0% / 0%	-	-	15%	7567	0
>> Total Zone Loads	-	-	-	-	58014	0
Zone Conditioning	-	-	-	-	57426	0
Plenum Wall Load	0%	-	-	0	0	-
Plenum Roof Load	0%	-	-	0	0	-
Plenum Lighting Load	0%	-	-	0	0	-
Exhaust Fan Load	-	-	-	0 CFM	0	-
Ventilation Load	-	-	-	36 CFM	2472	0
Ventilation Fan Load	-	-	-	0 CFM	0	-
Space Fan Coil Fans	-	-	-	-	-736	-
Duct Heat Gain / Loss	0%	-	-	0%	0	-
>> Total System Loads	-	-	-	-	59162	0
Terminal Unit Cooling	-	-	-	-	0	0
Terminal Unit Heating	-	-	-	-	59162	-
>> Total Conditioning	-	-	-	-	59162	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for Heating Only Spaces - Areas C and D

Project Name: 60-20-409 NEMT

02/14/2023

Prepared by: TMP Consulting Engineers, Inc.

11:28AM

Air System Information

Air System Name **Heating Only Spaces - Areas C and D**
Equipment Class **TERM**
Air System Type **2P-FC**

Number of zones **1**
Floor Area **9615.6** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for Heating Only Spaces - Areas C an

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:28AM

Air System Information

Air System Name **Heating Only Spaces - Areas C an**
Equipment Class **TERM**
Air System Type **2P-FC**

Number of zones **1**
Floor Area **9615.6** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	0.0	0.0	-1.0 / -1.0	-1.0 / -1.0	0.00	Des 0000	1.04

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @30.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	297.6	71.2 / 100.0	19.85	10002	1.479	1.173	30

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	55.9	Jul 1400	301.6	9615.6

Zone Sizing Summary for Heating Only Spaces - Areas C and

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:28AM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C001 ELECT - MAIN ELECT	1	0.0	Jan 0000	168	5.1	601.1	0.28
C005 ELECT - MAIN STANDB	1	0.5	Jan 1100	58	1.8	242.5	0.24
C006 ELECT - LIFE SAFETY	1	0.5	Jan 1100	0	0.0	218.6	0.00
C007 Generator Panels	1	0.0	Jan 0000	145	4.4	144.9	1.00
C008 PLUMBING ROOM	1	0.0	Jan 0000	189	5.7	430.8	0.44
C101 CUST	1	0.1	Jan 1100	0	0.0	46.9	0.00
C102 CUST STOR	1	0.1	Jan 1100	0	0.0	50.7	0.00
C112 TLT	1	0.5	Jan 1100	0	0.0	246.8	0.00
C113 TLT	1	0.5	Jan 1100	0	0.0	246.3	0.00
C104 Vest	1	9.3	Jul 1800	1886	57.0	446.6	4.22
C106K STOR	1	0.6	Jul 2100	126	3.8	70.3	1.80
C106A CUBBIES	1	0.5	Jul 1400	30	0.4	188.7	0.16
C106C LOCKERS	1	0.2	Jul 1400	5	0.1	75.1	0.07
C106G TLT	1	0.9	Aug 2000	87	2.6	155.4	0.56
C108 TLT	1	0.3	Jul 2100	60	1.8	73.6	0.81
C107 TLT	1	0.3	Jul 2100	60	1.8	73.6	0.81
D101 VEST	1	3.3	Jul 1800	682	20.6	160.3	4.26
C302 MECHANICAL	1	7.8	Jul 1400	226	6.8	2746.9	0.08
1-CB102 MAINTENANCE	1	0.5	Jul 1500	136	4.1	43.0	3.16
1-LRS1 STAIR	1	7.4	Jul 1400	1184	35.8	247.4	4.79
1-LR104 FIELD MAINT GAR	1	5.5	Jul 1400	990	29.9	1017.5	0.97
1-LR101 VEST	1	6.9	Jul 1100	416	12.6	133.6	3.11
1-LR201 VEST	1	7.1	Jul 1100	416	12.6	136.5	3.05
1-LR105 TLT	1	0.5	Aug 0800	70	2.1	53.1	1.31
1-M101 MAINT GARAGE	1	13.2	Jul 1400	2861	86.4	1680.1	1.70
1-M101a Toilet	1	1.4	Aug 0100	206	6.2	85.3	2.42

Ventilation Sizing Summary for Heating Only Spaces - Areas C and D

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
11:28AM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
C001 ELECT - MAIN ELECT	1	601.1	0.0	168.0	0.00	0.00	0.0	0.0	0.0
C005 ELECT - MAIN STANDB	1	242.5	0.0	58.1	0.00	0.00	0.0	0.0	0.0
C006 ELECT - LIFE SAFETY	1	218.6	0.0	0.0	0.00	0.00	0.0	0.0	0.0
C007 Generator Panels	1	144.9	0.0	145.5	0.00	0.00	0.0	0.0	0.0
C008 PLUMBING ROOM	1	430.8	0.0	189.1	0.00	0.00	0.0	0.0	0.0
C101 CUST	1	46.9	0.0	0.0	0.00	0.00	0.0	0.0	0.0
C102 CUST STOR	1	50.7	0.0	0.0	0.00	0.00	0.0	0.0	0.0
C112 TLT	1	246.8	0.0	0.0	0.00	0.00	0.0	0.0	0.0
C113 TLT	1	246.3	0.0	0.0	0.00	0.00	0.0	0.0	0.0
C104 Vest	1	446.6	0.0	1886.1	0.00	0.00	0.0	0.0	0.0
C106K STOR	1	70.3	0.0	126.3	0.00	0.00	0.0	0.0	0.0
C106A CUBBIES	1	188.7	0.0	30.0	0.00	0.00	30.0	0.0	30.0
C106C LOCKERS	1	75.1	0.0	4.9	0.00	0.00	0.0	0.0	0.0
C106G TLT	1	155.4	0.0	87.0	0.00	0.00	0.0	0.0	0.0
C108 TLT	1	73.6	0.0	59.6	0.00	0.00	0.0	0.0	0.0
C107 TLT	1	73.6	0.0	59.6	0.00	0.00	0.0	0.0	0.0
D101 VEST	1	160.3	0.0	682.3	0.00	0.00	0.0	0.0	0.0
C302 MECHANICAL	1	2746.9	0.0	225.9	0.00	0.00	0.0	0.0	0.0
1-CB102 MAINTENANCE	1	43.0	0.0	136.0	0.00	0.00	0.0	0.0	0.0
1-LRS1 STAIR	1	247.4	0.0	1184.2	0.00	0.00	0.0	0.0	0.0
1-LR104 FIELD MAINT GAR	1	1017.5	4.0	990.5	0.00	0.00	0.0	0.0	0.0
1-LR101 VEST	1	133.6	0.0	415.6	0.00	0.00	0.0	0.0	0.0
1-LR201 VEST	1	136.5	0.0	415.7	0.00	0.00	0.0	0.0	0.0
1-LR105 TLT	1	53.1	0.0	69.7	0.00	0.00	0.0	0.0	0.0
1-M101 MAINT GARAGE	1	1680.1	6.0	2861.3	0.00	0.00	0.0	0.0	0.0
1-M101a Toilet	1	85.3	0.0	206.2	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				10001.6					30.0

Air System Design Load Summary for Heating Only Spaces - Areas C an

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/14/2023

11:28AM

	DESIGN COOLING			DESIGN HEATING		
	NO COOLING DATA NO COOLING OA DB / WB			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	901 ft²	-	-	901 ft²	-	-
Wall Transmission	5719 ft²	-	-	5719 ft²	57936	-
Roof Transmission	6022 ft²	-	-	6022 ft²	10297	-
Window Transmission	901 ft²	-	-	901 ft²	18741	-
Skylight Transmission	0 ft²	-	-	0 ft²	0	-
Door Loads	1233 ft²	-	-	1233 ft²	29809	-
Floor Transmission	5935 ft²	-	-	5935 ft²	14589	-
Partitions	0 ft²	-	-	0 ft²	0	-
Ceiling	1761 ft²	-	-	1761 ft²	6975	-
Overhead Lighting	-	-	-	0	0	-
Task Lighting	-	-	-	0	0	-
Electric Equipment	-	-	-	0	0	-
People	-	-	-	0	0	0
Infiltration	-	-	-	-	123902	0
Miscellaneous	-	-	-	-	0	0
Safety Factor	0% / 0%	-	-	15%	39337	0
>> Total Zone Loads	-	-	-	-	301586	0
Zone Conditioning	-	-	-	-	299444	0
Plenum Wall Load	0%	-	-	0	0	-
Plenum Roof Load	0%	-	-	0	0	-
Plenum Lighting Load	0%	-	-	0	0	-
Exhaust Fan Load	-	-	-	0 CFM	0	-
Ventilation Load	-	-	-	29 CFM	1986	0
Ventilation Fan Load	-	-	-	0 CFM	0	-
Space Fan Coil Fans	-	-	-	-	-3837	-
Duct Heat Gain / Loss	0%	-	-	0%	0	-
>> Total System Loads	-	-	-	-	297593	0
Terminal Unit Cooling	-	-	-	-	0	0
Terminal Unit Heating	-	-	-	-	297593	-
>> Total Conditioning	-	-	-	-	297593	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/13/2023

01:21PM

Air System Information

Air System Name **HRU-1 Classrooms A/B**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **39**
Floor Area **37113.0** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **13.5** Tons
Total coil load **161.6** MBH
Total coil load **1469.3** CFM/Ton
Sensible coil load **161.6** MBH
Coil CFM at Jul 1400 **19790** CFM
Max coil CFM **19790** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.0 / 72.0** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **275.6** MBH
Coil CFM at Des Htg **19790** CFM
Max coil CFM **19790** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.5 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **19790** CFM
Standard CFM **19769** CFM
Actual max CFM/ft² **0.53** CFM/ft²

Fan motor BHP **20.42** BHP
Fan motor kW **16.20** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **19790** CFM
Standard CFM **19769** CFM
Actual max CFM/ft² **0.53** CFM/ft²

Fan motor BHP **13.61** BHP
Fan motor kW **10.80** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **19790** CFM
CFM/ft² **0.53** CFM/ft²

CFM/person **32.24** CFM/person

Zone Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

Air System Information

Air System Name **HRU-1 Classrooms A/B**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **39**
Floor Area **37113.0** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	10.8	6.0	75.0 / 70.6	66.1 / 65.7	-	Jul 0700	0.54
Zone 2	19.2	8.7	75.1 / 70.0	55.0 / 54.8	-	Jul 1200	0.46
Zone 3	29.7	17.5	75.4 / 66.9	55.4 / 54.8	-	Jul 1200	0.81
Zone 4	4.9	2.1	75.0 / 70.6	57.8 / 57.6	-	Jul 1100	0.15
Zone 5	4.1	2.1	75.6 / 68.6	55.0 / 54.5	-	Aug 1000	0.29
Zone 6	9.9	7.7	75.0 / 69.8	67.1 / 66.6	-	Jul 1100	1.49
Zone 7	18.3	8.0	75.0 / 70.6	55.0 / 54.9	-	Aug 1200	0.40
Zone 8	39.2	18.6	75.0 / 70.6	62.9 / 62.6	-	Jul 0900	0.96
Zone 9	16.2	7.2	75.0 / 70.6	59.0 / 58.7	-	Jul 0900	1.00
Zone 10	37.7	18.1	75.0 / 70.6	63.3 / 62.9	-	Jul 0900	0.96
Zone 11	14.5	6.6	75.0 / 70.6	60.9 / 60.6	-	Jul 0900	0.22
Zone 12	26.8	15.1	75.9 / 67.6	55.0 / 54.4	-	Jul 1000	0.78
Zone 13	26.6	14.9	75.8 / 67.6	55.0 / 54.4	-	Aug 1000	0.78
Zone 14	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Jul 1000	0.78
Zone 15	20.4	11.3	75.3 / 68.4	58.9 / 58.3	-	Jul 1400	0.73
Zone 16	19.1	8.9	75.2 / 69.7	55.0 / 54.7	-	Jul 1200	0.54
Zone 17	19.2	8.9	75.2 / 69.7	55.0 / 54.7	-	Jul 1200	0.54
Zone 18	9.3	5.9	76.0 / 66.2	55.0 / 54.2	-	Jul 1000	0.49
Zone 19	10.4	6.6	76.2 / 66.3	55.0 / 54.2	-	Jul 1000	0.44
Zone 20	20.4	10.1	75.3 / 68.9	55.5 / 55.2	-	Jul 0900	0.60
Zone 21	26.0	13.6	75.0 / 70.6	65.2 / 64.8	-	Jul 0700	0.52
Zone 22	27.1	15.4	75.8 / 67.4	55.0 / 54.4	-	Aug 1000	0.79
Zone 23	2.5	1.4	76.2 / 67.7	55.0 / 54.4	-	Aug 1000	0.41
Zone 24	38.9	18.1	75.0 / 70.6	62.2 / 61.8	-	Jul 0900	0.88
Zone 25	11.2	5.3	75.0 / 70.6	63.0 / 62.7	-	Jul 1100	1.00
Zone 26	38.9	18.1	75.0 / 70.6	62.2 / 61.8	-	Jul 0900	0.88
Zone 27	26.8	15.1	75.9 / 67.5	55.0 / 54.4	-	Jul 1000	0.78
Zone 28	26.9	15.2	75.9 / 67.6	55.0 / 54.4	-	Jul 1000	0.75
Zone 29	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Jul 1000	0.77
Zone 30	10.8	8.0	75.4 / 67.2	61.8 / 61.0	-	Jul 1400	1.11
Zone 31	41.3	19.6	75.1 / 70.3	61.5 / 61.2	-	Jul 1300	0.53
Zone 32	2.7	1.6	76.0 / 67.2	55.0 / 54.3	-	Jul 1000	0.46
Zone 33	4.0	1.8	75.0 / 70.6	58.6 / 58.4	-	Jul 1400	0.20
Zone 34	37.9	17.8	75.0 / 70.6	62.6 / 62.2	-	Jul 0800	0.89
Zone 35	11.6	5.5	75.0 / 70.6	62.7 / 62.3	-	Jul 1100	1.00
Zone 36	39.9	18.5	75.0 / 70.6	62.1 / 61.7	-	Jul 1000	0.89
Zone 37	27.2	15.5	75.8 / 67.4	55.0 / 54.4	-	Jul 1000	0.80
Zone 38	27.1	15.3	75.8 / 67.4	55.0 / 54.4	-	Jul 1000	0.80
Zone 39	27.1	15.4	75.8 / 67.4	55.0 / 54.4	-	Aug 1000	0.79

Terminal Unit Sizing Data - Heating, Fan, Ventilation

	Heating Coil	Heating Coil Ent/Lvg	Htg Coil Water Flow	Fan Design	Fan	Fan	OA Vent Design
--	--------------	----------------------	---------------------	------------	-----	-----	----------------

Zone Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

Zone Name	Load (MBH)	DB (°F)	@20.0 °F (gpm)	Airflow (CFM)	Motor (BHP)	Motor (kW)	Airflow (CFM)
Zone 1	2.2	70.0 / 73.3	-	625	0.000	0.000	625
Zone 2	1.7	70.0 / 74.0	-	401	0.000	0.000	355
Zone 3	8.2	69.7 / 79.1	-	812	0.000	0.000	370
Zone 4	0.9	70.0 / 77.4	-	115	0.000	0.000	115
Zone 5	0.0	0.0 / 0.0	0.00	94	0.000	0.000	55
Zone 6	15.9	69.2 / 85.5	-	905	0.000	0.000	205
Zone 7	0.0	0.0 / 0.0	0.00	369	0.000	0.000	360
Zone 8	16.1	70.0 / 80.4	-	1430	0.000	0.000	1430
Zone 9	0.0	0.0 / 0.0	0.00	415	0.000	0.000	415
Zone 10	14.8	70.0 / 79.6	-	1430	0.000	0.000	1430
Zone 11	0.0	0.0 / 0.0	0.00	430	0.000	0.000	430
Zone 12	7.6	69.7 / 80.2	-	670	0.000	0.000	360
Zone 13	6.5	69.7 / 78.8	-	665	0.000	0.000	360
Zone 14	6.7	69.8 / 79.1	-	666	0.000	0.000	360
Zone 15	11.1	69.6 / 85.7	-	634	0.000	0.000	360
Zone 16	4.6	69.9 / 80.4	-	408	0.000	0.000	340
Zone 17	4.6	69.9 / 80.4	-	410	0.000	0.000	345
Zone 18	4.7	69.4 / 86.1	-	260	0.000	0.000	80
Zone 19	4.6	69.3 / 84.2	-	286	0.000	0.000	85
Zone 20	7.3	69.7 / 84.0	-	476	0.000	0.000	345
Zone 21	0.0	0.0 / 0.0	0.00	1290	0.000	0.000	1290
Zone 22	8.1	69.7 / 80.6	-	685	0.000	0.000	360
Zone 23	0.0	0.0 / 0.0	0.00	62	0.000	0.000	30
Zone 24	14.7	70.0 / 80.4	-	1310	0.000	0.000	1310
Zone 25	0.0	0.0 / 0.0	0.00	410	0.000	0.000	410
Zone 26	14.4	70.0 / 80.2	-	1305	0.000	0.000	1305
Zone 27	7.5	69.7 / 80.0	-	670	0.000	0.000	360
Zone 28	6.6	69.8 / 78.9	-	673	0.000	0.000	360
Zone 29	6.7	69.8 / 79.2	-	667	0.000	0.000	360
Zone 30	9.9	69.3 / 86.0	-	546	0.000	0.000	100
Zone 31	12.2	70.0 / 78.4	-	1345	0.000	0.000	1205
Zone 32	0.3	69.9 / 73.5	-	69	0.000	0.000	30
Zone 33	1.1	70.0 / 80.2	-	100	0.000	0.000	100
Zone 34	22.4	70.0 / 85.6	-	1330	0.000	0.000	1330
Zone 35	1.4	70.0 / 73.2	-	410	0.000	0.000	410
Zone 36	23.0	70.0 / 86.1	-	1325	0.000	0.000	1325
Zone 37	9.2	69.6 / 82.0	-	688	0.000	0.000	360
Zone 38	8.0	69.6 / 80.5	-	683	0.000	0.000	360
Zone 39	8.1	69.7 / 80.6	-	685	0.000	0.000	360

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	424.8	35.4	271.2
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	424.8	35.4	271.2

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	2.5	Jul 1400	0.4	1167.2

Zone Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 2	8.6	Jul 1400	1.6	870.0
Zone 3	17.5	Jul 1400	8.3	998.3
Zone 4	1.9	Jul 1400	0.8	769.3
Zone 5	2.0	Jan 1400	0.0	326.7
Zone 6	6.4	Jul 1400	16.6	608.8
Zone 7	8.0	Jan 1400	0.0	918.5
Zone 8	11.8	Jul 1400	6.5	1490.2
Zone 9	6.0	Jan 1400	0.0	413.5
Zone 10	11.1	Jul 1400	5.7	1490.2
Zone 11	4.3	Jan 1100	0.0	1923.4
Zone 12	14.5	Aug 1100	7.9	862.2
Zone 13	14.3	Aug 1100	6.8	849.4
Zone 14	14.4	Aug 1100	6.8	859.6
Zone 15	10.3	Jul 1400	11.6	864.7
Zone 16	8.8	Jul 1400	4.9	752.4
Zone 17	8.8	Jul 1400	4.9	759.4
Zone 18	5.6	Jul 1400	4.8	531.6
Zone 19	6.2	Jul 1400	4.8	656.1
Zone 20	10.3	Nov 1400	7.9	790.3
Zone 21	5.5	Jan 1100	0.0	2494.3
Zone 22	14.8	Aug 1100	8.5	862.1
Zone 23	1.3	Jan 1400	0.0	149.9
Zone 24	11.8	Jul 1400	6.5	1490.3
Zone 25	3.6	Jan 1100	0.0	410.8
Zone 26	11.8	Jul 1400	6.5	1490.2
Zone 27	14.5	Aug 1100	7.9	864.7
Zone 28	14.5	Aug 1100	6.8	901.3
Zone 29	14.4	Aug 1100	6.8	864.1
Zone 30	7.2	Jul 1400	10.0	493.5
Zone 31	14.9	Jul 1400	7.1	2560.6
Zone 32	1.5	Jul 1400	0.3	149.9
Zone 33	1.6	Jul 1400	0.9	496.8
Zone 34	13.2	Jul 1400	11.4	1496.5
Zone 35	3.9	Jul 1400	0.7	410.8
Zone 36	13.2	Jul 1400	11.5	1496.5
Zone 37	14.8	Aug 1100	9.6	864.7
Zone 38	14.7	Aug 1100	8.5	852.0
Zone 39	14.8	Aug 1100	8.5	862.1

Zone Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
A146 CORRIDOR	1	2.5	Jul 1400	625	0.4	1167.2	0.54
Zone 2							
A141C RELATED CR	1	8.6	Jul 1400	401	1.6	870.0	0.46
Zone 3							
B101E RELATED CR	1	17.5	Jul 1400	812	8.3	998.3	0.81
Zone 4							
B111A CORRIDOR	1	1.9	Jul 1400	115	0.8	769.3	0.15
Zone 5							
B115 SCHOOL STORE	1	2.0	Jan 1400	94	0.0	326.7	0.29
Zone 6							
B114 CORRIDOR	1	6.4	Jul 1400	905	16.6	608.8	1.49
Zone 7							
A208 LANGUAGE LEARNING	1	8.0	Jan 1400	369	0.0	918.5	0.40
Zone 8							
A209 SCI LAB	1	11.8	Jul 1400	1430	6.5	1490.2	0.96
Zone 9							
A210 SCI PREP	1	6.0	Jan 1400	415	0.0	413.5	1.00
Zone 10							
A211 SCI LAB	1	11.1	Jul 1400	1430	5.7	1490.2	0.96
Zone 11							
A212 CORRIDOR	1	4.3	Jan 1100	430	0.0	1923.4	0.22
Zone 12							
A224 CR	1	14.5	Aug 1100	670	7.9	862.2	0.78
Zone 13							
A225 CR	1	14.3	Aug 1100	665	6.8	849.4	0.78
Zone 14							
A226 CR	1	14.4	Aug 1100	666	6.8	859.6	0.78
Zone 15							
A301 SPED LEARNING CENTE	1	10.3	Jul 1400	634	11.6	864.7	0.73
Zone 16							
A302 BIO RELATED CR	1	8.8	Jul 1400	408	4.9	752.4	0.54
Zone 17							
A305 HEALTH ASSIST RELAT	1	8.8	Jul 1400	410	4.9	759.4	0.54
Zone 18							
A306 SPED SMALL GROUP	1	5.6	Jul 1400	260	4.8	531.6	0.49
Zone 19							
A307 SPED SMALL GROUP	1	6.2	Jul 1400	286	4.8	656.1	0.44
Zone 20							
A308 DIGITAL LEARNING	1	10.3	Nov 1400	476	7.9	790.3	0.60
Zone 21							
A309 CORRIDOR	1	5.5	Jan 1100	1290	0.0	2494.3	0.52
Zone 22							
A431 CR	1	14.8	Aug 1100	685	8.5	862.1	0.79
Zone 23							
A317 SPED RESOURCE	1	1.3	Jan 1400	62	0.0	149.9	0.41
Zone 24							
A318 SCI LAB	1	11.8	Jul 1400	1310	6.5	1490.3	0.88
Zone 25							
A319 SCI PREP	1	3.6	Jan 1100	410	0.0	410.8	1.00
Zone 26							
A320 SCI LAB	1	11.8	Jul 1400	1305	6.5	1490.2	0.88
Zone 27							
A322 CR	1	14.5	Aug 1100	670	7.9	864.7	0.78
Zone 28							

Zone Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
A323 CR	1	14.5	Aug 1100	673	6.8	901.3	0.75
Zone 29							
A324 CR	1	14.4	Aug 1100	667	6.8	864.1	0.77
Zone 30							
A401 SPED SMALL GROUP	1	7.2	Jul 1400	546	10.0	493.5	1.11
Zone 31							
A416 CORRIDOR	1	9.8	Jul 1400	1035	2.5	1389.0	0.75
A416a CORRIDOR Ext	1	2.0	Jul 1400	160	2.9	249.6	0.64
A416b CORRIDOR	1	3.2	Jul 1400	150	1.7	922.0	0.16
Zone 32							
A424 SPED RESOURCE	1	1.5	Jul 1400	69	0.3	149.9	0.46
Zone 33							
A421 STOR	1	1.6	Jul 1400	100	0.9	496.8	0.20
Zone 34							
A425 SCI LAB	1	13.2	Jul 1400	1330	11.4	1496.5	0.89
Zone 35							
A426 SCI PREP	1	3.9	Jul 1400	410	0.7	410.8	1.00
Zone 36							
A427 SCI LAB	1	13.2	Jul 1400	1325	11.5	1496.5	0.89
Zone 37							
A429 CR	1	14.8	Aug 1100	688	9.6	864.7	0.80
Zone 38							
A430 CR	1	14.7	Aug 1100	683	8.5	852.0	0.80
Zone 39							
A431 CR	1	14.8	Aug 1100	685	8.5	862.1	0.79

Ventilation Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **19790** CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
A146 CORRIDOR	1	1167.2	0.0	625.0	0.00	0.00	625.0	0.0	625.0
Totals (incl. Space Multipliers)				625.0					625.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
A141C RELATED CR	1	870.0	25.0	400.6	0.00	0.00	355.0	0.0	355.0
Totals (incl. Space Multipliers)				400.6					355.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
B101E RELATED CR	1	998.3	25.0	811.7	0.00	0.00	370.0	0.0	370.0
Totals (incl. Space Multipliers)				811.7					370.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
B111A CORRIDOR	1	769.3	0.0	115.0	0.00	0.00	115.0	0.0	115.0
Totals (incl. Space Multipliers)				115.0					115.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
B115 SCHOOL STORE	1	326.7	2.0	94.2	0.00	0.00	55.0	0.0	55.0
Totals (incl. Space Multipliers)				94.2					55.0

Ventilation Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
B114 CORRIDOR	1	608.8	0.0	904.5	0.00	0.00	205.0	0.0	205.0
Totals (incl. Space Multipliers)				904.5					205.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
A208 LANGUAGE LEARNING	1	918.5	25.0	368.9	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				368.9					360.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
A209 SCI LAB	1	1490.2	25.0	1430.0	0.00	0.00	1430.0	0.0	1430.0
Totals (incl. Space Multipliers)				1430.0					1430.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
A210 SCI PREP	1	413.5	25.0	415.0	0.00	0.00	415.0	0.0	415.0
Totals (incl. Space Multipliers)				415.0					415.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
A211 SCI LAB	1	1490.2	25.0	1430.0	0.00	0.00	1430.0	0.0	1430.0
Totals (incl. Space Multipliers)				1430.0					1430.0

2.11 Zone: Zone 11

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 11									
A212 CORRIDOR	1	1923.4	3.0	430.0	0.00	0.00	430.0	0.0	430.0
Totals (incl. Space Multipliers)				430.0					430.0

Ventilation Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

2.12 Zone: Zone 12

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 12									
A224 CR	1	862.2	25.0	669.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				669.8					360.0

2.13 Zone: Zone 13

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 13									
A225 CR	1	849.4	25.0	664.6	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				664.6					360.0

2.14 Zone: Zone 14

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 14									
A226 CR	1	859.6	25.0	666.3	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				666.3					360.0

2.15 Zone: Zone 15

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 15									
A301 SPED LEARNING CENTE	1	864.7	25.0	634.3	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				634.3					360.0

2.16 Zone: Zone 16

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 16									
A302 BIO RELATED CR	1	752.4	25.0	408.5	0.00	0.00	340.0	0.0	340.0
Totals (incl. Space Multipliers)				408.5					340.0

2.17 Zone: Zone 17

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 17									
A305 HEALTH ASSIST RELAT	1	759.4	25.0	409.6	0.00	0.00	345.0	0.0	345.0
Totals (incl. Space Multipliers)				409.6					345.0

Ventilation Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

2.18 Zone: Zone 18

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 18									
A306 SPED SMALL GROUP	1	531.6	9.0	260.0	0.00	0.00	80.0	0.0	80.0
Totals (incl. Space Multipliers)				260.0					80.0

2.19 Zone: Zone 19

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 19									
A307 SPED SMALL GROUP	1	656.1	9.0	286.2	0.00	0.00	85.0	0.0	85.0
Totals (incl. Space Multipliers)				286.2					85.0

2.20 Zone: Zone 20

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 20									
A308 DIGITAL LEARNING	1	790.3	25.0	475.6	0.00	0.00	345.0	0.0	345.0
Totals (incl. Space Multipliers)				475.6					345.0

2.21 Zone: Zone 21

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 21									
A309 CORRIDOR	1	2494.3	3.0	1290.0	0.00	0.00	1290.0	0.0	1290.0
Totals (incl. Space Multipliers)				1290.0					1290.0

2.22 Zone: Zone 22

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 22									
A431 CR	1	862.1	25.0	684.5	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				684.5					360.0

2.23 Zone: Zone 23

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 23									
A317 SPED RESOURCE	1	149.9	4.0	62.1	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				62.1					30.0

Ventilation Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

2.24 Zone: Zone 24

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 24									
A318 SCI LAB	1	1490.3	25.0	1310.0	0.00	0.00	1310.0	0.0	1310.0
Totals (incl. Space Multipliers)				1310.0					1310.0

2.25 Zone: Zone 25

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 25									
A319 SCI PREP	1	410.8	2.0	410.0	0.00	0.00	410.0	0.0	410.0
Totals (incl. Space Multipliers)				410.0					410.0

2.26 Zone: Zone 26

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 26									
A320 SCI LAB	1	1490.2	25.0	1305.0	0.00	0.00	1305.0	0.0	1305.0
Totals (incl. Space Multipliers)				1305.0					1305.0

2.27 Zone: Zone 27

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 27									
A322 CR	1	864.7	25.0	670.2	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				670.2					360.0

2.28 Zone: Zone 28

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 28									
A323 CR	1	901.3	25.0	673.0	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				673.0					360.0

2.29 Zone: Zone 29

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 29									
A324 CR	1	864.1	25.0	667.0	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				667.0					360.0

Ventilation Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

2.30 Zone: Zone 30

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 30									
A401 SPED SMALL GROUP	1	493.5	13.0	546.4	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				546.4					100.0

2.31 Zone: Zone 31

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 31									
A416 CORRIDOR	1	1389.0	24.0	1035.0	0.00	0.00	1035.0	0.0	1035.0
A416a CORRIDOR Ext	1	249.6	3.0	160.0	0.00	0.00	20.0	0.0	20.0
A416b CORRIDOR	1	922.0	3.0	150.0	0.00	0.00	150.0	0.0	150.0
Totals (incl. Space Multipliers)				1345.0					1205.0

2.32 Zone: Zone 32

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 32									
A424 SPED RESOURCE	1	149.9	4.0	68.8	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				68.8					30.0

2.33 Zone: Zone 33

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 33									
A421 STOR	1	496.8	1.0	100.0	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				100.0					100.0

2.34 Zone: Zone 34

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 34									
A425 SCI LAB	1	1496.5	25.0	1330.0	0.00	0.00	1330.0	0.0	1330.0
Totals (incl. Space Multipliers)				1330.0					1330.0

Ventilation Sizing Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:21PM

2.35 Zone: Zone 35

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 35									
A426 SCI PREP	1	410.8	2.0	410.0	0.00	0.00	410.0	0.0	410.0
Totals (incl. Space Multipliers)				410.0					410.0

2.36 Zone: Zone 36

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 36									
A427 SCI LAB	1	1496.5	25.0	1325.0	0.00	0.00	1325.0	0.0	1325.0
Totals (incl. Space Multipliers)				1325.0					1325.0

2.37 Zone: Zone 37

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 37									
A429 CR	1	864.7	25.0	688.2	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				688.2					360.0

2.38 Zone: Zone 38

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 38									
A430 CR	1	852.0	25.0	682.7	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				682.7					360.0

2.39 Zone: Zone 39

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 39									
A431 CR	1	862.1	25.0	684.5	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				684.5					360.0

Air System Design Load Summary for HRU-1 Classrooms A/B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:22PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1000 COOLING OA DB / WB 76.1 °F / 70.9 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	3630 ft²	80851	-	3630 ft²	-	-
Wall Transmission	6355 ft²	3727	-	6355 ft²	24842	-
Roof Transmission	14881 ft²	10021	-	14881 ft²	30590	-
Window Transmission	3630 ft²	974	-	3630 ft²	73187	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	42 ft²	1046	-	42 ft²	2117	-
Floor Transmission	4740 ft²	0	-	4740 ft²	814	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	28206 W	68123	-	0	0	-
Task Lighting	12947 W	37019	-	0	0	-
Electric Equipment	7267 W	21655	-	0	0	-
People	614	92317	95625	0	0	0
Infiltration	-	0	2	-	61180	0
Miscellaneous	-	2400	0	-	0	0
Safety Factor	5% / 5%	15907	4781	10%	19273	0
>> Total Zone Loads	-	334039	100408	-	212002	0
Zone Conditioning	-	405911	100408	-	209779	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	19790 CFM	36847	-	19790 CFM	-36847	-
Ventilation Load	19790 CFM	-32415	287564	19790 CFM	356337	0
Ventilation Fan Load	19790 CFM	55271	-	19790 CFM	-55271	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	465613	387973	-	473999	0
Cooling Coil	-	79546	0	-	0	0
Heating Coil	-	0	-	-	275591	-
Terminal Unit Cooling	-	424792	388058	-	0	0
Terminal Unit Heating	-	0	-	-	271169	-
>> Total Conditioning	-	504338	388058	-	546760	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/13/2023

01:32PM

Air System Information

Air System Name **HRU-2 Classrooms B**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **57**
Floor Area **57127.4** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **13.0** Tons
Total coil load **155.9** MBH
Total coil load **1441.7** CFM/Ton
Sensible coil load **155.9** MBH
Coil CFM at Jul 1400 **18735** CFM
Max coil CFM **18735** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.1 / 72.1** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **261.0** MBH
Coil CFM at Des Htg **18735** CFM
Max coil CFM **18735** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.5 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **18735** CFM
Standard CFM **18715** CFM
Actual max CFM/ft² **0.33** CFM/ft²

Fan motor BHP **19.33** BHP
Fan motor kW **15.33** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **18735** CFM
Standard CFM **18715** CFM
Actual max CFM/ft² **0.33** CFM/ft²

Fan motor BHP **12.89** BHP
Fan motor kW **10.22** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **18735** CFM
CFM/ft² **0.33** CFM/ft²

CFM/person **19.53** CFM/person

Zone Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

Air System Information

Air System Name **HRU-2 Classrooms B**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **57**
Floor Area **57127.4** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	20.4	9.4	75.2 / 69.8	55.0 / 54.8	-	Jul 1200	0.43
Zone 2	23.5	12.3	75.4 / 68.2	55.0 / 54.5	-	Aug 1400	0.67
Zone 3	8.3	3.6	75.0 / 70.7	55.0 / 54.9	-	Jul 1200	0.12
Zone 4	5.1	3.0	76.2 / 67.0	55.0 / 54.3	-	Aug 1000	0.33
Zone 5	1.5	0.9	76.3 / 66.7	55.0 / 54.2	-	Aug 1000	0.50
Zone 6	1.4	0.6	75.2 / 70.5	55.0 / 54.9	-	Jul 1200	0.13
Zone 7	24.7	12.9	75.5 / 68.3	55.0 / 54.5	-	Aug 1000	0.60
Zone 8	20.5	8.9	75.1 / 70.5	55.0 / 54.9	-	Aug 1200	0.34
Zone 9	26.7	15.0	75.8 / 67.6	55.0 / 54.4	-	Jul 1000	0.78
Zone 10	41.9	37.0	75.4 / 64.6	59.1 / 58.0	-	Jul 1800	2.05
Zone 11	26.7	15.0	75.8 / 67.6	55.0 / 54.4	-	Aug 1000	0.78
Zone 12	10.9	5.3	75.0 / 70.6	63.6 / 63.2	-	Jul 0800	0.47
Zone 13	7.7	3.9	75.8 / 68.9	55.0 / 54.6	-	Aug 1000	0.35
Zone 14	5.8	3.2	76.2 / 67.8	55.0 / 54.4	-	Aug 1000	0.41
Zone 15	22.1	11.4	75.3 / 68.5	55.9 / 55.5	-	Aug 1400	0.65
Zone 16	25.8	19.4	76.5 / 64.5	55.0 / 53.9	-	Aug 1000	0.84
Zone 17	30.8	13.4	75.0 / 70.6	55.8 / 55.6	-	Jul 0900	0.18
Zone 18	22.9	11.9	75.4 / 68.4	55.5 / 55.1	-	Aug 1400	0.62
Zone 19	22.6	11.7	75.3 / 68.4	55.6 / 55.1	-	Aug 1400	0.65
Zone 20	27.0	15.2	75.9 / 67.5	55.0 / 54.4	-	Jul 1000	0.79
Zone 21	26.6	14.9	75.8 / 67.6	55.0 / 54.4	-	Aug 1000	0.79
Zone 22	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Aug 1000	0.78
Zone 23	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Aug 1000	0.78
Zone 24	26.9	15.2	75.9 / 67.5	55.0 / 54.4	-	Jul 1000	0.79
Zone 25	2.5	1.4	76.2 / 67.8	55.0 / 54.4	-	Aug 1000	0.42
Zone 26	24.9	11.2	75.3 / 70.3	55.0 / 54.8	-	Jul 1000	0.13
Zone 27	13.8	6.3	75.9 / 70.5	55.0 / 54.8	-	Jul 1000	0.11
Zone 28	39.2	34.1	75.6 / 63.1	55.7 / 54.6	-	Jul 1800	2.39
Zone 29	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Aug 1000	0.78
Zone 30	26.7	15.0	75.8 / 67.6	55.0 / 54.4	-	Jul 1000	0.78
Zone 31	22.2	11.5	75.4 / 68.5	55.9 / 55.4	-	Aug 1400	0.65
Zone 32	22.9	11.9	75.4 / 68.4	55.5 / 55.0	-	Aug 1400	0.62
Zone 33	22.2	11.5	75.4 / 68.5	55.9 / 55.4	-	Aug 1400	0.65
Zone 34	35.3	17.3	75.0 / 70.6	63.8 / 63.4	-	Jul 1400	0.92
Zone 35	12.5	6.0	75.0 / 70.7	63.3 / 62.9	-	Jul 1300	1.00
Zone 36	2.5	1.1	75.0 / 70.7	55.0 / 54.9	-	Jul 1300	0.16
Zone 37	34.8	17.1	75.0 / 70.6	63.9 / 63.6	-	Jul 1100	0.92
Zone 38	25.3	18.9	76.0 / 64.4	55.0 / 54.0	-	Jul 1000	0.84
Zone 39	2.5	1.4	76.2 / 67.8	55.0 / 54.4	-	Aug 1000	0.42
Zone 40	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Jul 1000	0.78
Zone 41	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Aug 1000	0.78
Zone 42	26.7	15.0	75.9 / 67.6	55.0 / 54.4	-	Aug 1000	0.78
Zone 43	27.4	15.6	75.8 / 67.4	55.0 / 54.4	-	Aug 1000	0.82
Zone 44	26.6	14.9	75.8 / 67.6	55.0 / 54.4	-	Aug 1000	0.79
Zone 45	27.1	15.3	75.8 / 67.5	55.0 / 54.4	-	Jul 1000	0.80

Zone Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft²
Zone 46	44.4	28.2	75.4 / 68.7	62.9 / 62.3	-	Jul 1000	0.44
Zone 47	39.2	34.9	75.7 / 63.0	55.7 / 54.6	-	Jun 1800	2.45
Zone 48	27.2	15.5	75.8 / 67.4	55.0 / 54.4	-	Jul 1000	0.81
Zone 49	26.2	19.8	76.3 / 64.4	55.0 / 53.9	-	Jul 1000	0.86
Zone 50	2.7	1.5	76.0 / 67.3	55.0 / 54.3	-	Jul 1000	0.46
Zone 51	27.2	15.4	75.8 / 67.4	55.0 / 54.4	-	Jul 1000	0.80
Zone 52	27.1	15.3	75.8 / 67.5	55.0 / 54.4	-	Jul 1000	0.80
Zone 53	27.1	15.3	75.8 / 67.5	55.0 / 54.4	-	Jul 1000	0.80
Zone 54	27.2	15.4	75.8 / 67.4	55.0 / 54.4	-	Jul 1000	0.81
Zone 55	27.3	15.5	75.8 / 67.4	55.0 / 54.4	-	Jul 1000	0.83
Zone 56	23.6	12.3	75.4 / 68.2	55.0 / 54.5	-	Aug 1400	0.66
Zone 57	23.9	12.6	75.4 / 68.2	55.0 / 54.5	-	Aug 1400	0.63

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	2.0	70.0 / 74.3	-	432	0.000	0.000	365
Zone 2	6.2	69.8 / 80.1	-	560	0.000	0.000	360
Zone 3	0.8	70.0 / 74.7	-	165	0.000	0.000	165
Zone 4	0.0	0.0 / 0.0	0.00	133	0.000	0.000	45
Zone 5	0.0	0.0 / 0.0	0.00	41	0.000	0.000	15
Zone 6	0.0	0.0 / 0.0	0.00	28	0.000	0.000	25
Zone 7	10.4	69.7 / 86.2	-	585	0.000	0.000	370
Zone 8	0.0	0.0 / 0.0	0.00	414	0.000	0.000	400
Zone 9	9.8	69.7 / 83.4	-	666	0.000	0.000	360
Zone 10	38.3	69.4 / 86.3	-	2103	0.000	0.000	185
Zone 11	6.5	69.7 / 78.8	-	665	0.000	0.000	360
Zone 12	7.1	70.0 / 85.3	-	430	0.000	0.000	430
Zone 13	0.0	0.0 / 0.0	0.00	175	0.000	0.000	115
Zone 14	0.0	0.0 / 0.0	0.00	141	0.000	0.000	70
Zone 15	5.0	69.8 / 78.3	-	547	0.000	0.000	360
Zone 16	11.2	69.3 / 81.7	-	837	0.000	0.000	135
Zone 17	8.6	70.0 / 82.4	-	645	0.000	0.000	645
Zone 18	4.7	69.8 / 77.7	-	557	0.000	0.000	360
Zone 19	4.8	69.8 / 78.0	-	548	0.000	0.000	360
Zone 20	9.4	69.6 / 82.5	-	677	0.000	0.000	360
Zone 21	6.5	69.7 / 78.8	-	664	0.000	0.000	360
Zone 22	6.7	69.8 / 79.1	-	665	0.000	0.000	360
Zone 23	6.7	69.8 / 79.1	-	665	0.000	0.000	360
Zone 24	7.9	69.7 / 80.5	-	675	0.000	0.000	360
Zone 25	0.0	0.0 / 0.0	0.00	61	0.000	0.000	30
Zone 26	5.5	69.9 / 79.8	-	512	0.000	0.000	390
Zone 27	3.4	69.8 / 81.3	-	278	0.000	0.000	180
Zone 28	27.5	69.4 / 85.4	-	1594	0.000	0.000	160
Zone 29	6.7	69.8 / 79.1	-	665	0.000	0.000	360
Zone 30	7.2	69.7 / 79.7	-	666	0.000	0.000	360
Zone 31	4.6	69.8 / 77.6	-	546	0.000	0.000	360
Zone 32	5.1	69.9 / 78.3	-	557	0.000	0.000	360
Zone 33	4.9	69.9 / 78.1	-	548	0.000	0.000	360
Zone 34	7.2	70.0 / 74.7	-	1430	0.000	0.000	1430
Zone 35	1.6	70.0 / 73.2	-	470	0.000	0.000	470
Zone 36	0.5	70.0 / 80.2	-	50	0.000	0.000	50
Zone 37	6.4	70.0 / 74.1	-	1430	0.000	0.000	1430

Zone Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 38	15.2	69.3 / 86.3	-	834	0.000	0.000	135
Zone 39	0.0	0.0 / 0.0	0.00	61	0.000	0.000	30
Zone 40	7.1	69.7 / 79.6	-	668	0.000	0.000	360
Zone 41	6.7	69.8 / 79.1	-	665	0.000	0.000	360
Zone 42	6.7	69.8 / 79.1	-	665	0.000	0.000	360
Zone 43	8.1	69.6 / 80.4	-	696	0.000	0.000	360
Zone 44	8.0	69.7 / 80.8	-	665	0.000	0.000	360
Zone 45	8.3	69.7 / 81.0	-	683	0.000	0.000	360
Zone 46	37.2	69.1 / 85.7	-	2088	0.000	0.000	340
Zone 47	29.0	69.5 / 86.1	-	1618	0.000	0.000	160
Zone 48	9.4	69.7 / 82.5	-	688	0.000	0.000	360
Zone 49	12.9	69.2 / 83.2	-	858	0.000	0.000	135
Zone 50	0.3	70.0 / 74.3	-	68	0.000	0.000	30
Zone 51	8.8	69.7 / 81.5	-	685	0.000	0.000	360
Zone 52	8.1	69.7 / 80.7	-	683	0.000	0.000	360
Zone 53	8.1	69.7 / 80.7	-	683	0.000	0.000	360
Zone 54	10.8	69.7 / 84.2	-	687	0.000	0.000	360
Zone 55	9.4	69.6 / 82.1	-	691	0.000	0.000	360
Zone 56	6.6	69.8 / 80.7	-	562	0.000	0.000	360
Zone 57	6.8	69.8 / 80.8	-	572	0.000	0.000	360

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	676.3	56.4	440.8
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	676.3	56.4	440.8

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	9.3	Jul 1400	1.8	998.3
Zone 2	12.1	Sep 1400	6.6	837.7
Zone 3	3.2	Jul 1400	0.8	1430.1
Zone 4	2.9	Jan 1100	0.0	400.3
Zone 5	0.9	Jan 1100	0.0	82.1
Zone 6	0.6	Jan 1400	0.0	220.6
Zone 7	11.5	Jul 1400	10.7	981.4
Zone 8	8.9	Jan 1400	0.0	1208.2
Zone 9	14.4	Aug 1100	9.8	850.1
Zone 10	36.4	Jun 1800	38.6	1027.0
Zone 11	14.3	Aug 1100	6.8	848.5
Zone 12	2.9	Jul 1400	4.5	907.7
Zone 13	3.8	Jan 1400	0.0	500.2
Zone 14	3.0	Jan 1400	0.0	341.3
Zone 15	11.8	Oct 1400	5.4	837.7
Zone 16	18.1	Aug 1100	11.6	991.5
Zone 17	10.2	Jul 1500	7.6	3600.0

Zone Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 18	12.0	Oct 1400	5.2	904.5
Zone 19	11.8	Oct 1400	5.2	844.9
Zone 20	14.6	Aug 1100	9.7	852.4
Zone 21	14.3	Aug 1100	6.8	844.4
Zone 22	14.4	Aug 1100	6.8	852.5
Zone 23	14.4	Aug 1100	6.8	852.5
Zone 24	14.6	Aug 1100	8.3	858.4
Zone 25	1.3	Jan 1400	0.0	144.1
Zone 26	9.4	Jul 1100	5.0	4008.5
Zone 27	6.0	Jul 1100	3.6	2432.8
Zone 28	34.4	Jun 1800	27.7	665.8
Zone 29	14.4	Aug 1100	6.8	853.0
Zone 30	14.4	Aug 1100	7.6	850.1
Zone 31	11.8	Oct 1400	4.9	837.7
Zone 32	12.0	Oct 1400	5.1	904.5
Zone 33	11.8	Oct 1400	5.0	846.8
Zone 34	11.2	Jul 1400	2.8	1549.7
Zone 35	4.2	Jul 1400	0.9	468.8
Zone 36	1.1	Jul 1400	0.6	311.8
Zone 37	11.0	Jul 1400	2.4	1549.7
Zone 38	16.8	Aug 1100	15.3	993.4
Zone 39	1.3	Jan 1400	0.0	146.4
Zone 40	14.4	Aug 1100	7.5	858.4
Zone 41	14.4	Aug 1100	6.8	852.5
Zone 42	14.4	Aug 1100	6.8	852.5
Zone 43	15.0	Aug 1100	8.6	852.5
Zone 44	14.3	Aug 1100	8.1	836.8
Zone 45	14.7	Aug 1100	8.5	853.0
Zone 46	23.9	Jul 1400	38.3	4733.3
Zone 47	34.9	Jun 1800	29.3	659.1
Zone 48	14.9	Aug 1100	9.4	850.1
Zone 49	18.5	Aug 1100	13.6	993.2
Zone 50	1.5	Jul 1400	0.3	146.4
Zone 51	14.8	Aug 1100	9.2	858.4
Zone 52	14.7	Aug 1100	8.5	852.5
Zone 53	14.7	Aug 1100	8.5	852.5
Zone 54	14.8	Aug 1100	10.8	852.5
Zone 55	14.9	Aug 1100	9.9	836.8
Zone 56	12.1	Sep 1400	6.7	846.8
Zone 57	12.4	Sep 1400	6.9	904.8

Zone Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B103E RELATED CR	1	9.3	Jul 1400	432	1.8	998.3	0.43
Zone 2							
B409 CR	1	12.1	Sep 1400	560	6.6	837.7	0.67
Zone 3							
B111 CORRIDOR	1	3.2	Jul 1400	165	0.8	1430.1	0.12
Zone 4							
B118 BANK	1	2.9	Jan 1100	133	0.0	400.3	0.33
Zone 5							
B1 -2 Room - Bank Office	1	0.9	Jan 1100	41	0.0	82.1	0.50
Zone 6							
B121D STOR	1	0.6	Jan 1400	28	0.0	220.6	0.13
Zone 7							
B121E THEORY CR	1	11.5	Jul 1400	585	10.7	981.4	0.60
Zone 8							
B104G RELATED CR	1	8.9	Jan 1400	414	0.0	1208.2	0.34
Zone 9							
B233 CR	1	14.4	Aug 1100	666	9.8	850.1	0.78
Zone 10							
B230 COLLAB	1	36.4	Jun 1800	2103	38.6	1027.0	2.05
Zone 11							
A227 CR	1	14.3	Aug 1100	665	6.8	848.5	0.78
Zone 12							
A223 CORRIDOR	1	2.9	Jul 1400	430	4.5	907.7	0.47
Zone 13							
B215 SPED SMALL GROUP	1	3.8	Jan 1400	175	0.0	500.2	0.35
Zone 14							
B216 IN-HOUSE SUSPENSION	1	3.0	Jan 1400	141	0.0	341.3	0.41
Zone 15							
B211 CR	1	11.8	Oct 1400	547	5.4	837.7	0.65
Zone 16							
B234 TEACHERS PLANNING	1	18.1	Aug 1100	837	11.6	991.5	0.84
Zone 17							
B214 CORRIDOR	1	2.3	Jan 1400	215	0.0	922.2	0.23
B231 CORRIDOR	1	8.4	Jul 1700	430	7.6	2677.8	0.16
Zone 18							
B212 CR	1	12.0	Oct 1400	557	5.2	904.5	0.62
Zone 19							
B213 SPED LEARNING CENTE	1	11.8	Oct 1400	548	5.2	844.9	0.65
Zone 20							
B239 CR	1	14.6	Aug 1100	677	9.7	852.4	0.79
Zone 21							
B238 CR	1	14.3	Aug 1100	664	6.8	844.4	0.79
Zone 22							
B237 CR	1	14.4	Aug 1100	665	6.8	852.5	0.78
Zone 23							
B236 CR	1	14.4	Aug 1100	665	6.8	852.5	0.78
Zone 24							
B235 CR	1	14.6	Aug 1100	675	8.3	858.4	0.79
Zone 25							
B234B HUDDLE	1	1.3	Jan 1400	61	0.0	144.1	0.42
Zone 26							
D301 CORRIDOR	1	1.1	Jan 1400	53	0.0	413.6	0.13
B324 CORRIDOR	1	6.0	Jul 1100	279	5.0	2672.7	0.10
B312 CORRIDOR	1	2.3	Jan 1400	180	0.0	922.2	0.20

Zone Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 27							
A321 CORRIDOR	1	6.0	Jul 1100	278	3.6	2432.8	0.11
Zone 28							
B323 COLLAB	1	34.4	Jun 1800	1594	27.7	665.8	2.39
Zone 29							
B326 CR	1	14.4	Aug 1100	665	6.8	853.0	0.78
Zone 30							
B327 CR	1	14.4	Aug 1100	666	7.6	850.1	0.78
Zone 31							
B309 CR	1	11.8	Oct 1400	546	4.9	837.7	0.65
Zone 32							
B310 CR	1	12.0	Oct 1400	557	5.1	904.5	0.62
Zone 33							
B311 SPED LEARNING CENTE	1	11.8	Oct 1400	548	5.0	846.8	0.65
Zone 34							
B315 SCI LAB	1	11.2	Jul 1400	1430	2.8	1549.7	0.92
Zone 35							
B316 SCI PREP	1	4.2	Jul 1400	470	0.9	468.8	1.00
Zone 36							
B317 STOR	1	1.1	Jul 1400	50	0.6	311.8	0.16
Zone 37							
B322 SCI LAB	1	11.0	Jul 1400	1430	2.4	1549.7	0.92
Zone 38							
B328 TEACHERS PLANNING	1	16.8	Aug 1100	834	15.3	993.4	0.84
Zone 39							
B328B HUDDLE	1	1.3	Jan 1400	61	0.0	146.4	0.42
Zone 40							
B329 CR	1	14.4	Aug 1100	668	7.5	858.4	0.78
Zone 41							
B330 CR	1	14.4	Aug 1100	665	6.8	852.5	0.78
Zone 42							
B331 CR	1	14.4	Aug 1100	665	6.8	852.5	0.78
Zone 43							
B332 CR	1	15.0	Aug 1100	696	8.6	852.5	0.82
Zone 44							
B333 CR	1	14.3	Aug 1100	665	8.1	836.8	0.79
Zone 45							
A432 CR	1	14.7	Aug 1100	683	8.5	853.0	0.80
Zone 46							
A428 CORRIDOR	1	3.8	Jul 1400	292	5.4	901.3	0.32
B420 CORRIDOR	1	11.3	Jul 1400	804	14.7	3084.2	0.26
B412 CORRIDOR	1	8.7	Jul 1400	992	18.2	747.8	1.33
Zone 47							
B419 COLLAB	1	34.9	Jun 1800	1618	29.3	659.1	2.45
Zone 48							
B422 CR	1	14.9	Aug 1100	688	9.4	850.1	0.81
Zone 49							
B423 TEACHERS PLANNING	1	18.5	Aug 1100	858	13.6	993.2	0.86
Zone 50							
B423B HUDDLE	1	1.5	Jul 1400	68	0.3	146.4	0.46
Zone 51							
B424 CR	1	14.8	Aug 1100	685	9.2	858.4	0.80
Zone 52							
B425 CR	1	14.7	Aug 1100	683	8.5	852.5	0.80
Zone 53							
B426 CR	1	14.7	Aug 1100	683	8.5	852.5	0.80
Zone 54							

Zone Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
B427 CR	1	14.8	Aug 1100	687	10.8	852.5	0.81
Zone 55							
B428 CR	1	14.9	Aug 1100	691	9.9	836.8	0.83
Zone 56							
B411 SPED LEARNING CENTE	1	12.1	Sep 1400	562	6.7	846.8	0.66
Zone 57							
B410 CR	1	12.4	Sep 1400	572	6.9	904.8	0.63

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

1. Summary

Ventilation Sizing Method **Sum of Space OA Airflows**
Design Ventilation Airflow Rate **18735** CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
B103E RELATED CR	1	998.3	25.0	432.3	0.00	0.00	365.0	0.0	365.0
Totals (incl. Space Multipliers)				432.3					365.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
B409 CR	1	837.7	25.0	559.9	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				559.9					360.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
B111 CORRIDOR	1	1430.1	0.0	165.0	0.00	0.00	165.0	0.0	165.0
Totals (incl. Space Multipliers)				165.0					165.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
B118 BANK	1	400.3	4.0	133.1	0.00	0.00	45.0	0.0	45.0
Totals (incl. Space Multipliers)				133.1					45.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
B1 -2 Room - Bank Office	1	82.1	1.0	40.9	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				40.9					15.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
B121D STOR	1	220.6	1.0	27.6	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				27.6					25.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
B121E THEORY CR	1	981.4	25.0	584.9	0.00	0.00	370.0	0.0	370.0
Totals (incl. Space Multipliers)				584.9					370.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
B104G RELATED CR	1	1208.2	25.0	413.7	0.00	0.00	400.0	0.0	400.0
Totals (incl. Space Multipliers)				413.7					400.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
B233 CR	1	850.1	25.0	665.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				665.8					360.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
B230 COLLAB	1	1027.0	24.0	2102.9	0.00	0.00	185.0	0.0	185.0
Totals (incl. Space Multipliers)				2102.9					185.0

2.11 Zone: Zone 11

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 11									
A227 CR	1	848.5	25.0	664.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				664.8					360.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.12 Zone: Zone 12

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 12									
A223 CORRIDOR	1	907.7	3.0	430.0	0.00	0.00	430.0	0.0	430.0
Totals (incl. Space Multipliers)				430.0					430.0

2.13 Zone: Zone 13

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 13									
B215 SPED SMALL GROUP	1	500.2	9.0	174.8	0.00	0.00	115.0	0.0	115.0
Totals (incl. Space Multipliers)				174.8					115.0

2.14 Zone: Zone 14

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 14									
B216 IN-HOUSE SUSPENSION	1	341.3	9.0	140.7	0.00	0.00	70.0	0.0	70.0
Totals (incl. Space Multipliers)				140.7					70.0

2.15 Zone: Zone 15

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 15									
B211 CR	1	837.7	25.0	546.6	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				546.6					360.0

2.16 Zone: Zone 16

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 16									
B234 TEACHERS PLANNING	1	991.5	15.0	836.7	0.00	0.00	135.0	0.0	135.0
Totals (incl. Space Multipliers)				836.7					135.0

2.17 Zone: Zone 17

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 17									
B214 CORRIDOR	1	922.2	3.0	215.0	0.00	0.00	215.0	0.0	215.0
B231 CORRIDOR	1	2677.8	3.0	430.0	0.00	0.00	430.0	0.0	430.0
Totals (incl. Space Multipliers)				645.0					645.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.18 Zone: Zone 18

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 18									
B212 CR	1	904.5	25.0	556.7	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				556.7					360.0

2.19 Zone: Zone 19

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 19									
B213 SPED LEARNING CENTE	1	844.9	25.0	547.6	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				547.6					360.0

2.20 Zone: Zone 20

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 20									
B239 CR	1	852.4	25.0	676.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				676.8					360.0

2.21 Zone: Zone 21

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 21									
B238 CR	1	844.4	25.0	663.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				663.8					360.0

2.22 Zone: Zone 22

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 22									
B237 CR	1	852.5	25.0	665.1	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				665.1					360.0

2.23 Zone: Zone 23

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 23									
B236 CR	1	852.5	25.0	665.1	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				665.1					360.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.24 Zone: Zone 24

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 24									
B235 CR	1	858.4	25.0	674.7	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				674.7					360.0

2.25 Zone: Zone 25

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 25									
B234B HUDDLE	1	144.1	4.0	60.9	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				60.9					30.0

2.26 Zone: Zone 26

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 26									
D301 CORRIDOR	1	413.6	2.0	52.7	0.00	0.00	30.0	0.0	30.0
B324 CORRIDOR	1	2672.7	3.0	278.9	0.00	0.00	180.0	0.0	180.0
B312 CORRIDOR	1	922.2	3.0	180.0	0.00	0.00	180.0	0.0	180.0
Totals (incl. Space Multipliers)				511.6					390.0

2.27 Zone: Zone 27

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 27									
A321 CORRIDOR	1	2432.8	6.0	277.7	0.00	0.00	180.0	0.0	180.0
Totals (incl. Space Multipliers)				277.7					180.0

2.28 Zone: Zone 28

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 28									
B323 COLLAB	1	665.8	24.0	1593.8	0.00	0.00	160.0	0.0	160.0
Totals (incl. Space Multipliers)				1593.8					160.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.29 Zone: Zone 29

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 29									
B326 CR	1	853.0	25.0	665.2	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				665.2					360.0

2.30 Zone: Zone 30

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 30									
B327 CR	1	850.1	25.0	665.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				665.8					360.0

2.31 Zone: Zone 31

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 31									
B309 CR	1	837.7	25.0	546.3	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				546.3					360.0

2.32 Zone: Zone 32

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 32									
B310 CR	1	904.5	25.0	556.6	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				556.6					360.0

2.33 Zone: Zone 33

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 33									
B311 SPED LEARNING CENTE	1	846.8	25.0	547.7	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				547.7					360.0

2.34 Zone: Zone 34

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 34									
B315 SCI LAB	1	1549.7	25.0	1430.0	0.00	0.00	1430.0	0.0	1430.0
Totals (incl. Space Multipliers)				1430.0					1430.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.35 Zone: Zone 35

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 35									
B316 SCI PREP	1	468.8	2.0	470.0	0.00	0.00	470.0	0.0	470.0
Totals (incl. Space Multipliers)				470.0					470.0

2.36 Zone: Zone 36

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 36									
B317 STOR	1	311.8	1.0	50.0	0.00	0.00	50.0	0.0	50.0
Totals (incl. Space Multipliers)				50.0					50.0

2.37 Zone: Zone 37

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 37									
B322 SCI LAB	1	1549.7	25.0	1430.0	0.00	0.00	1430.0	0.0	1430.0
Totals (incl. Space Multipliers)				1430.0					1430.0

2.38 Zone: Zone 38

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 38									
B328 TEACHERS PLANNING	1	993.4	15.0	833.6	0.00	0.00	135.0	0.0	135.0
Totals (incl. Space Multipliers)				833.6					135.0

2.39 Zone: Zone 39

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 39									
B328B HUDDLE	1	146.4	4.0	61.4	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				61.4					30.0

2.40 Zone: Zone 40

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 40									
B329 CR	1	858.4	25.0	667.6	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				667.6					360.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.41 Zone: Zone 41

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 41									
B330 CR	1	852.5	25.0	665.1	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				665.1					360.0

2.42 Zone: Zone 42

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 42									
B331 CR	1	852.5	25.0	665.1	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				665.1					360.0

2.43 Zone: Zone 43

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 43									
B332 CR	1	852.5	25.0	695.7	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				695.7					360.0

2.44 Zone: Zone 44

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 44									
B333 CR	1	836.8	25.0	664.7	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				664.7					360.0

2.45 Zone: Zone 45

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 45									
A432 CR	1	853.0	25.0	682.9	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				682.9					360.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.46 Zone: Zone 46

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 46									
A428 CORRIDOR	1	901.3	6.0	292.5	0.00	0.00	100.0	0.0	100.0
B420 CORRIDOR	1	3084.2	3.0	804.1	0.00	0.00	140.0	0.0	140.0
B412 CORRIDOR	1	747.8	3.0	991.6	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				2088.1					340.0

2.47 Zone: Zone 47

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 47									
B419 COLLAB	1	659.1	24.0	1617.6	0.00	0.00	160.0	0.0	160.0
Totals (incl. Space Multipliers)				1617.6					160.0

2.48 Zone: Zone 48

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 48									
B422 CR	1	850.1	25.0	688.4	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				688.4					360.0

2.49 Zone: Zone 49

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 49									
B423 TEACHERS PLANNING	1	993.2	15.0	858.0	0.00	0.00	135.0	0.0	135.0
Totals (incl. Space Multipliers)				858.0					135.0

2.50 Zone: Zone 50

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 50									
B423B HUDDLE	1	146.4	4.0	67.9	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				67.9					30.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.51 Zone: Zone 51

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 51									
B424 CR	1	858.4	25.0	685.4	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				685.4					360.0

2.52 Zone: Zone 52

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 52									
B425 CR	1	852.5	25.0	682.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				682.8					360.0

2.53 Zone: Zone 53

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 53									
B426 CR	1	852.5	25.0	682.8	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				682.8					360.0

2.54 Zone: Zone 54

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 54									
B427 CR	1	852.5	25.0	686.9	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				686.9					360.0

2.55 Zone: Zone 55

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 55									
B428 CR	1	836.8	25.0	690.9	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				690.9					360.0

2.56 Zone: Zone 56

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 56									
B411 SPED LEARNING CENTE	1	846.8	25.0	561.9	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				561.9					360.0

Ventilation Sizing Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:32PM

2.57 Zone: Zone 57

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 57									
B410 CR	1	904.8	25.0	572.4	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				572.4					360.0

Air System Design Load Summary for HRU-2 Classrooms B

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1000 COOLING OA DB / WB 76.1 °F / 70.9 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	8306 ft²	196616	-	8306 ft²	-	-
Wall Transmission	13569 ft²	9595	-	13569 ft²	60106	-
Roof Transmission	20141 ft²	6252	-	20141 ft²	33376	-
Window Transmission	8306 ft²	2228	-	8306 ft²	167448	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	74 ft²	542	-	74 ft²	3704	-
Floor Transmission	5321 ft²	0	-	5321 ft²	952	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	43417 W	104861	-	0	0	-
Task Lighting	17773 W	50724	-	0	0	-
Electric Equipment	11293 W	33632	-	0	0	-
People	959	144415	151263	0	0	0
Infiltration	-	0	2	-	132867	0
Miscellaneous	-	3600	0	-	0	0
Safety Factor	5% / 5%	27623	7563	10%	39845	0
>> Total Zone Loads	-	580089	158829	-	438297	0
Zone Conditioning	-	689755	158829	-	435405	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	18735 CFM	34883	-	18735 CFM	-34883	-
Ventilation Load	18735 CFM	-37408	357134	18735 CFM	337300	0
Ventilation Fan Load	18735 CFM	52324	-	18735 CFM	-52324	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	739555	515962	-	685499	0
Cooling Coil	-	75305	0	-	0	0
Heating Coil	-	0	-	-	261015	-
Terminal Unit Cooling	-	676340	516044	-	0	0
Terminal Unit Heating	-	0	-	-	440770	-
>> Total Conditioning	-	751645	516044	-	701785	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/13/2023

01:35PM

Air System Information

Air System Name **HRU-3 Classrooms Plan North**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **80**
Floor Area **53364.8** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **13.7** Tons
Total coil load **164.7** MBH
Total coil load **1412.8** CFM/Ton
Sensible coil load **164.7** MBH
Coil CFM at Jul 1400 **19395** CFM
Max coil CFM **19395** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.3 / 72.1** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **270.4** MBH
Coil CFM at Des Htg **19395** CFM
Max coil CFM **19395** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.5 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **19395** CFM
Standard CFM **19374** CFM
Actual max CFM/ft² **0.36** CFM/ft²

Fan motor BHP **20.01** BHP
Fan motor kW **15.88** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **19395** CFM
Standard CFM **19374** CFM
Actual max CFM/ft² **0.36** CFM/ft²

Fan motor BHP **13.34** BHP
Fan motor kW **10.58** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **19395** CFM
CFM/ft² **0.36** CFM/ft²

CFM/person **25.59** CFM/person

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Air System Information

Air System Name **HRU-3 Classrooms Plan North**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **80**
Floor Area **53364.8** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	33.2	20.8	76.0 / 66.4	55.0 / 54.2	-	Jul 1000	0.94
Zone 2	3.7	1.8	75.5 / 69.4	55.0 / 54.7	-	Aug 1200	0.29
Zone 3	4.3	3.1	76.4 / 64.9	55.0 / 54.0	-	Aug 1000	0.91
Zone 4	39.4	23.3	76.2 / 67.1	55.0 / 54.3	-	Jul 1000	0.57
Zone 5	16.5	7.1	75.0 / 70.7	55.0 / 54.9	-	Jul 1200	0.50
Zone 6	34.6	21.7	76.1 / 66.3	55.0 / 54.2	-	Jul 1000	0.88
Zone 7	40.5	20.4	75.4 / 68.7	55.0 / 54.6	-	Jul 1000	0.38
Zone 8	16.5	7.1	75.0 / 70.7	55.0 / 54.9	-	Jul 1200	0.55
Zone 9	32.1	19.5	76.0 / 66.6	55.0 / 54.3	-	Jul 1000	0.85
Zone 10	5.5	4.8	75.7 / 64.8	59.1 / 58.1	-	Aug 1000	1.78
Zone 11	6.3	5.5	76.1 / 62.9	55.0 / 53.8	-	Aug 1000	1.52
Zone 12	53.4	27.7	75.6 / 68.5	55.0 / 54.5	-	Jul 1000	0.80
Zone 13	4.3	3.1	76.4 / 64.9	55.0 / 54.0	-	Aug 1000	0.93
Zone 14	33.5	20.8	76.0 / 66.4	55.0 / 54.2	-	Jul 1000	0.91
Zone 15	19.9	12.3	75.4 / 66.2	55.0 / 54.3	-	Jul 1200	0.78
Zone 16	18.7	11.2	76.1 / 66.9	55.0 / 54.3	-	Jul 1000	0.68
Zone 17	4.4	3.3	76.5 / 64.4	55.0 / 53.9	-	Aug 1000	0.94
Zone 18	11.1	5.8	75.9 / 68.4	55.0 / 54.5	-	Aug 1000	0.51
Zone 19	16.0	6.9	75.0 / 70.7	55.0 / 54.9	-	Jul 1200	0.57
Zone 20	3.4	2.5	76.7 / 64.8	55.0 / 54.0	-	Aug 1000	0.71
Zone 21	18.7	11.2	76.0 / 66.9	55.0 / 54.3	-	Jul 1000	0.69
Zone 22	18.8	11.3	76.0 / 66.8	55.0 / 54.3	-	Jul 1000	0.72
Zone 23	7.8	3.6	75.3 / 69.9	55.0 / 54.8	-	Aug 1200	0.34
Zone 24	15.8	6.8	75.0 / 70.7	55.0 / 54.9	-	Jul 1200	0.59
Zone 25	29.2	16.3	76.0 / 67.8	55.0 / 54.4	-	Jul 1000	0.49
Zone 26	6.6	5.6	75.5 / 64.7	58.4 / 57.3	-	Jul 1000	1.99
Zone 27	5.6	4.8	75.9 / 63.3	55.6 / 54.4	-	Aug 1000	1.35
Zone 28	6.3	5.5	76.1 / 62.9	55.0 / 53.8	-	Aug 1000	1.52
Zone 29	46.9	21.9	75.0 / 70.6	62.2 / 61.9	-	Jul 0900	1.07
Zone 30	4.3	2.0	75.0 / 70.6	62.6 / 62.2	-	Jul 1000	0.99
Zone 31	13.4	5.8	75.0 / 70.6	55.0 / 54.9	-	Jul 1500	1.00
Zone 32	12.1	5.3	75.0 / 70.7	58.6 / 58.3	-	Jul 1300	1.04
Zone 33	4.3	3.1	76.4 / 64.9	55.0 / 54.0	-	Aug 1000	0.88
Zone 34	46.5	21.7	75.0 / 70.6	62.3 / 62.0	-	Jul 0900	1.08
Zone 35	30.0	19.4	76.2 / 66.0	55.0 / 54.2	-	Jul 1000	0.41
Zone 36	5.5	4.8	75.7 / 64.8	59.1 / 58.0	-	Jul 1000	1.77
Zone 37	3.5	2.9	75.4 / 67.0	62.8 / 62.0	-	Jul 1300	1.37
Zone 38	3.0	2.4	75.5 / 63.8	55.2 / 54.2	-	Jul 1800	1.11
Zone 39	3.8	2.8	75.4 / 66.2	59.2 / 58.4	-	Jul 1700	0.83
Zone 40	9.7	5.7	76.2 / 67.2	55.0 / 54.3	-	Aug 1000	0.55
Zone 41	5.4	3.9	76.4 / 65.0	55.0 / 54.0	-	Aug 1000	0.89
Zone 42	26.8	13.0	75.4 / 69.3	55.0 / 54.7	-	Jul 1200	0.39
Zone 43	27.2	13.2	75.5 / 69.3	55.0 / 54.7	-	Jul 1200	0.36
Zone 44	1.9	1.0	75.9 / 68.7	55.0 / 54.5	-	Aug 1000	0.24
Zone 45	1.0	0.5	75.0 / 70.6	58.2 / 58.0	-	Jul 0900	0.45

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft²
Zone 46	3.7	2.4	76.5 / 66.5	55.0 / 54.2	-	Aug 1000	0.49
Zone 47	19.1	8.5	75.0 / 70.6	59.7 / 59.4	-	Jul 1800	1.00
Zone 48	22.6	10.8	75.4 / 69.5	55.0 / 54.7	-	Jul 1200	0.42
Zone 49	29.6	15.4	75.8 / 68.6	55.0 / 54.5	-	Jul 1000	0.41
Zone 50	35.6	20.6	75.5 / 67.2	55.7 / 55.1	-	Jul 0900	0.57
Zone 51	23.2	17.2	76.9 / 64.8	55.0 / 53.9	-	Jul 1000	0.48
Zone 52	3.4	2.9	75.5 / 67.1	63.0 / 62.2	-	Jul 1300	1.35
Zone 53	5.5	4.7	76.2 / 63.2	55.0 / 53.8	-	Aug 1000	1.27
Zone 54	6.8	5.6	75.5 / 64.2	57.3 / 56.3	-	Aug 1000	1.91
Zone 55	3.6	1.6	75.0 / 70.6	60.2 / 59.9	-	Jul 0900	0.20
Zone 56	22.2	10.9	75.3 / 69.1	55.0 / 54.6	-	Jul 1200	0.51
Zone 57	5.2	2.7	75.7 / 68.3	55.0 / 54.5	-	Jul 1000	0.43
Zone 58	4.6	3.1	75.5 / 65.1	55.0 / 54.1	-	Aug 1000	0.98
Zone 59	38.9	17.2	75.1 / 70.4	55.0 / 54.9	-	Jul 1200	0.50
Zone 60	38.7	17.0	75.1 / 70.4	55.0 / 54.9	-	Jul 1200	0.50
Zone 61	4.9	3.5	76.3 / 65.1	55.0 / 54.0	-	Jul 1000	0.75
Zone 62	4.0	1.8	75.0 / 70.6	58.6 / 58.4	-	Jul 1400	0.20
Zone 63	4.6	2.1	75.0 / 70.6	60.2 / 59.9	-	Jul 1100	0.72
Zone 64	26.1	17.2	76.3 / 65.8	55.0 / 54.1	-	Jul 1000	0.63
Zone 65	3.5	2.1	75.4 / 66.4	55.0 / 54.3	-	Aug 1100	0.67
Zone 66	5.5	4.9	75.4 / 67.2	63.7 / 62.9	-	Aug 1000	2.58
Zone 67	6.3	5.6	75.8 / 64.3	58.2 / 57.1	-	Aug 1100	1.88
Zone 68	21.3	10.4	75.3 / 69.1	55.0 / 54.7	-	Jul 1200	0.54
Zone 69	4.5	2.3	75.5 / 68.8	55.0 / 54.6	-	Jul 1200	0.46
Zone 70	34.4	20.5	75.8 / 66.8	55.0 / 54.3	-	Jul 1000	0.69
Zone 71	31.4	17.6	75.5 / 67.4	55.0 / 54.4	-	Jul 0900	0.59
Zone 72	33.5	19.7	75.8 / 66.9	55.0 / 54.3	-	Jul 1000	0.70
Zone 73	3.3	2.5	76.3 / 64.5	55.0 / 54.0	-	Jul 1000	0.88
Zone 74	21.2	12.0	75.3 / 68.2	59.1 / 58.5	-	Aug 1000	0.72
Zone 75	40.6	31.4	75.7 / 64.7	57.0 / 56.0	-	Jul 1000	1.08
Zone 76	2.5	1.1	75.0 / 70.6	58.0 / 57.8	-	Jul 1400	0.21
Zone 77	6.3	5.5	76.0 / 62.9	55.0 / 53.8	-	Aug 1000	1.53
Zone 78	5.6	4.8	75.9 / 63.3	55.5 / 54.4	-	Aug 1000	1.36
Zone 79	6.3	5.6	75.7 / 64.5	58.8 / 57.7	-	Aug 1100	2.05
Zone 80	24.6	11.4	75.1 / 69.7	55.0 / 54.8	-	Jul 1500	0.93

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	6.0	70.0 / 76.1	-	915	0.000	0.000	370
Zone 2	0.0	0.0 / 0.0	0.00	80	0.000	0.000	60
Zone 3	0.0	0.0 / 0.0	0.00	135	0.000	0.000	30
Zone 4	10.9	69.8 / 79.7	-	1017	0.000	0.000	465
Zone 5	0.0	0.0 / 0.0	0.00	330	0.000	0.000	330
Zone 6	10.3	69.6 / 79.6	-	953	0.000	0.000	380
Zone 7	13.0	69.8 / 82.8	-	927	0.000	0.000	630
Zone 8	0.0	0.0 / 0.0	0.00	330	0.000	0.000	330
Zone 9	7.4	69.8 / 77.7	-	862	0.000	0.000	375
Zone 10	4.9	69.4 / 86.2	-	268	0.000	0.000	15
Zone 11	3.9	69.3 / 84.5	-	240	0.000	0.000	15
Zone 12	6.3	69.9 / 74.6	-	1244	0.000	0.000	845
Zone 13	0.0	0.0 / 0.0	0.00	133	0.000	0.000	30
Zone 14	5.6	70.0 / 75.6	-	917	0.000	0.000	375

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 15	5.4	69.7 / 78.7	-	560	0.000	0.000	220
Zone 16	5.6	69.7 / 80.2	-	495	0.000	0.000	220
Zone 17	0.0	0.0 / 0.0	0.00	142	0.000	0.000	25
Zone 18	0.0	0.0 / 0.0	0.00	260	0.000	0.000	165
Zone 19	0.0	0.0 / 0.0	0.00	320	0.000	0.000	320
Zone 20	0.0	0.0 / 0.0	0.00	107	0.000	0.000	20
Zone 21	5.4	69.6 / 79.8	-	495	0.000	0.000	220
Zone 22	7.5	69.6 / 83.6	-	498	0.000	0.000	220
Zone 23	0.0	0.0 / 0.0	0.00	166	0.000	0.000	140
Zone 24	0.0	0.0 / 0.0	0.00	315	0.000	0.000	315
Zone 25	10.5	69.6 / 83.1	-	718	0.000	0.000	385
Zone 26	5.4	69.4 / 86.3	-	300	0.000	0.000	30
Zone 27	3.9	69.0 / 85.6	-	217	0.000	0.000	15
Zone 28	4.0	69.0 / 84.2	-	240	0.000	0.000	15
Zone 29	19.3	70.0 / 81.3	-	1585	0.000	0.000	1585
Zone 30	0.0	0.0 / 0.0	0.00	150	0.000	0.000	150
Zone 31	3.3	70.0 / 81.3	-	270	0.000	0.000	270
Zone 32	0.0	0.0 / 0.0	0.00	300	0.000	0.000	300
Zone 33	0.0	0.0 / 0.0	0.00	135	0.000	0.000	30
Zone 34	18.9	70.0 / 81.1	-	1585	0.000	0.000	1585
Zone 35	9.5	69.6 / 80.0	-	849	0.000	0.000	235
Zone 36	4.9	69.4 / 86.2	-	268	0.000	0.000	15
Zone 37	3.9	69.0 / 85.6	-	216	0.000	0.000	15
Zone 38	1.9	69.4 / 86.2	-	107	0.000	0.000	20
Zone 39	2.8	69.4 / 86.2	-	158	0.000	0.000	45
Zone 40	0.0	0.0 / 0.0	0.00	250	0.000	0.000	115
Zone 41	0.0	0.0 / 0.0	0.00	168	0.000	0.000	40
Zone 42	7.6	69.8 / 81.8	-	588	0.000	0.000	450
Zone 43	7.4	69.8 / 81.4	-	597	0.000	0.000	450
Zone 44	0.0	0.0 / 0.0	0.00	43	0.000	0.000	25
Zone 45	0.0	0.0 / 0.0	0.00	25	0.000	0.000	25
Zone 46	0.0	0.0 / 0.0	0.00	101	0.000	0.000	35
Zone 47	7.1	70.0 / 82.8	-	515	0.000	0.000	515
Zone 48	7.0	69.9 / 83.1	-	491	0.000	0.000	390
Zone 49	8.4	69.8 / 81.1	-	687	0.000	0.000	440
Zone 50	14.4	69.6 / 83.4	-	966	0.000	0.000	455
Zone 51	10.4	69.3 / 82.6	-	728	0.000	0.000	95
Zone 52	3.9	69.0 / 85.6	-	214	0.000	0.000	15
Zone 53	3.6	69.1 / 85.6	-	205	0.000	0.000	15
Zone 54	5.2	69.4 / 86.2	-	288	0.000	0.000	30
Zone 55	0.0	0.0 / 0.0	0.00	100	0.000	0.000	100
Zone 56	6.6	69.8 / 82.2	-	496	0.000	0.000	370
Zone 57	0.5	69.9 / 73.8	-	122	0.000	0.000	75
Zone 58	0.3	69.9 / 71.7	-	141	0.000	0.000	40
Zone 59	12.6	70.0 / 84.7	-	793	0.000	0.000	750
Zone 60	11.9	70.0 / 84.0	-	787	0.000	0.000	750
Zone 61	0.4	70.1 / 72.5	-	151	0.000	0.000	35
Zone 62	1.1	70.0 / 80.2	-	100	0.000	0.000	100
Zone 63	0.5	70.0 / 73.4	-	130	0.000	0.000	130
Zone 64	11.4	69.5 / 83.7	-	748	0.000	0.000	230
Zone 65	0.2	69.9 / 72.2	-	95	0.000	0.000	40
Zone 66	7.1	69.3 / 86.3	-	388	0.000	0.000	15
Zone 67	5.4	69.4 / 86.3	-	295	0.000	0.000	15
Zone 68	6.7	69.8 / 83.0	-	474	0.000	0.000	360
Zone 69	0.4	70.0 / 74.0	-	102	0.000	0.000	70

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 70	10.4	69.7 / 80.3	-	911	0.000	0.000	410
Zone 71	14.2	69.6 / 86.1	-	798	0.000	0.000	415
Zone 72	9.9	69.6 / 80.1	-	880	0.000	0.000	410
Zone 73	0.2	69.8 / 71.3	-	108	0.000	0.000	20
Zone 74	12.2	69.6 / 86.0	-	690	0.000	0.000	360
Zone 75	27.5	69.1 / 85.4	-	1562	0.000	0.000	230
Zone 76	0.6	70.0 / 79.7	-	60	0.000	0.000	60
Zone 77	4.1	68.9 / 84.7	-	243	0.000	0.000	15
Zone 78	3.9	69.0 / 85.6	-	218	0.000	0.000	15
Zone 79	5.6	69.4 / 86.2	-	309	0.000	0.000	15
Zone 80	5.7	69.9 / 80.0	-	524	0.000	0.000	460

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	738.1	61.5	415.4
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	738.1	61.5	415.4

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	19.7	Jul 1100	6.0	978.4
Zone 2	1.7	Jan 1400	0.0	278.9
Zone 3	2.9	Jan 1100	0.0	148.0
Zone 4	21.9	Jul 1100	10.8	1784.1
Zone 5	6.8	Jan 1400	0.0	659.3
Zone 6	20.6	Jul 1400	10.8	1082.5
Zone 7	17.6	Aug 1100	12.1	2459.7
Zone 8	6.6	Jan 1400	0.0	601.1
Zone 9	18.6	Jul 1400	7.4	1009.1
Zone 10	4.4	Aug 1100	4.9	150.5
Zone 11	5.2	Aug 1100	4.0	157.3
Zone 12	26.8	Jul 1100	6.5	1553.2
Zone 13	2.9	Jan 1100	0.0	143.7
Zone 14	19.8	Jul 1100	5.6	1007.7
Zone 15	12.1	Jul 1600	5.7	713.4
Zone 16	10.7	Jul 1400	5.7	727.3
Zone 17	3.1	Jan 1100	0.0	151.0
Zone 18	5.6	Jan 1100	0.0	510.5
Zone 19	6.5	Jan 1400	0.0	560.7
Zone 20	2.3	Jan 1100	0.0	151.0
Zone 21	10.7	Jul 1400	5.7	721.7
Zone 22	10.8	Jul 1400	7.7	696.6
Zone 23	3.6	Jan 1100	0.0	490.1
Zone 24	6.4	Jan 1400	0.0	530.1
Zone 25	15.5	Aug 1100	11.3	1452.8
Zone 26	5.2	Aug 1100	5.5	150.5

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 27	4.4	Aug 1100	4.0	160.7
Zone 28	5.2	Aug 1100	4.1	158.7
Zone 29	13.9	Jul 1400	8.5	1483.6
Zone 30	1.4	Jan 1400	0.0	151.1
Zone 31	5.6	Jul 1500	3.6	270.2
Zone 32	4.8	Jan 1100	0.0	287.9
Zone 33	2.9	Jan 1100	0.0	153.7
Zone 34	13.8	Jul 1400	7.8	1466.3
Zone 35	17.3	Aug 1100	9.1	2070.4
Zone 36	4.4	Aug 1100	4.9	151.3
Zone 37	2.7	Jul 1400	4.0	157.2
Zone 38	2.3	Jun 1800	2.0	96.4
Zone 39	2.7	Jun 1800	2.9	189.2
Zone 40	5.4	Jan 1100	0.0	452.1
Zone 41	3.6	Jan 1100	0.0	188.5
Zone 42	12.7	Jul 1400	8.3	1501.1
Zone 43	12.9	Jul 1400	7.7	1651.5
Zone 44	0.9	Jan 1400	0.0	181.1
Zone 45	0.3	Jan 1400	0.0	56.0
Zone 46	2.2	Jan 1100	0.0	205.3
Zone 47	8.1	Jun 1800	5.5	514.8
Zone 48	10.6	Jul 1400	7.2	1159.5
Zone 49	14.8	Jul 1400	8.6	1668.3
Zone 50	20.8	Jun 1700	14.7	1701.6
Zone 51	15.7	Aug 1100	10.7	1502.1
Zone 52	2.7	Jul 1400	3.9	158.7
Zone 53	4.4	Aug 1100	3.6	160.7
Zone 54	5.2	Aug 1100	5.3	150.5
Zone 55	1.1	Jan 1100	0.0	496.8
Zone 56	10.7	Jul 1400	7.3	981.9
Zone 57	2.6	Jul 1400	0.5	285.3
Zone 58	3.0	Jul 1400	0.3	142.9
Zone 59	17.1	Jul 1400	12.7	1584.5
Zone 60	17.0	Jul 1400	12.9	1558.1
Zone 61	3.3	Jul 1100	0.4	200.9
Zone 62	1.6	Jul 1400	0.9	496.8
Zone 63	1.6	Jul 1400	0.3	180.5
Zone 64	16.1	Aug 1100	11.6	1180.0
Zone 65	2.1	Jul 1400	0.3	142.7
Zone 66	4.5	Aug 1100	7.1	150.5
Zone 67	5.2	Aug 1100	5.4	157.2
Zone 68	10.2	Jul 1400	7.0	870.5
Zone 69	2.2	Jul 1400	0.4	223.8
Zone 70	19.7	Jul 1400	10.6	1327.5
Zone 71	14.9	Jul 1400	14.6	1360.5
Zone 72	19.0	Jul 1400	10.3	1258.4
Zone 73	2.3	Jul 1100	0.2	123.1
Zone 74	11.0	Jul 1400	12.6	961.2
Zone 75	27.7	Aug 1100	28.6	1440.4
Zone 76	1.0	Jul 1400	0.5	290.6
Zone 77	5.3	Aug 1100	4.3	158.7
Zone 78	4.5	Aug 1100	4.0	160.7
Zone 79	5.3	Aug 1100	5.7	150.5
Zone 80	11.3	Jul 1600	6.3	563.4

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
A206F COMPUTER LAB	1	19.7	Jul 1100	915	6.0	978.4	0.94
Zone 2							
a206e photo stor	1	1.7	Jan 1400	80	0.0	278.9	0.29
Zone 3							
A148M (2nd flr. Voc. CR)	1	2.9	Jan 1100	135	0.0	148.0	0.91
Zone 4							
A206 DES. AND VIS. COMM.	1	21.9	Jul 1100	1017	10.8	1784.1	0.57
Zone 5							
A206A RELATED CR	1	6.8	Jan 1400	330	0.0	659.3	0.50
Zone 6							
A206B COMPUTER LAB	1	20.6	Jul 1400	953	10.8	1082.5	0.88
Zone 7							
A207A CORRIDOR	1	14.6	Aug 1100	677	12.1	1170.7	0.58
A207 CORRIDOR	1	3.0	Jan 1100	250	0.0	1289.0	0.19
Zone 8							
B201F RELATED CR	1	6.6	Jan 1400	330	0.0	601.1	0.55
Zone 9							
B201G COMPUTER LAB	1	18.6	Jul 1400	862	7.4	1009.1	0.85
Zone 10							
B206 GUID OFF	1	4.4	Aug 1100	268	4.9	150.5	1.78
Zone 11							
B207 GUID OFF	1	5.2	Aug 1100	240	4.0	157.3	1.52
Zone 12							
B201 DRAFTING - DESIGN	1	26.8	Jul 1100	1244	6.5	1553.2	0.80
Zone 13							
B201E OFF	1	2.9	Jan 1100	133	0.0	143.7	0.93
Zone 14							
B201D COMPUTER LAB	1	19.8	Jul 1100	917	5.6	1007.7	0.91
Zone 15							
B202C COMPUTER LAB	1	12.1	Jul 1600	560	5.7	713.4	0.78
Zone 16							
B202B COMPUTER LAB	1	10.7	Jul 1400	495	5.7	727.3	0.68
Zone 17							
B202D OFF	1	3.1	Jan 1100	142	0.0	151.0	0.94
Zone 18							
B202 BUSINESS OFFICE TEC	1	5.6	Jan 1100	260	0.0	510.5	0.51
Zone 19							
B202A RELATED CR	1	6.5	Jan 1400	320	0.0	560.7	0.57
Zone 20							
B203E OFF	1	2.3	Jan 1100	107	0.0	151.0	0.71
Zone 21							
B203D COMPUTER LAB	1	10.7	Jul 1400	495	5.7	721.7	0.69
Zone 22							
B203C COMPUTER LAB	1	10.8	Jul 1400	498	7.7	696.6	0.72
Zone 23							
B203 MARKETING	1	3.6	Jan 1100	166	0.0	490.1	0.34
Zone 24							
B203B RELATED CR	1	6.4	Jan 1400	315	0.0	530.1	0.59
Zone 25							
B204 CORRIDOR	1	15.5	Aug 1100	718	11.3	1452.8	0.49
Zone 26							
B210 SPED RESOURCE	1	5.2	Aug 1100	300	5.5	150.5	1.99
Zone 27							
B209 VOC DEAN	1	4.4	Aug 1100	217	4.0	160.7	1.35

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 28							
B208 GUID OFF	1	5.2	Aug 1100	240	4.1	158.7	1.52
Zone 29							
A303-1 BIOTECHNOLOGY-1	1	13.9	Jul 1400	1585	8.5	1483.6	1.07
Zone 30							
A303A PREP	1	1.4	Jan 1400	150	0.0	151.1	0.99
Zone 31							
A303H LAB	1	5.6	Jul 1500	270	3.6	270.2	1.00
Zone 32							
A303J TISSUE CULTURE LAB	1	4.8	Jan 1100	300	0.0	287.9	1.04
Zone 33							
A303D OFF	1	2.9	Jan 1100	135	0.0	153.7	0.88
Zone 34							
A303-3 BIOTECHNOLOGY-2	1	13.8	Jul 1400	1585	7.8	1466.3	1.08
Zone 35							
A304 CORRIDOR	1	2.1	Jan 1100	145	0.0	922.1	0.16
B303-1 CORRIDOR	1	15.2	Aug 1100	704	9.1	1148.3	0.61
Zone 36							
B304 ADJUST CNSLR	1	4.4	Aug 1100	268	4.9	151.3	1.77
Zone 37							
B305 GUID OFF	1	2.7	Jul 1400	216	4.0	157.2	1.37
Zone 38							
B301J Observ	1	2.3	Jun 1800	107	2.0	96.4	1.11
Zone 39							
B301H SIM	1	2.7	Jun 1800	158	2.9	189.2	0.83
Zone 40							
B301G MOCK APT	1	5.4	Jan 1100	250	0.0	452.1	0.55
Zone 41							
B301D OFF	1	3.6	Jan 1100	168	0.0	188.5	0.89
Zone 42							
B302-1 MEDICAL ASSISTING	1	12.7	Jul 1400	588	8.3	1501.1	0.39
Zone 43							
B302-2 MEDICAL ASSISTING	1	12.9	Jul 1400	597	7.7	1651.5	0.36
Zone 44							
B302A OBSERV / STOR	1	0.9	Jan 1400	43	0.0	181.1	0.24
Zone 45							
B302G CLEAN	1	0.3	Jan 1400	25	0.0	56.0	0.45
Zone 46							
B302D OFF	1	2.2	Jan 1100	101	0.0	205.3	0.49
Zone 47							
B302H LAB	1	8.1	Jun 1800	515	5.5	514.8	1.00
Zone 48							
B302J RELATED CR	1	10.6	Jul 1400	491	7.2	1159.5	0.42
Zone 49							
B301-1 HEALTH ASSISTING-	1	14.8	Jul 1400	687	8.6	1668.3	0.41
Zone 50							
B301-3 HEALTH ASSISTING-	1	20.8	Jun 1700	966	14.7	1701.6	0.57
Zone 51							
B303 - CORRIDOR	1	15.7	Aug 1100	728	10.7	1502.1	0.48
Zone 52							
B306 GUID OFF	1	2.7	Jul 1400	214	3.9	158.7	1.35
Zone 53							
B307 DEAN OFF	1	4.4	Aug 1100	205	3.6	160.7	1.27
Zone 54							
B308 SPED RESOURCE	1	5.2	Aug 1100	288	5.3	150.5	1.91
Zone 55							
A314 STOR	1	1.1	Jan 1100	100	0.0	496.8	0.20

Zone Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 56							
A402A THEORY	1	10.7	Jul 1400	496	7.3	981.9	0.51
Zone 57							
A402B MODEL MAKING	1	2.6	Jul 1400	122	0.5	285.3	0.43
Zone 58							
A402D STERILIZATION	1	3.0	Jul 1400	141	0.3	142.9	0.98
Zone 59							
A402-1 DENTAL ASSISTING	1	17.1	Jul 1400	793	12.7	1584.5	0.50
Zone 60							
A402-2 DENTAL ASSISTING	1	17.0	Jul 1400	787	12.9	1558.1	0.50
Zone 61							
A402G OFFICE	1	3.3	Jul 1100	151	0.4	200.9	0.75
Zone 62							
A421 STOR	1	1.6	Jul 1400	100	0.9	496.8	0.20
Zone 63							
A402J X-RAY	1	1.6	Jul 1400	130	0.3	180.5	0.72
Zone 64							
A403a CORRIDOR	1	16.1	Aug 1100	748	11.6	1180.0	0.63
Zone 65							
A402M STERILIZATION	1	2.1	Jul 1400	95	0.3	142.7	0.67
Zone 66							
B404 ADJUST CNSLR	1	4.5	Aug 1100	388	7.1	150.5	2.58
Zone 67							
B405 GUID OFF	1	5.2	Aug 1100	295	5.4	157.2	1.88
Zone 68							
A402P THEORY	1	10.2	Jul 1400	474	7.0	870.5	0.54
Zone 69							
A402P MODEL MAKING	1	2.2	Jul 1400	102	0.4	223.8	0.46
Zone 70							
B402-1 ROBOTICS & AUTOMA	1	19.7	Jul 1400	911	10.6	1327.5	0.69
Zone 71							
B401 PLTW / ENGINEERING	1	14.9	Jul 1400	798	14.6	1360.5	0.59
Zone 72							
B402-2 ROBOTICS & AUTMA	1	19.0	Jul 1400	880	10.3	1258.4	0.70
Zone 73							
B402C OFFICE	1	2.3	Jul 1100	108	0.2	123.1	0.88
Zone 74							
B402H RELATED CR	1	11.0	Jul 1400	690	12.6	961.2	0.72
Zone 75							
B403 CORRIDOR	1	27.7	Aug 1100	1562	28.6	1440.4	1.08
Zone 76							
B402J STORAGE	1	1.0	Jul 1400	60	0.5	290.6	0.21
Zone 77							
B406 GUID OFF	1	5.3	Aug 1100	243	4.3	158.7	1.53
Zone 78							
B407 GUID OFF	1	4.5	Aug 1100	218	4.0	160.7	1.36
Zone 79							
B408 DEAN OFF	1	5.3	Aug 1100	309	5.7	150.5	2.05
Zone 80							
B402D FABRICATION LAB	1	11.3	Jul 1600	524	6.3	563.4	0.93

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows
Design Ventilation Airflow Rate 19395 CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
A206F COMPUTER LAB	1	978.4	25.0	914.9	0.00	0.00	370.0	0.0	370.0
Totals (incl. Space Multipliers)				914.9					370.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
a206e photo stor	1	278.9	5.0	80.3	0.00	0.00	60.0	0.0	60.0
Totals (incl. Space Multipliers)				80.3					60.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
A148M (2nd flr. Voc. CR)	1	148.0	4.0	135.0	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				135.0					30.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
A206 DES. AND VIS. COMM.	1	1784.1	24.0	1016.9	0.00	0.00	465.0	0.0	465.0
Totals (incl. Space Multipliers)				1016.9					465.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
A206A RELATED CR	1	659.3	25.0	330.0	0.00	0.00	330.0	0.0	330.0
Totals (incl. Space Multipliers)				330.0					330.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
A206B COMPUTER LAB	1	1082.5	25.0	953.3	0.00	0.00	380.0	0.0	380.0
Totals (incl. Space Multipliers)				953.3					380.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
A207A CORRIDOR	1	1170.7	3.0	677.0	0.00	0.00	380.0	0.0	380.0
A207 CORRIDOR	1	1289.0	3.0	250.0	0.00	0.00	250.0	0.0	250.0
Totals (incl. Space Multipliers)				927.0					630.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
B201F RELATED CR	1	601.1	25.0	330.0	0.00	0.00	330.0	0.0	330.0
Totals (incl. Space Multipliers)				330.0					330.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
B201G COMPUTER LAB	1	1009.1	25.0	862.1	0.00	0.00	375.0	0.0	375.0
Totals (incl. Space Multipliers)				862.1					375.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
B206 GUID OFF	1	150.5	1.0	268.1	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				268.1					15.0

2.11 Zone: Zone 11

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 11									
B207 GUID OFF	1	157.3	1.0	239.8	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				239.8					15.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.12 Zone: Zone 12

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 12									
B201 DRAFTING - DESIGN	1	1553.2	25.0	1243.5	0.00	0.00	845.0	0.0	845.0
Totals (incl. Space Multipliers)				1243.5					845.0

2.13 Zone: Zone 13

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 13									
B201E OFF	1	143.7	4.0	133.5	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				133.5					30.0

2.14 Zone: Zone 14

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 14									
B201D COMPUTER LAB	1	1007.7	25.0	916.9	0.00	0.00	375.0	0.0	375.0
Totals (incl. Space Multipliers)				916.9					375.0

2.15 Zone: Zone 15

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 15									
B202C COMPUTER LAB	1	713.4	13.0	559.7	0.00	0.00	220.0	0.0	220.0
Totals (incl. Space Multipliers)				559.7					220.0

2.16 Zone: Zone 16

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 16									
B202B COMPUTER LAB	1	727.3	13.0	495.1	0.00	0.00	220.0	0.0	220.0
Totals (incl. Space Multipliers)				495.1					220.0

2.17 Zone: Zone 17

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 17									
B202D OFF	1	151.0	3.0	142.2	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				142.2					25.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.18 Zone: Zone 18

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 18									
B202 BUSINESS OFFICE TEC	1	510.5	10.0	260.0	0.00	0.00	165.0	0.0	165.0
Totals (incl. Space Multipliers)				260.0					165.0

2.19 Zone: Zone 19

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 19									
B202A RELATED CR	1	560.7	25.0	320.0	0.00	0.00	320.0	0.0	320.0
Totals (incl. Space Multipliers)				320.0					320.0

2.20 Zone: Zone 20

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 20									
B203E OFF	1	151.0	3.0	107.1	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				107.1					20.0

2.21 Zone: Zone 21

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 21									
B203D COMPUTER LAB	1	721.7	13.0	494.5	0.00	0.00	220.0	0.0	220.0
Totals (incl. Space Multipliers)				494.5					220.0

2.22 Zone: Zone 22

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 22									
B203C COMPUTER LAB	1	696.6	13.0	498.3	0.00	0.00	220.0	0.0	220.0
Totals (incl. Space Multipliers)				498.3					220.0

2.23 Zone: Zone 23

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 23									
B203 MARKETING	1	490.1	8.0	165.8	0.00	0.00	140.0	0.0	140.0
Totals (incl. Space Multipliers)				165.8					140.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.24 Zone: Zone 24

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 24									
B203B RELATED CR	1	530.1	25.0	315.0	0.00	0.00	315.0	0.0	315.0
Totals (incl. Space Multipliers)				315.0					315.0

2.25 Zone: Zone 25

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 25									
B204 CORRIDOR	1	1452.8	3.0	718.4	0.00	0.00	385.0	0.0	385.0
Totals (incl. Space Multipliers)				718.4					385.0

2.26 Zone: Zone 26

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 26									
B210 SPED RESOURCE	1	150.5	1.0	299.6	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				299.6					30.0

2.27 Zone: Zone 27

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 27									
B209 VOC DEAN	1	160.7	1.0	217.1	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				217.1					15.0

2.28 Zone: Zone 28

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 28									
B208 GUID OFF	1	158.7	1.0	240.5	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				240.5					15.0

2.29 Zone: Zone 29

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 29									
A303-1 BIOTECHNOLOGY-1	1	1483.6	25.0	1585.0	0.00	0.00	1585.0	0.0	1585.0
Totals (incl. Space Multipliers)				1585.0					1585.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.30 Zone: Zone 30

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 30									
A303A PREP	1	151.1	4.0	150.0	0.00	0.00	150.0	0.0	150.0
Totals (incl. Space Multipliers)				150.0					150.0

2.31 Zone: Zone 31

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 31									
A303H LAB	1	270.2	4.0	270.0	0.00	0.00	270.0	0.0	270.0
Totals (incl. Space Multipliers)				270.0					270.0

2.32 Zone: Zone 32

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 32									
A303J TISSUE CULTURE LAB	1	287.9	4.0	300.0	0.00	0.00	300.0	0.0	300.0
Totals (incl. Space Multipliers)				300.0					300.0

2.33 Zone: Zone 33

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 33									
A303D OFF	1	153.7	4.0	135.1	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				135.1					30.0

2.34 Zone: Zone 34

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 34									
A303-3 BIOTECHNOLOGY-2	1	1466.3	25.0	1585.0	0.00	0.00	1585.0	0.0	1585.0
Totals (incl. Space Multipliers)				1585.0					1585.0

2.35 Zone: Zone 35

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 35									
A304 CORRIDOR	1	922.1	2.0	145.0	0.00	0.00	145.0	0.0	145.0
B303-1 CORRIDOR	1	1148.3	3.0	703.7	0.00	0.00	90.0	0.0	90.0
Totals (incl. Space Multipliers)				848.7					235.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.36 Zone: Zone 36

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 36									
B304 ADJUST CNSLR	1	151.3	1.0	268.1	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				268.1					15.0

2.37 Zone: Zone 37

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 37									
B305 GUID OFF	1	157.2	1.0	215.6	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				215.6					15.0

2.38 Zone: Zone 38

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 38									
B301J Observ	1	96.4	1.0	107.3	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				107.3					20.0

2.39 Zone: Zone 39

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 39									
B301H SIM	1	189.2	2.0	157.5	0.00	0.00	45.0	0.0	45.0
Totals (incl. Space Multipliers)				157.5					45.0

2.40 Zone: Zone 40

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 40									
B301G MOCK APT	1	452.1	6.0	249.9	0.00	0.00	115.0	0.0	115.0
Totals (incl. Space Multipliers)				249.9					115.0

2.41 Zone: Zone 41

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 41									
B301D OFF	1	188.5	5.0	168.3	0.00	0.00	40.0	0.0	40.0
Totals (incl. Space Multipliers)				168.3					40.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.42 Zone: Zone 42

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 42									
B302-1 MEDICAL ASSISTING	1	1501.1	25.0	588.3	0.00	0.00	450.0	0.0	450.0
Totals (incl. Space Multipliers)				588.3					450.0

2.43 Zone: Zone 43

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 43									
B302-2 MEDICAL ASSISTING	1	1651.5	25.0	597.2	0.00	0.00	450.0	0.0	450.0
Totals (incl. Space Multipliers)				597.2					450.0

2.44 Zone: Zone 44

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 44									
B302A OBSERV / STOR	1	181.1	2.0	42.8	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				42.8					25.0

2.45 Zone: Zone 45

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 45									
B302G CLEAN	1	56.0	1.0	25.0	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				25.0					25.0

2.46 Zone: Zone 46

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 46									
B302D OFF	1	205.3	4.0	101.4	0.00	0.00	35.0	0.0	35.0
Totals (incl. Space Multipliers)				101.4					35.0

2.47 Zone: Zone 47

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 47									
B302H LAB	1	514.8	13.0	515.0	0.00	0.00	515.0	0.0	515.0
Totals (incl. Space Multipliers)				515.0					515.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.48 Zone: Zone 48

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 48									
B302J RELATED CR	1	1159.5	25.0	490.9	0.00	0.00	390.0	0.0	390.0
Totals (incl. Space Multipliers)				490.9					390.0

2.49 Zone: Zone 49

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 49									
B301-1 HEALTH ASSISTING-	1	1668.3	25.0	686.6	0.00	0.00	440.0	0.0	440.0
Totals (incl. Space Multipliers)				686.6					440.0

2.50 Zone: Zone 50

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 50									
B301-3 HEALTH ASSISTING-	1	1701.6	26.0	965.9	0.00	0.00	455.0	0.0	455.0
Totals (incl. Space Multipliers)				965.9					455.0

2.51 Zone: Zone 51

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 51									
B303 - CORRIDOR	1	1502.1	3.0	728.0	0.00	0.00	95.0	0.0	95.0
Totals (incl. Space Multipliers)				728.0					95.0

2.52 Zone: Zone 52

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 52									
B306 GUID OFF	1	158.7	1.0	214.3	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				214.3					15.0

2.53 Zone: Zone 53

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 53									
B307 DEAN OFF	1	160.7	1.0	204.9	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				204.9					15.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.54 Zone: Zone 54

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 54									
B308 SPED RESOURCE	1	150.5	1.0	288.1	0.00	0.00	30.0	0.0	30.0
Totals (incl. Space Multipliers)				288.1					30.0

2.55 Zone: Zone 55

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 55									
A314 STOR	1	496.8	1.0	100.0	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				100.0					100.0

2.56 Zone: Zone 56

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 56									
A402A THEORY	1	981.9	25.0	496.2	0.00	0.00	370.0	0.0	370.0
Totals (incl. Space Multipliers)				496.2					370.0

2.57 Zone: Zone 57

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 57									
A402B MODEL MAKING	1	285.3	4.0	121.6	0.00	0.00	75.0	0.0	75.0
Totals (incl. Space Multipliers)				121.6					75.0

2.58 Zone: Zone 58

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 58									
A402D STERILIZATION	1	142.9	2.0	140.6	0.00	0.00	40.0	0.0	40.0
Totals (incl. Space Multipliers)				140.6					40.0

2.59 Zone: Zone 59

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 59									
A402-1 DENTAL ASSISTING	1	1584.5	28.0	792.8	0.00	0.00	750.0	0.0	750.0
Totals (incl. Space Multipliers)				792.8					750.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.60 Zone: Zone 60

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 60									
A402-2 DENTAL ASSISTING	1	1558.1	28.0	786.5	0.00	0.00	750.0	0.0	750.0
Totals (incl. Space Multipliers)				786.5					750.0

2.61 Zone: Zone 61

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 61									
A402G OFFICE	1	200.9	4.0	150.7	0.00	0.00	35.0	0.0	35.0
Totals (incl. Space Multipliers)				150.7					35.0

2.62 Zone: Zone 62

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 62									
A421 STOR	1	496.8	1.0	100.0	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				100.0					100.0

2.63 Zone: Zone 63

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 63									
A402J X-RAY	1	180.5	2.0	130.0	0.00	0.00	130.0	0.0	130.0
Totals (incl. Space Multipliers)				130.0					130.0

2.64 Zone: Zone 64

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 64									
A403a CORRIDOR	1	1180.0	3.0	748.3	0.00	0.00	230.0	0.0	230.0
Totals (incl. Space Multipliers)				748.3					230.0

2.65 Zone: Zone 65

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 65									
A402M STERILIZATION	1	142.7	1.0	95.4	0.00	0.00	40.0	0.0	40.0
Totals (incl. Space Multipliers)				95.4					40.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.66 Zone: Zone 66

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 66									
B404 ADJUST CNSLR	1	150.5	1.0	387.5	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				387.5					15.0

2.67 Zone: Zone 67

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 67									
B405 GUID OFF	1	157.2	1.0	295.3	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				295.3					15.0

2.68 Zone: Zone 68

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 68									
A402P THEORY	1	870.5	25.0	474.3	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				474.3					360.0

2.69 Zone: Zone 69

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 69									
A402P MODEL MAKING	1	223.8	4.0	101.9	0.00	0.00	70.0	0.0	70.0
Totals (incl. Space Multipliers)				101.9					70.0

2.70 Zone: Zone 70

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 70									
B402-1 ROBOTICS & AUTOMA	1	1327.5	25.0	910.9	0.00	0.00	410.0	0.0	410.0
Totals (incl. Space Multipliers)				910.9					410.0

2.71 Zone: Zone 71

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 71									
B401 PLTW / ENGINEERING	1	1360.5	25.0	797.6	0.00	0.00	415.0	0.0	415.0
Totals (incl. Space Multipliers)				797.6					415.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.72 Zone: Zone 72

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 72									
B402-2 ROBOTICS & AUTMA	1	1258.4	25.0	879.8	0.00	0.00	410.0	0.0	410.0
Totals (incl. Space Multipliers)				879.8					410.0

2.73 Zone: Zone 73

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 73									
B402C OFFICE	1	123.1	3.0	107.9	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				107.9					20.0

2.74 Zone: Zone 74

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 74									
B402H RELATED CR	1	961.2	25.0	689.7	0.00	0.00	360.0	0.0	360.0
Totals (incl. Space Multipliers)				689.7					360.0

2.75 Zone: Zone 75

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 75									
B403 CORRIDOR	1	1440.4	3.0	1562.1	0.00	0.00	230.0	0.0	230.0
Totals (incl. Space Multipliers)				1562.1					230.0

2.76 Zone: Zone 76

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 76									
B402J STORAGE	1	290.6	1.0	60.0	0.00	0.00	60.0	0.0	60.0
Totals (incl. Space Multipliers)				60.0					60.0

2.77 Zone: Zone 77

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 77									
B406 GUID OFF	1	158.7	1.0	243.4	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				243.4					15.0

Ventilation Sizing Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
01:35PM

2.78 Zone: Zone 78

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 78									
B407 GUID OFF	1	160.7	1.0	218.3	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				218.3					15.0

2.79 Zone: Zone 79

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 79									
B408 DEAN OFF	1	150.5	1.0	308.9	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				308.9					15.0

2.80 Zone: Zone 80

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 80									
B402D FABRICATION LAB	1	563.4	10.0	524.0	0.00	0.00	460.0	0.0	460.0
Totals (incl. Space Multipliers)				524.0					460.0

Air System Design Load Summary for HRU-3 Classrooms Plan North

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1000 COOLING OA DB / WB 76.1 °F / 70.9 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	7275 ft²	152745	-	7275 ft²	-	-
Wall Transmission	13436 ft²	8908	-	13436 ft²	58311	-
Roof Transmission	17221 ft²	5346	-	17221 ft²	28537	-
Window Transmission	7275 ft²	1952	-	7275 ft²	146658	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	84 ft²	2093	-	84 ft²	4234	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	39867 W	96288	-	0	0	-
Task Lighting	14824 W	42362	-	0	0	-
Electric Equipment	57131 W	170180	-	0	0	-
People	758	113913	118746	0	0	0
Infiltration	-	0	4	-	126483	0
Miscellaneous	-	11355	0	-	0	0
Safety Factor	5% / 5%	30257	5937	10%	36422	0
>> Total Zone Loads	-	635399	124687	-	400644	0
Zone Conditioning	-	755623	124687	-	398019	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	19395 CFM	36112	-	19395 CFM	-36112	-
Ventilation Load	19395 CFM	-41599	425363	19395 CFM	349106	0
Ventilation Fan Load	19395 CFM	54168	-	19395 CFM	-54168	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	804303	550050	-	656846	0
Cooling Coil	-	77958	0	-	0	0
Heating Coil	-	0	-	-	270428	-
Terminal Unit Cooling	-	738075	550242	-	0	0
Terminal Unit Heating	-	0	-	-	415355	-
>> Total Conditioning	-	816033	550242	-	685783	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

Air System Information

Air System Name **HRU-4 (B+1 C/D)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **38**
Floor Area **21304.8** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **5.2** Tons
Total coil load **62.3** MBH
Total coil load **1469.0** CFM/Ton
Sensible coil load **62.3** MBH
Coil CFM at Jul 1400 **7630** CFM
Max coil CFM **7630** CFM
Sensible heat ratio **1.000**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **80.0 / 72.0** °F
Leaving DB / WB **72.4 / 69.8** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **104.8** MBH
Coil CFM at Des Htg **7630** CFM
Max coil CFM **7630** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
Ent. DB / Lvg DB **54.7 / 67.4** °F

Ventilation Fan Sizing Data

Actual max CFM **7630** CFM
Standard CFM **7622** CFM
Actual max CFM/ft² **0.36** CFM/ft²

Fan motor BHP **7.87** BHP
Fan motor kW **6.25** kW
Fan static **3.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **7630** CFM
Standard CFM **7622** CFM
Actual max CFM/ft² **0.36** CFM/ft²

Fan motor BHP **5.25** BHP
Fan motor kW **4.16** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **7630** CFM
CFM/ft² **0.36** CFM/ft²

CFM/person **16.36** CFM/person

Zone Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

Air System Information

Air System Name **HRU-4 (B+1 C/D)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **38**
Floor Area **21304.8** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	2.7	1.5	75.0 / 70.6	66.1 / 65.7	-	Jul 1000	0.45
Zone 2	32.5	16.2	75.0 / 70.6	64.3 / 63.9	-	Jul 1100	0.32
Zone 3	0.6	0.3	75.1 / 73.1	69.9 / 69.7	-	Aug 1300	0.34
Zone 4	18.2	7.9	75.1 / 70.6	55.0 / 54.9	-	Aug 1200	0.42
Zone 5	3.4	1.4	75.5 / 72.0	55.0 / 55.0	-	Jul 1000	0.09
Zone 6	8.8	5.1	75.9 / 67.2	55.0 / 54.3	-	Aug 1000	0.48
Zone 7	0.0	0.0	0.0 / 0.0	0.0 / 0.0	0.00	Des 0000	0.81
Zone 8	1.8	1.1	76.3 / 67.3	55.0 / 54.3	-	Aug 1000	0.43
Zone 9	1.8	1.1	76.3 / 67.3	55.0 / 54.3	-	Aug 1000	0.43
Zone 10	21.1	9.9	75.3 / 69.7	55.0 / 54.7	-	Aug 1200	0.49
Zone 11	20.4	8.9	75.1 / 70.5	55.0 / 54.9	-	Aug 1200	0.36
Zone 12	0.0	0.0	0.0 / 0.0	0.0 / 0.0	0.00	Des 0000	0.35
Zone 13	4.2	1.9	75.3 / 70.9	60.6 / 60.3	-	Jul 0900	0.20
Zone 14	3.3	1.8	76.1 / 68.4	55.0 / 54.5	-	Aug 1000	0.42
Zone 15	2.2	1.3	76.5 / 67.7	55.0 / 54.4	-	Aug 1000	0.34
Zone 16	1.6	0.8	75.8 / 69.3	55.0 / 54.6	-	Aug 1000	0.28
Zone 17	2.2	1.2	76.4 / 67.7	55.0 / 54.4	-	Aug 1000	0.34
Zone 18	1.6	0.8	75.8 / 69.3	55.0 / 54.6	-	Aug 1000	0.28
Zone 19	1.5	0.7	75.7 / 69.4	55.0 / 54.6	-	Aug 1000	0.29
Zone 20	6.3	3.8	75.8 / 66.5	55.0 / 54.3	-	Aug 1000	0.46
Zone 21	17.0	7.3	75.0 / 70.7	55.0 / 54.9	-	Jul 1200	0.46
Zone 22	3.1	2.3	75.9 / 64.6	55.9 / 54.8	-	Mar 1000	0.60
Zone 23	59.1	40.7	75.8 / 65.3	55.5 / 54.6	-	Sep 1400	1.35
Zone 24	7.9	4.2	75.0 / 70.6	65.4 / 65.0	-	Jul 0900	0.41
Zone 25	2.1	1.1	76.0 / 68.5	55.0 / 54.5	-	Aug 1000	0.38
Zone 26	2.7	1.2	75.0 / 70.6	59.9 / 59.6	-	Jul 0900	0.76
Zone 27	43.9	19.5	75.0 / 70.6	59.2 / 59.0	-	Jul 1000	1.19
Zone 28	8.7	7.4	76.2 / 63.2	55.0 / 53.8	-	Feb 1400	0.95
Zone 29	6.5	5.2	76.1 / 63.6	55.0 / 53.9	-	Jul 1000	0.83
Zone 30	4.0	2.7	76.0 / 65.5	55.0 / 54.1	-	Aug 1000	0.60
Zone 31	6.5	5.3	76.2 / 63.6	55.0 / 53.9	-	Jul 1000	0.81
Zone 32	8.7	7.4	76.2 / 63.2	55.0 / 53.8	-	Feb 1400	0.94
Zone 33	44.9	19.9	75.0 / 70.6	58.9 / 58.7	-	Aug 1000	1.06
Zone 34	2.9	1.3	75.0 / 70.6	59.2 / 58.9	-	Jul 0900	0.74
Zone 35	1.7	1.0	76.5 / 67.4	55.0 / 54.3	-	Aug 1000	0.48
Zone 36	8.5	6.6	76.2 / 64.0	55.0 / 53.9	-	Dec 1400	0.60
Zone 37	55.0	34.3	75.4 / 66.5	56.4 / 55.7	-	Jul 0900	1.00
Zone 38	2.1	0.7	76.7 / 75.7	55.0 / 55.0	-	Jan 1000	0.09

Terminal Unit Sizing Data - Heating, Fan, Ventilation

	Heating Coil Load	Heating Coil Ent/Lvg DB	Htg Coil Water Flow @20.0 °F	Fan Design Airflow	Fan Motor	Fan Motor	OA Vent Design Airflow
--	-------------------	-------------------------	------------------------------	--------------------	-----------	-----------	------------------------

Zone Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

Zone Name	(MBH)	(°F)	(gpm)	(CFM)	(BHP)	(kW)	(CFM)
Zone 1	0.0	0.0 / 0.0	0.00	155	0.000	0.000	155
Zone 2	6.7	70.0 / 74.4	-	1400	0.000	0.000	1400
Zone 3	0.8	69.3 / 85.3	-	48	0.000	0.000	15
Zone 4	0.0	0.0 / 0.0	0.00	367	0.000	0.000	355
Zone 5	0.0	0.0 / 0.0	0.00	61	0.000	0.000	45
Zone 6	0.0	0.0 / 0.0	0.00	226	0.000	0.000	80
Zone 7	4.5	69.1 / 85.1	-	259	0.000	0.000	50
Zone 8	0.0	0.0 / 0.0	0.00	47	0.000	0.000	15
Zone 9	0.0	0.0 / 0.0	0.00	47	0.000	0.000	15
Zone 10	0.0	0.0 / 0.0	0.00	451	0.000	0.000	365
Zone 11	0.0	0.0 / 0.0	0.00	412	0.000	0.000	390
Zone 12	1.9	70.0 / 85.3	-	115	0.000	0.000	115
Zone 13	2.1	69.6 / 86.0	-	118	0.000	0.000	70
Zone 14	0.0	0.0 / 0.0	0.00	78	0.000	0.000	40
Zone 15	0.0	0.0 / 0.0	0.00	55	0.000	0.000	15
Zone 16	0.0	0.0 / 0.0	0.00	34	0.000	0.000	20
Zone 17	0.0	0.0 / 0.0	0.00	54	0.000	0.000	15
Zone 18	0.0	0.0 / 0.0	0.00	35	0.000	0.000	20
Zone 19	0.0	0.0 / 0.0	0.00	33	0.000	0.000	20
Zone 20	0.0	0.0 / 0.0	0.00	170	0.000	0.000	40
Zone 21	0.0	0.0 / 0.0	0.00	340	0.000	0.000	340
Zone 22	0.0	0.0 / 0.0	0.00	107	0.000	0.000	0
Zone 23	26.7	69.6 / 82.9	-	1859	0.000	0.000	565
Zone 24	0.0	0.0 / 0.0	0.00	405	0.000	0.000	405
Zone 25	0.0	0.0 / 0.0	0.00	49	0.000	0.000	25
Zone 26	0.0	0.0 / 0.0	0.00	75	0.000	0.000	75
Zone 27	6.9	70.0 / 75.6	-	1145	0.000	0.000	1145
Zone 28	0.0	0.0 / 0.0	0.00	323	0.000	0.000	0
Zone 29	3.4	69.3 / 83.0	-	230	0.000	0.000	0
Zone 30	0.0	0.0 / 0.0	0.00	119	0.000	0.000	20
Zone 31	3.3	69.1 / 82.4	-	231	0.000	0.000	0
Zone 32	0.0	0.0 / 0.0	0.00	324	0.000	0.000	0
Zone 33	5.9	70.0 / 74.8	-	1145	0.000	0.000	1145
Zone 34	0.0	0.0 / 0.0	0.00	75	0.000	0.000	75
Zone 35	0.0	0.0 / 0.0	0.00	42	0.000	0.000	15
Zone 36	0.0	0.0 / 0.0	0.00	288	0.000	0.000	0
Zone 37	29.7	69.3 / 85.7	-	1676	0.000	0.000	580
Zone 38	0.0	0.0 / 0.0	0.00	31	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	220.4	18.4	91.8
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	220.4	18.4	91.8

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	0.7	Jan 1100	0.0	342.4
Zone 2	9.1	Jul 1100	2.1	4423.7
Zone 3	0.6	Jan 1100	0.9	142.2

Zone Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 4	7.9	Jan 1400	0.0	872.0
Zone 5	1.3	Jan 1100	0.0	654.1
Zone 6	4.9	Jan 1400	0.0	474.1
Zone 7	0.0	Des Htg	4.8	320.7
Zone 8	1.0	Jan 1100	0.0	108.6
Zone 9	1.0	Jan 1100	0.0	108.6
Zone 10	9.7	Jan 1400	0.0	926.2
Zone 11	8.9	Jan 1400	0.0	1143.5
Zone 12	0.0	Des Htg	1.5	332.7
Zone 13	1.4	Jul 1400	2.2	578.4
Zone 14	1.7	Jan 1400	0.0	186.1
Zone 15	1.2	Jan 1100	0.0	163.4
Zone 16	0.7	Jan 1400	0.0	122.2
Zone 17	1.2	Jan 1100	0.0	157.3
Zone 18	0.8	Jan 1400	0.0	124.1
Zone 19	0.7	Jan 1400	0.0	110.8
Zone 20	3.7	Jan 1400	0.0	371.4
Zone 21	7.3	Jan 1400	0.0	739.5
Zone 22	2.3	Jan 1100	0.0	176.6
Zone 23	40.1	Sep 1400	26.6	1372.5
Zone 24	2.0	Jan 1100	0.0	976.9
Zone 25	1.1	Jan 1100	0.0	126.7
Zone 26	1.0	Jan 1100	0.0	98.9
Zone 27	17.1	Jul 1400	4.5	958.2
Zone 28	7.0	Jan 1400	0.0	340.5
Zone 29	5.0	Jul 1400	3.4	278.6
Zone 30	2.6	Jan 1100	0.0	197.8
Zone 31	5.0	Jul 1400	3.4	286.9
Zone 32	7.0	Jan 1400	0.0	344.0
Zone 33	17.3	Jul 1400	4.2	1081.9
Zone 34	1.0	Jan 1100	0.0	101.2
Zone 35	0.9	Jan 1100	0.0	86.7
Zone 36	6.2	Jan 1600	0.0	476.9
Zone 37	29.4	Jul 1100	30.7	1671.2
Zone 38	0.7	Jan 1100	0.0	327.3

Zone Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C004B - STOR	1	0.5	Jan 1100	80	0.0	233.1	0.34
C004D TOOL CRIB	1	0.3	Jan 1100	75	0.0	109.3	0.69
Zone 2							
C010 CORRIDOR	1	3.0	Jan 1100	475	0.0	1507.8	0.32
C017 CORRIDOR	1	2.1	Jan 1100	455	0.0	1020.3	0.45
D002 CORRIDOR	1	4.0	Jul 1100	470	2.1	1895.6	0.25
Zone 3							
C013 CUST OFF	1	0.6	Jan 1100	48	0.9	142.2	0.34
Zone 4							
C018 METAL FAB RELATED C	1	7.9	Jan 1400	367	0.0	872.0	0.42
Zone 5							
C019 GENERAL SUPPLY	1	1.3	Jan 1100	61	0.0	654.1	0.09
Zone 6							
C020 Cust Workshop	1	4.9	Jan 1400	226	0.0	474.1	0.48
Zone 7							
C015 GENERAL SUPPLY	1	0.0	Jan 0000	259	4.8	320.7	0.81
Zone 8							
C024 COACH OFF	1	1.0	Jan 1100	47	0.0	108.6	0.43
Zone 9							
C026 COACH OFF	1	1.0	Jan 1100	47	0.0	108.6	0.43
Zone 10							
C022D RELATED CR	1	9.7	Jan 1400	451	0.0	926.2	0.49
Zone 11							
D003D RELATED CR	1	8.9	Jan 1400	412	0.0	1143.5	0.36
Zone 12							
C011 CORRIDOR	1	0.0	Jan 0000	115	1.5	332.7	0.35
Zone 13							
C120 CORRIDOR	1	1.4	Jul 1400	118	2.2	578.4	0.20
Zone 14							
D102 NURSE WAIT	1	1.7	Jan 1400	78	0.0	186.1	0.42
Zone 15							
D103 NURSE OFF	1	1.2	Jan 1100	55	0.0	163.4	0.34
Zone 16							
D106 EXAM	1	0.7	Jan 1400	34	0.0	122.2	0.28
Zone 17							
D104 NURSE OFF	1	1.2	Jan 1100	54	0.0	157.3	0.34
Zone 18							
D109 EXAM	1	0.8	Jan 1400	35	0.0	124.1	0.28
Zone 19							
D110 EXAM	1	0.7	Jan 1400	33	0.0	110.8	0.29
Zone 20							
D105 RESTING	1	2.8	Jan 1400	131	0.0	269.0	0.49
D102A - CORRIDOR	1	0.8	Jan 1100	39	0.0	102.4	0.38
Zone 21							
D111 HEALTH CR	1	7.3	Jan 1400	340	0.0	739.5	0.46
Zone 22							
D120 PE STOR	1	2.3	Jan 1100	107	0.0	176.6	0.60
Zone 23							
D113 FITNESS	1	40.1	Sep 1400	1859	26.6	1372.5	1.35
Zone 24							
D114 CORRIDOR	1	2.0	Jan 1100	405	0.0	976.9	0.41
Zone 25							
D116 ATH DIR OFF	1	1.1	Jan 1100	49	0.0	126.7	0.38
Zone 26							

Zone Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
D117D PE INSTR OFF	1	1.0	Jan 1100	75	0.0	98.9	0.76
Zone 27							
D117 BOYS LOCKER	1	17.1	Jul 1400	1145	4.5	958.2	1.19
Zone 28							
D117B TEAM LOCKER	1	7.0	Jan 1400	323	0.0	340.5	0.95
Zone 29							
D117C TEAM LOCKER	1	5.0	Jul 1400	230	3.4	278.6	0.83
Zone 30							
D119 TRAINER	1	2.6	Jan 1100	119	0.0	197.8	0.60
Zone 31							
D122C TEAM LOCKER	1	5.0	Jul 1400	231	3.4	286.9	0.81
Zone 32							
D122B TEAM LOCKER	1	7.0	Jan 1400	324	0.0	344.0	0.94
Zone 33							
D122 GIRLS LOCKER	1	17.3	Jul 1400	1145	4.2	1081.9	1.06
Zone 34							
D122D PE INST OFF	1	1.0	Jan 1100	75	0.0	101.2	0.74
Zone 35							
D123 OFFICIALS	1	0.9	Jan 1100	42	0.0	86.7	0.48
Zone 36							
C023 TEAM LOCKER	1	6.2	Jan 1600	288	0.0	476.9	0.60
Zone 37							
D115 WEIGHTS	1	29.4	Jul 1100	1676	30.7	1671.2	1.00
Zone 38							
C027 TEAM LOCKER	1	0.7	Jan 1100	31	0.0	327.3	0.09

Ventilation Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows
Design Ventilation Airflow Rate 7630 CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
C004B - STOR	1	233.1	0.0	80.0	0.00	0.00	80.0	0.0	80.0
C004D TOOL CRIB	1	109.3	0.0	75.0	0.00	0.00	75.0	0.0	75.0
Totals (incl. Space Multipliers)				155.0					155.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
C010 CORRIDOR	1	1507.8	0.0	475.0	0.00	0.00	475.0	0.0	475.0
C017 CORRIDOR	1	1020.3	0.0	455.0	0.00	0.00	455.0	0.0	455.0
D002 CORRIDOR	1	1895.6	0.0	470.0	0.00	0.00	470.0	0.0	470.0
Totals (incl. Space Multipliers)				1400.0					1400.0

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
C013 CUST OFF	1	142.2	1.0	48.0	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				48.0					15.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
C018 METAL FAB RELATED C	1	872.0	25.0	366.9	0.00	0.00	355.0	0.0	355.0
Totals (incl. Space Multipliers)				366.9					355.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
C019 GENERAL SUPPLY	1	654.1	0.0	61.3	0.00	0.00	45.0	0.0	45.0
Totals (incl. Space Multipliers)				61.3					45.0

Ventilation Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
C020 Cust Workshop	1	474.1	10.0	225.5	0.00	0.00	80.0	0.0	80.0
Totals (incl. Space Multipliers)				225.5					80.0

2.7 Zone: Zone 7

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 7									
C015 GENERAL SUPPLY	1	320.7	0.0	259.2	0.00	0.00	50.0	0.0	50.0
Totals (incl. Space Multipliers)				259.2					50.0

2.8 Zone: Zone 8

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 8									
C024 COACH OFF	1	108.6	1.0	46.7	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				46.7					15.0

2.9 Zone: Zone 9

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 9									
C026 COACH OFF	1	108.6	1.0	46.7	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				46.7					15.0

2.10 Zone: Zone 10

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 10									
C022D RELATED CR	1	926.2	25.0	451.3	0.00	0.00	365.0	0.0	365.0
Totals (incl. Space Multipliers)				451.3					365.0

2.11 Zone: Zone 11

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 11									
D003D RELATED CR	1	1143.5	25.0	412.3	0.00	0.00	390.0	0.0	390.0
Totals (incl. Space Multipliers)				412.3					390.0

Ventilation Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

2.12 Zone: Zone 12

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 12									
C011 CORRIDOR	1	332.7	0.0	115.0	0.00	0.00	115.0	0.0	115.0
Totals (incl. Space Multipliers)				115.0					115.0

2.13 Zone: Zone 13

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 13									
C120 CORRIDOR	1	578.4	0.0	117.6	0.00	0.00	70.0	0.0	70.0
Totals (incl. Space Multipliers)				117.6					70.0

2.14 Zone: Zone 14

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 14									
D102 NURSE WAIT	1	186.1	4.0	77.9	0.00	0.00	40.0	0.0	40.0
Totals (incl. Space Multipliers)				77.9					40.0

2.15 Zone: Zone 15

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 15									
D103 NURSE OFF	1	163.4	1.0	54.8	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				54.8					15.0

2.16 Zone: Zone 16

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 16									
D106 EXAM	1	122.2	2.0	34.5	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				34.5					20.0

2.17 Zone: Zone 17

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 17									
D104 NURSE OFF	1	157.3	1.0	53.8	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				53.8					15.0

Ventilation Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

2.18 Zone: Zone 18

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 18									
D109 EXAM	1	124.1	2.0	34.8	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				34.8					20.0

2.19 Zone: Zone 19

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 19									
D110 EXAM	1	110.8	2.0	32.6	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				32.6					20.0

2.20 Zone: Zone 20

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 20									
D105 RESTING	1	269.0	4.0	131.5	0.00	0.00	40.0	0.0	40.0
D102A - CORRIDOR	1	102.4	0.0	38.8	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				170.3					40.0

2.21 Zone: Zone 21

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 21									
D111 HEALTH CR	1	739.5	25.0	340.0	0.00	0.00	340.0	0.0	340.0
Totals (incl. Space Multipliers)				340.0					340.0

2.22 Zone: Zone 22

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 22									
D120 PE STOR	1	176.6	0.0	106.7	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				106.7					0.0

2.23 Zone: Zone 23

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 23									
D113 FITNESS	1	1372.5	24.0	1859.0	0.00	0.00	565.0	0.0	565.0
Totals (incl. Space Multipliers)				1859.0					565.0

Ventilation Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

2.24 Zone: Zone 24

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 24									
D114 CORRIDOR	1	976.9	0.0	405.0	0.00	0.00	405.0	0.0	405.0
Totals (incl. Space Multipliers)				405.0					405.0

2.25 Zone: Zone 25

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 25									
D116 ATH DIR OFF	1	126.7	1.0	48.7	0.00	0.00	25.0	0.0	25.0
Totals (incl. Space Multipliers)				48.7					25.0

2.26 Zone: Zone 26

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 26									
D117D PE INSTR OFF	1	98.9	1.0	75.0	0.00	0.00	75.0	0.0	75.0
Totals (incl. Space Multipliers)				75.0					75.0

2.27 Zone: Zone 27

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 27									
D117 BOYS LOCKER	1	958.2	92.0	1145.0	0.00	0.00	1145.0	0.0	1145.0
Totals (incl. Space Multipliers)				1145.0					1145.0

2.28 Zone: Zone 28

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 28									
D117B TEAM LOCKER	1	340.5	39.0	323.3	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				323.3					0.0

2.29 Zone: Zone 29

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 29									
D117C TEAM LOCKER	1	278.6	26.0	230.2	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				230.2					0.0

Ventilation Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

2.30 Zone: Zone 30

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 30									
D119 TRAINER	1	197.8	1.0	118.9	0.00	0.00	20.0	0.0	20.0
Totals (incl. Space Multipliers)				118.9					20.0

2.31 Zone: Zone 31

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 31									
D122C TEAM LOCKER	1	286.9	26.0	231.0	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				231.0					0.0

2.32 Zone: Zone 32

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 32									
D122B TEAM LOCKER	1	344.0	39.0	323.6	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				323.6					0.0

2.33 Zone: Zone 33

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 33									
D122 GIRLS LOCKER	1	1081.9	92.0	1145.0	0.00	0.00	1145.0	0.0	1145.0
Totals (incl. Space Multipliers)				1145.0					1145.0

2.34 Zone: Zone 34

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 34									
D122D PE INST OFF	1	101.2	1.0	75.0	0.00	0.00	75.0	0.0	75.0
Totals (incl. Space Multipliers)				75.0					75.0

2.35 Zone: Zone 35

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 35									
D123 OFFICIALS	1	86.7	1.0	42.0	0.00	0.00	15.0	0.0	15.0
Totals (incl. Space Multipliers)				42.0					15.0

Ventilation Sizing Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

2.36 Zone: Zone 36

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 36									
C023 TEAM LOCKER	1	476.9	20.0	288.5	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				288.5					0.0

2.37 Zone: Zone 37

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 37									
D115 WEIGHTS	1	1671.2	24.0	1676.2	0.00	0.00	580.0	0.0	580.0
Totals (incl. Space Multipliers)				1676.2					580.0

2.38 Zone: Zone 38

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 38									
C027 TEAM LOCKER	1	327.3	0.0	30.7	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				30.7					0.0

Air System Design Load Summary for HRU-4 (B+1 C/D)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/06/2023
12:57PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1000 COOLING OA DB / WB 76.1 °F / 70.9 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	1430 ft²	27737	-	1430 ft²	-	-
Wall Transmission	3485 ft²	1795	-	3485 ft²	13624	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	1430 ft²	384	-	1430 ft²	28829	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	11231 ft²	0	-	11231 ft²	4041	-
Partitions	940 ft²	-4231	-	940 ft²	3385	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	16192 W	39276	-	0	0	-
Task Lighting	4884 W	14322	-	0	0	-
Electric Equipment	4876 W	14372	-	0	0	-
People	466	71496	88070	0	0	0
Infiltration	-	0	0	-	26726	0
Miscellaneous	-	4800	0	-	0	0
Safety Factor	5% / 5%	8498	4403	10%	7660	0
>> Total Zone Loads	-	178448	92473	-	84265	0
Zone Conditioning	-	213063	92473	-	84334	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	7630 CFM	14206	-	7630 CFM	-14206	-
Ventilation Load	7630 CFM	-10902	88648	7630 CFM	137903	0
Ventilation Fan Load	7630 CFM	21310	-	7630 CFM	-21310	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	237677	181121	-	186721	0
Cooling Coil	-	30669	0	-	0	0
Heating Coil	-	0	-	-	104780	-
Terminal Unit Cooling	-	220440	181283	-	0	0
Terminal Unit Heating	-	-2839	-	-	91830	-
>> Total Conditioning	-	248270	181283	-	196610	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for HRU-5 (Cosmetology)

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

01/20/2023

11:06AM

Air System Information

Air System Name **HRU-5 (Cosmetology)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **6**
Floor Area **4455.6** ft²
Location **Boston, Massachusetts**

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**

Cooling Coil Sizing Data

Total coil load **10.7** Tons
Total coil load **127.9** MBH
Total coil load **258.9** CFM/Ton
Sensible coil load **88.9** MBH
Coil CFM at Aug 1400 **2759** CFM
Max coil CFM **2759** CFM
Sensible heat ratio **0.695**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Aug 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **81.4 / 66.5** °F
Leaving DB / WB **51.5 / 50.4** °F
Bypass Factor **0.100**

Heating Coil Sizing Data

Max coil load **44.6** MBH
Coil CFM at Jan 0700 **2759** CFM
Max coil CFM **2759** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Jan 0700**
Ent. DB / Lvg DB **51.5 / 66.5** °F

Ventilation Fan Sizing Data

Actual max CFM **2759** CFM
Standard CFM **2756** CFM
Actual max CFM/ft² **0.62** CFM/ft²

Fan motor BHP **3.80** BHP
Fan motor kW **3.01** kW
Fan static **4.00** in wg

Exhaust Fan Sizing Data

Actual max CFM **2759** CFM
Standard CFM **2756** CFM
Actual max CFM/ft² **0.62** CFM/ft²

Fan motor BHP **2.85** BHP
Fan motor kW **2.26** kW
Fan static **3.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **2759** CFM
CFM/ft² **0.62** CFM/ft²

CFM/person **30.96** CFM/person

Zone Sizing Summary for HRU-5 (Cosmetology)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/20/2023
11:07AM

Air System Information

Air System Name **HRU-5 (Cosmetology)**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **6**
Floor Area **4455.6** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	29.5	29.5	72.3 / 59.4	58.0 / 53.8	-	Jul 1400	0.95
Zone 2	1.9	1.7	75.8 / 64.1	58.0 / 56.9	-	Apr 1000	0.72
Zone 3	0.9	0.9	70.0 / 58.1	61.3 / 54.7	-	Jul 0900	0.61
Zone 4	21.9	21.9	71.7 / 59.1	58.2 / 53.8	-	Aug 1200	0.82
Zone 5	1.8	1.6	75.7 / 63.9	58.0 / 56.9	-	Apr 1000	0.81
Zone 6	0.4	0.4	70.0 / 58.1	68.8 / 57.6	-	Jul 1000	1.51

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	35.2	69.6 / 86.6	-	1918	0.000	0.000	1220
Zone 2	0.0	0.0 / 0.0	0.00	89	0.000	0.000	17
Zone 3	0.2	70.0 / 71.8	-	100	0.000	0.000	100
Zone 4	23.7	69.7 / 84.3	-	1509	0.000	0.000	1100
Zone 5	0.0	0.0 / 0.0	0.00	86	0.000	0.000	16
Zone 6	0.6	70.0 / 71.7	-	305	0.000	0.000	305

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	54.7	4.6	59.6
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	54.7	4.6	59.6

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	35.2	Jul 1400	36.8	2028.5
Zone 2	1.6	Jan 1100	0.0	123.8
Zone 3	1.3	Jul 1400	0.2	164.9
Zone 4	27.7	Aug 1400	25.2	1831.2
Zone 5	1.6	Jan 1100	0.0	105.6
Zone 6	0.9	Jul 1400	0.1	201.5

Zone Sizing Summary for HRU-5 (Cosmetology)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/20/2023
11:07AM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B120 COSMETOLOGY	1	35.2	Jul 1400	1918	36.8	2028.5	0.95
Zone 2							
B120A OFF	1	1.6	Jan 1100	89	0.0	123.8	0.72
Zone 3							
B120C FACIAL	1	1.3	Jul 1400	100	0.2	164.9	0.61
Zone 4							
B121 COSMETOLOGY	1	27.7	Aug 1400	1509	25.2	1831.2	0.82
Zone 5							
B121C OFF	1	1.6	Jan 1100	86	0.0	105.6	0.81
Zone 6							
B120B DISP	1	0.9	Jul 1400	305	0.1	201.5	1.51

Ventilation Sizing Summary for HRU-5 (Cosmetology)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/20/2023
11:07AM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows
Design Ventilation Airflow Rate 2759 CFM

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
B120 COSMETOLOGY	1	2028.5	45.0	1917.9	0.00	0.00	1220.0	0.0	1220.0
Totals (incl. Space Multipliers)				1917.9					1220.0

2.2 Zone: Zone 2

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 2									
B120A OFF	1	123.8	2.0	89.1	5.00	0.06	0.0	0.0	17.4
Totals (incl. Space Multipliers)				89.1					17.4

2.3 Zone: Zone 3

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 3									
B120C FACIAL	1	164.9	4.0	100.0	0.00	0.00	100.0	0.0	100.0
Totals (incl. Space Multipliers)				100.0					100.0

2.4 Zone: Zone 4

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 4									
B121 COSMETOLOGY	1	1831.2	45.0	1508.8	0.00	0.00	1100.0	0.0	1100.0
Totals (incl. Space Multipliers)				1508.8					1100.0

2.5 Zone: Zone 5

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 5									
B121C OFF	1	105.6	2.0	85.6	5.00	0.06	0.0	0.0	16.3
Totals (incl. Space Multipliers)				85.6					16.3

Ventilation Sizing Summary for HRU-5 (Cosmetology)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/20/2023
11:07AM

2.6 Zone: Zone 6

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 6									
B120B DISP	1	201.5	1.0	305.0	0.00	0.00	305.0	0.0	305.0
Totals (incl. Space Multipliers)				305.0					305.0

Air System Design Load Summary for HRU-5 (Cosmetology)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/20/2023
11:07AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	800 ft²	11026	-	800 ft²	-	-
Wall Transmission	1618 ft²	11899	-	1618 ft²	22976	-
Roof Transmission	150 ft²	137	-	150 ft²	249	-
Window Transmission	800 ft²	2352	-	800 ft²	16128	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	4456 ft²	0	-	4456 ft²	4134	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	2852 W	8341	-	0	0	-
Task Lighting	2228 W	6848	-	0	0	-
Electric Equipment	2835 W	9079	-	0	0	-
People	79	15247	12472	0	0	0
Infiltration	-	0	0	-	13147	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	3246	624	10%	5663	0
>> Total Zone Loads	-	68176	13096	-	62298	0
Zone Conditioning	-	72311	13096	-	61537	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	2759 CFM	7705	-	2759 CFM	-7705	-
Ventilation Load	2759 CFM	7204	25956	2759 CFM	57825	0
Ventilation Fan Load	2759 CFM	10273	-	2759 CFM	-10273	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	97493	39052	-	101384	0
Cooling Coil	-	88703	39064	-	-2337	0
Heating Coil	-	-44644	-	-	44644	-
Terminal Unit Cooling	-	54671	180	-	0	0
Terminal Unit Heating	-	0	-	-	59624	-
Terminal Reheat Coils	-	0	-	-	59624	-
>> Total Conditioning	-	98730	39244	-	101931	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Press Booth

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/14/2023

08:32AM

Air System Information

Air System Name **VRF - Press Booth**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **132.0** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Press Booth

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
08:32AM

Air System Information

Air System Name **VRF - Press Booth**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **132.0** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	3.8	3.4	79.9 / 75.7	74.6 / 74.1	-	Jul 1300	4.44

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	10.6	68.8 / 85.5	-	586	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	3.4	0.3	10.6
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	3.4	0.3	10.6

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	3.3	Jul 1200	10.8	132.0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
1-G201 Press Booth	1	3.3	Jul 1200	586	10.8	132.0	4.44

Ventilation Sizing Summary for VRF - Press Booth

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
08:32AM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
1-G201 Press Booth	1	132.0	2.0	586.2	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				586.2					0.0

Air System Design Load Summary for VRF - Press Booth

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/14/2023
08:32AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1300 COOLING OA DB / WB 85.0 °F / 73.5 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	88 ft²	1826	-	88 ft²	-	-
Wall Transmission	233 ft²	468	-	233 ft²	2727	-
Roof Transmission	132 ft²	88	-	132 ft²	219	-
Window Transmission	88 ft²	69	-	88 ft²	1764	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	31 ft²	54	-	31 ft²	1367	-
Floor Transmission	132 ft²	-112	-	132 ft²	119	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	84 W	242	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	53 W	168	-	0	0	-
People	2	351	400	0	0	0
Infiltration	-	0	0	-	3578	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	158	20	10%	977	0
>> Total Zone Loads	-	3312	420	-	10751	0
Zone Conditioning	-	3379	420	-	10551	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	3379	420	-	10551	0
Terminal Unit Cooling	-	3379	433	-	0	0
Terminal Unit Heating	-	0	-	-	10551	-
>> Total Conditioning	-	3379	433	-	10551	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 RTU-1 (Resteraunt)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
09:08AM

Air System Information

Air System Name **RTU-1 (Resteraunt)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **1400.0** ft²
Location **Boston, Massachusetts**

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**

Central Cooling Coil Sizing Data

Total coil load **3.4** Tons
Total coil load **41.3** MBH
Sensible coil load **31.7** MBH
Coil CFM at Jul 1400 **1263** CFM
Max block CFM **1263** CFM
Sum of peak zone CFM **1263** CFM
Sensible heat ratio **0.768**
CFM/Ton **367.0**
ft²/Ton **406.7**
BTU/(hr-ft²) **29.5**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Jul 1400**
OA DB / WB **87.0 / 74.0** °F
Entering DB / WB **78.7 / 65.3** °F
Leaving DB / WB **55.4 / 54.2** °F
Coil ADP **52.8** °F
Bypass Factor **0.100**
Resulting RH **49** %
Design supply temp. **58.0** °F
Zone T-stat Check **0 of 1** OK
Max zone temperature deviation **0.2** °F

Central Heating Coil Sizing Data

Max coil load **31.5** MBH
Coil CFM at Des Htg **1263** CFM
Max coil CFM **1263** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr-ft²) **22.5**
Ent. DB / Lvg DB **62.7 / 85.8** °F

Preheat Coil Sizing Data

No heating coil loads occurred during this calculation.

Supply Fan Sizing Data

Actual max CFM **1263** CFM
Standard CFM **1262** CFM
Actual max CFM/ft² **0.90** CFM/ft²

Fan motor BHP **1.30** BHP
Fan motor kW **1.03** kW
Fan static **3.00** in wg

Return Fan Sizing Data

Actual max CFM **1263** CFM
Standard CFM **1262** CFM
Actual max CFM/ft² **0.90** CFM/ft²

Fan motor BHP **0.87** BHP
Fan motor kW **0.69** kW
Fan static **2.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **678** CFM
CFM/ft² **0.48** CFM/ft²

CFM/person **17.51** CFM/person

Zone Sizing Summary for RTU-1 (Resteraunt)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
09:08AM

Air System Information

Air System Name **RTU-1 (Resteraunt)**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **1400.0** ft²
Location **Boston, Massachusetts**

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	1225	1225	0.88	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	22.5	Jul 1400	24.9	1400.0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
B113 RESTAURANT	1	22.5	Jul 1400	1225	24.9	1400.0	0.88

Ventilation Sizing Summary for RTU-1 (Resteraunt)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
09:08AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Heating operation**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **542** CFM
System Ventilation Efficiency (Ev) **1.000**
Outdoor Air Intake (Vot) **678** CFM

2. Space Ventilation Analysis

		Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
B113 RESTAURANT	1	1225	1400.0	0.18	38.7	7.50	0.8	678	542	1.000
Totals (incl. Space Multipliers)		1225							542	1.000

Air System Design Load Summary for RTU-1 (Resteraunt)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
09:08AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	354 ft²	3629	-	354 ft²	-	-
Wall Transmission	526 ft²	600	-	526 ft²	2055	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	354 ft²	1041	-	354 ft²	7137	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	48 ft²	1307	-	48 ft²	2419	-
Floor Transmission	1333 ft²	0	-	1333 ft²	1522	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	896 W	2621	-	0	0	-
Task Lighting	1400 W	4375	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	34	6216	4128	0	0	0
Infiltration	-	0	0	-	9459	0
Miscellaneous	-	1613	538	-	0	0
Safety Factor	5% / 5%	1070	233	10%	2259	0
>> Total Zone Loads	-	22472	4899	-	24851	0
Zone Conditioning	-	24005	4899	-	25025	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	1263 CFM	2352	-	1263 CFM	-2352	-
Ventilation Load	678 CFM	1836	4687	678 CFM	12307	0
Supply Fan Load	1263 CFM	3528	-	1263 CFM	-3528	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	31721	9586	-	31453	0
Central Cooling Coil	-	31721	9586	-	0	0
Central Heating Coil	-	0	-	-	31453	-
Preheat Coil	-	0	-	-	0	-
>> Total Conditioning	-	31721	9586	-	31453	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 RTU-2 (Gym)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:01AM

Air System Information

Air System Name RTU-2 (Gym)
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 12668.7 ft²
Location Boston, Massachusetts

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

Central Cooling Coil Sizing Data

Total coil load 35.4 Tons
Total coil load 425.3 MBH
Sensible coil load 289.0 MBH
Coil CFM at Jul 1400 11719 CFM
Max block CFM 11719 CFM
Sum of peak zone CFM 11719 CFM
Sensible heat ratio 0.679
CFM/Ton 330.7
ft²/Ton 357.5
BTU/(hr-ft²) 33.6
Water flow @ 10.0 °F rise N/A

Load occurs at Jul 1400
OA DB / WB 87.0 / 74.0 °F
Entering DB / WB 78.3 / 66.5 °F
Leaving DB / WB 55.4 / 54.4 °F
Coil ADP 52.9 °F
Bypass Factor 0.100
Resulting RH 57 %
Design supply temp. 58.0 °F
Zone T-stat Check 0 of 1 OK
Max zone temperature deviation 0.2 °F

Central Heating Coil Sizing Data

Max coil load 196.1 MBH
Coil CFM at Des Htg 11719 CFM
Max coil CFM 11719 CFM
Water flow @ 20.0 °F drop N/A

Load occurs at Des Htg
BTU/(hr-ft²) 15.5
Ent. DB / Lvg DB 65.9 / 81.4 °F

Preheat Coil Sizing Data

No heating coil loads occurred during this calculation.

Supply Fan Sizing Data

Actual max CFM 11719 CFM
Standard CFM 11706 CFM
Actual max CFM/ft² 0.93 CFM/ft²

Fan motor BHP 12.09 BHP
Fan motor kW 9.59 kW
Fan static 3.00 in wg

Return Fan Sizing Data

Actual max CFM 11719 CFM
Standard CFM 11706 CFM
Actual max CFM/ft² 0.93 CFM/ft²

Fan motor BHP 8.06 BHP
Fan motor kW 6.39 kW
Fan static 2.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM 4125 CFM
CFM/ft² 0.33 CFM/ft²

CFM/person 15.28 CFM/person

Zone Sizing Summary for RTU-2 (Gym)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:01AM

Air System Information

Air System Name RTU-2 (Gym)
Equipment Class SPLT AHU
Air System Type SZCAV

Number of zones 1
Floor Area 12668.7 ft²
Location Boston, Massachusetts

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 Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	11367	11367	0.90	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	204.7	Jul 1400	171.8	12668.7

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
D202 GYMNASIUM	1	194.8	Jul 1400	10620	151.6	12194.5	0.87
D204 GYM STOR	1	10.7	Aug 1700	748	20.2	474.2	1.58

Ventilation Sizing Summary for RTU-2 (Gym)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:01AM

1. Summary

Ventilation Sizing Method **ASHRAE Std 62.1-2010**
Design Condition **Heating operation**
Occupant Diversity (D) **1.000**
Uncorrected Outdoor Air Intake (Vou) **3687** CFM
System Ventilation Efficiency (Ev) **0.894**
Outdoor Air Intake (Vot) **4125** CFM

2. Space Ventilation Analysis

		Supply Air (CFM)	Space Floor Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Averaged Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness	Space Outdoor Air (CFM)	Breathing Zone Outdoor Air (CFM)	Space Ventilation Efficiency
Zone Name / Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vbz)	(Evz)
Zone 1										
D202 GYMNASIUM	1	10620	12194.5	0.30	252.0	0.00	0.8	4573	<i>3658</i>	0.894
D204 GYM STOR	1	748	474.2	0.06	0.0	5.00	0.8	36	<i>28</i>	1.277
Totals (incl. Space Multipliers)		11367							3687	0.894

Air System Design Load Summary for RTU-2 (Gym)

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/13/2023
10:01AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	3723 ft²	42622	-	3723 ft²	-	-
Wall Transmission	4266 ft²	4332	-	4266 ft²	16674	-
Roof Transmission	12669 ft²	11544	-	12669 ft²	20994	-
Window Transmission	3723 ft²	10947	-	3723 ft²	75056	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	8108 W	23717	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	14412 W	46148	-	0	0	-
People	240	55622	109200	0	0	0
Infiltration	-	0	0	-	43436	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	9747	5460	10%	15616	0
>> Total Zone Loads	-	204679	114660	-	171775	0
Zone Conditioning	-	223300	114660	-	175624	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	11719 CFM	21820	-	11719 CFM	-21820	-
Ventilation Load	4125 CFM	11122	21608	4125 CFM	75006	0
Supply Fan Load	11719 CFM	32730	-	11719 CFM	-32730	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	288971	136268	-	196080	0
Central Cooling Coil	-	288971	136314	-	0	0
Central Heating Coil	-	0	-	-	196080	-
Preheat Coil	-	0	-	-	0	-
>> Total Conditioning	-	288971	136314	-	196080	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Stair 1

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/06/2023

01:41PM

Air System Information

Air System Name **VRF - Stair 1**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **897.9** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Stair 1

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
01:41PM

Air System Information

Air System Name **VRF - Stair 1**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **897.9** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	29.6	29.6	80.1 / 48.3	72.5 / 44.7	-	Aug 1100	4.05

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	66.9	69.2 / 86.2	-	3634	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	29.6	2.5	66.9
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	29.6	2.5	66.9

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	29.4	Aug 1100	66.7	897.9

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
S1 STAIR 1	1	29.4	Aug 1100	3634	66.7	897.9	4.05

Air System Design Load Summary for VRF - Stair 1

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
01:41PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1100 COOLING OA DB / WB 78.4 °F / 71.6 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	821 ft²	24955	-	821 ft²	-	-
Wall Transmission	2164 ft²	702	-	2164 ft²	8460	-
Roof Transmission	898 ft²	255	-	898 ft²	1488	-
Window Transmission	821 ft²	-660	-	821 ft²	16551	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	44 ft²	1040	-	44 ft²	2218	-
Floor Transmission	898 ft²	0	-	898 ft²	996	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	682 W	1730	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	30883	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1401	0	10%	6060	0
>> Total Zone Loads	-	29422	0	-	66655	0
Zone Conditioning	-	29643	0	-	66903	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	29643	0	-	66903	0
Terminal Unit Cooling	-	29643	0	-	0	0
Terminal Unit Heating	-	0	-	-	66903	-
>> Total Conditioning	-	29643	0	-	66903	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Stair 2

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/06/2023

01:36PM

Air System Information

Air System Name **VRF - Stair 2**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **359.2** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Stair 2

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
01:36PM

Air System Information

Air System Name **VRF - Stair 2**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **359.2** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	13.6	13.6	80.5 / 48.5	71.5 / 44.2	-	Aug 1800	3.91

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	25.4	68.6 / 85.4	-	1405	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	13.6	1.1	25.4
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	13.6	1.1	25.4

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	13.8	Aug 1800	25.6	359.2

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
S2 STAIR 2	1	13.7	Aug 1800	1398	25.6	269.6	5.18
S2 STAIR 2 - Interior	1	0.2	Jan 1100	8	0.0	89.6	0.09

Air System Design Load Summary for VRF - Stair 2

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/06/2023
01:36PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1800 COOLING OA DB / WB 85.5 °F / 73.6 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	646 ft²	10708	-	646 ft²	-	-
Wall Transmission	15 ft²	10	-	15 ft²	58	-
Roof Transmission	270 ft²	147	-	270 ft²	447	-
Window Transmission	646 ft²	876	-	646 ft²	13023	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	42 ft²	1005	-	42 ft²	2117	-
Floor Transmission	359 ft²	0	-	359 ft²	494	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	101 W	441	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	7165	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	659	0	10%	2330	0
>> Total Zone Loads	-	13846	0	-	25634	0
Zone Conditioning	-	13612	0	-	25444	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	13612	0	-	25444	0
Terminal Unit Cooling	-	13612	0	-	0	0
Terminal Unit Heating	-	0	-	-	25444	-
>> Total Conditioning	-	13612	0	-	25444	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Stair 3

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/07/2023

12:55PM

Air System Information

Air System Name **VRF - Stair 3**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **1238.5** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Stair 3

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:55PM

Air System Information

Air System Name **VRF - Stair 3**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **1238.5** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	22.9	22.9	80.6 / 48.5	72.2 / 44.6	-	Sep 1200	2.05

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	45.7	68.4 / 85.0	-	2545	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	22.9	1.9	45.7
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	22.9	1.9	45.7

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	23.5	Sep 1200	46.2	1238.5

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
S3 STAIR 3	1	23.0	Sep 1200	2519	46.2	938.4	2.68
S3 STAIR 3 BASEMENT	1	0.6	Jan 1100	26	0.0	300.1	0.09

Ventilation Sizing Summary for VRF - Stair 3

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:55PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
S3 STAIR 3	1	938.4	0.0	2519.1	0.00	0.00	0.0	0.0	0.0
S3 STAIR 3 BASEMENT	1	300.1	0.0	25.6	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				2544.7					0.0

Air System Design Load Summary for VRF - Stair 3

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:55PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1200 COOLING OA DB / WB 77.0 °F / 70.3 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	491 ft²	19162	-	491 ft²	-	-
Wall Transmission	1600 ft²	274	-	1600 ft²	6256	-
Roof Transmission	938 ft²	219	-	938 ft²	1555	-
Window Transmission	491 ft²	-720	-	491 ft²	9899	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	49 ft²	1256	-	49 ft²	2470	-
Floor Transmission	300 ft²	0	-	300 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	793 W	2206	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	21821	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	1120	0	10%	4200	0
>> Total Zone Loads	-	23517	0	-	46201	0
Zone Conditioning	-	22869	0	-	45688	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	22869	0	-	45688	0
Terminal Unit Cooling	-	22869	0	-	0	0
Terminal Unit Heating	-	0	-	-	45688	-
>> Total Conditioning	-	22869	0	-	45688	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Stair 4

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/07/2023

12:00PM

Air System Information

Air System Name **VRF - Stair 4**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **578.4** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Stair 4

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:00PM

Air System Information

Air System Name **VRF - Stair 4**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **578.4** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	44.0	44.0	80.3 / 48.4	68.1 / 42.5	-	Jun 1800	5.76

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	60.8	69.2 / 86.1	-	3334	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	44.0	3.7	60.8
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	44.0	3.7	60.8

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	44.1	Jun 1800	61.1	578.4

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
S4 STAIR 4	1	44.1	Jun 1800	3334	61.1	578.4	5.76

Ventilation Sizing Summary for VRF - Stair 4

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:00PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
S4 STAIR 4	1	578.4	0.0	3333.9	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				3333.9					0.0

Air System Design Load Summary for VRF - Stair 4

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:00PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1800 COOLING OA DB / WB 82.5 °F / 71.6 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	1045 ft²	38956	-	1045 ft²	-	-
Wall Transmission	1401 ft²	472	-	1401 ft²	5476	-
Roof Transmission	578 ft²	334	-	578 ft²	958	-
Window Transmission	1045 ft²	365	-	1045 ft²	21067	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	42 ft²	1115	-	42 ft²	2117	-
Floor Transmission	578 ft²	0	-	578 ft²	604	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	162 W	710	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	25363	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	2098	0	10%	5559	0
>> Total Zone Loads	-	44050	0	-	61144	0
Zone Conditioning	-	43980	0	-	60753	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	43980	0	-	60753	0
Terminal Unit Cooling	-	43980	0	-	0	0
Terminal Unit Heating	-	0	-	-	60753	-
>> Total Conditioning	-	43980	0	-	60753	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Stair 5

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

02/07/2023

12:57PM

Air System Information

Air System Name **VRF - Stair 5**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **350.9** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Stair 5

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:57PM

Air System Information

Air System Name **VRF - Stair 5**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **350.9** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	6.7	6.7	80.0 / 48.3	76.3 / 46.5	-	Jul 1400	4.85

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	31.2	69.1 / 86.0	-	1703	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	6.7	0.6	31.2
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	6.7	0.6	31.2

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	6.6	Jul 1500	31.2	350.9

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
S5 STAIR 5	1	6.6	Jul 1500	1703	31.2	350.9	4.85

Ventilation Sizing Summary for VRF - Stair 5

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:57PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
S5 STAIR 5	1	350.9	0.0	1702.8	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				1702.8					0.0

Air System Design Load Summary for VRF - Stair 5

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

02/07/2023
12:57PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	300 ft²	3712	-	300 ft²	-	-
Wall Transmission	1087 ft²	989	-	1087 ft²	4251	-
Roof Transmission	351 ft²	274	-	351 ft²	581	-
Window Transmission	300 ft²	402	-	300 ft²	6048	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	62 ft²	182	-	62 ft²	2734	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	225 W	657	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	14777	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	311	0	10%	2839	0
>> Total Zone Loads	-	6526	0	-	31230	0
Zone Conditioning	-	6731	0	-	31176	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	6731	0	-	31176	0
Terminal Unit Cooling	-	6731	0	-	0	0
Terminal Unit Heating	-	0	-	-	31176	-
>> Total Conditioning	-	6731	0	-	31176	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Stair 6

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

01/30/2023

01:37PM

Air System Information

Air System Name VRF - Stair 6

Equipment Class TERM

Air System Type VRF

Number of zones 1

Floor Area 334.8 ft²

Location Boston, Massachusetts

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

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Stair 6

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
01:37PM

Air System Information

Air System Name **VRF - Stair 6**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **334.8** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	15.6	15.6	79.7 / 48.1	76.3 / 46.5	-	Jul 1500	12.48

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	75.3	68.1 / 84.8	-	4177	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	15.6	1.3	75.3
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	15.6	1.3	75.3

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	15.1	Jul 1500	76.6	334.8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
S6 STAIR 6	1	15.1	Jul 1500	4177	76.6	334.8	12.48

Ventilation Sizing Summary for VRF - Stair 6

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
01:37PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
S6 STAIR 6	1	334.8	0.0	4176.8	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				4176.8					0.0

Air System Design Load Summary for VRF - Stair 6

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
01:37PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	773 ft²	9372	-	773 ft²	-	-
Wall Transmission	2993 ft²	2423	-	2993 ft²	11699	-
Roof Transmission	328 ft²	274	-	328 ft²	544	-
Window Transmission	773 ft²	1120	-	773 ft²	15584	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	44 ft²	542	-	44 ft²	2218	-
Floor Transmission	335 ft²	0	-	335 ft²	753	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	187 W	612	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	38842	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	717	0	10%	6964	0
>> Total Zone Loads	-	15056	0	-	76603	0
Zone Conditioning	-	15556	0	-	75323	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	15556	0	-	75323	0
Terminal Unit Cooling	-	15556	0	-	0	0
Terminal Unit Heating	-	0	-	-	75323	-
>> Total Conditioning	-	15556	0	-	75323	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Dedicated Outdoor Air System (DOAS) Sizing Summary for VRF - Stair 7

Project Name: 60-20-409 NEMT

Prepared by: TMP Consulting Engineers, Inc.

01/30/2023

01:35PM

Air System Information

Air System Name **VRF - Stair 7**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **361.4** ft²
Location **Boston, Massachusetts**

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**

NOTE: No other data is applicable for a Terminal Units air system without a Dedicated Outdoor Air System (DOAS).

Zone Sizing Summary for VRF - Stair 7

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
01:35PM

Air System Information

Air System Name **VRF - Stair 7**
Equipment Class **TERM**
Air System Type **VRF**

Number of zones **1**
Floor Area **361.4** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	7.7	7.7	80.0 / 48.2	75.2 / 46.0	-	Jul 1500	4.14

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	35.4	63.9 / 85.8	-	1497	0.000	0.000	0

VRF Outdoor Unit Sizing Data

	Cooling [MBH]	Cooling [Tons]	Heating [MBH]
Peak Coincident Indoor Unit Loads	7.7	0.6	35.4
Estimated Piping / Line Losses	0.0	0.0	0.0
Total Required ODU Capacity	7.7	0.6	35.4

Note: VRF piping / line losses are based on typical loss factors for this class of equipment. Actual line loss varies widely from one product to another. Therefore, when selecting equipment it is critical to consult manufacturer's guidance to utilize actual line loss data.

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	7.6	Jul 1500	35.5	361.4

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
S7 STAIR 7	1	7.6	Jul 1500	1497	35.5	361.4	4.14

Ventilation Sizing Summary for VRF - Stair 7

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
01:35PM

1. Summary

Ventilation Sizing Method Sum of Space OA Airflows

2. Space Ventilation Analysis

2.1 Zone: Zone 1

Zone Name / Space Name	Mult.	Floor Area (ft²)	Maximum Occupants	Maximum Supply Air (CFM)	Required Outdoor Air (CFM/person)	Required Outdoor Air (CFM/ft²)	Required Outdoor Air (CFM)	Required Outdoor Air (% of supply)	Uncorrected Outdoor Air (CFM)
Zone 1									
S7 STAIR 7	1	361.4	0.0	1496.8	0.00	0.00	0.0	0.0	0.0
Totals (incl. Space Multipliers)				1496.8					0.0

Air System Design Load Summary for VRF - Stair 7

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

01/30/2023
01:35PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500 COOLING OA DB / WB 87.0 °F / 74.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 7.0 °F / 4.9 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	410 ft²	4971	-	410 ft²	-	-
Wall Transmission	1305 ft²	803	-	1305 ft²	4698	-
Roof Transmission	361 ft²	302	-	361 ft²	551	-
Window Transmission	410 ft²	594	-	410 ft²	7610	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	44 ft²	542	-	44 ft²	2042	-
Floor Transmission	361 ft²	0	-	361 ft²	882	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	20 W	66	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	16513	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	364	0	10%	3230	0
>> Total Zone Loads	-	7641	0	-	35526	0
Zone Conditioning	-	7742	0	-	35387	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	0 CFM	0	-	0 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Ventilation Fan Load	0 CFM	0	-	0 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	7742	0	-	35387	0
Terminal Unit Cooling	-	7742	0	-	0	0
Terminal Unit Heating	-	0	-	-	35387	-
>> Total Conditioning	-	7742	0	-	35387	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Zone Sizing Summary for Heating Only Spaces - Areas C an

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/08/2023
06:50AM

Air System Information

Air System Name **Heating Only Spaces - Areas C an**
Equipment Class **TERM**
Air System Type **2P-FC**

Number of zones **1**
Floor Area **9782.0** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	0.0	0.0	-1.0 / -1.0	-1.0 / -1.0	0.00	Des 0000	1.03

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @30.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	298.7	71.2 / 100.0	19.93	10041	1.485	1.178	30

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	55.6	Jul 1400	302.8	9782.0

Zone Sizing Summary for Heating Only Spaces - Areas C and D

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/08/2023
06:50AM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C001 ELECT - MAIN ELECT	1	0.0	Jan 0000	168	5.1	601.1	0.28
C005 ELECT - MAIN STANDB	1	0.5	Jan 1100	58	1.8	242.5	0.24
C006 ELECT - LIFE SAFETY	1	0.5	Jan 1100	0	0.0	218.6	0.00
C007 Generator Panels	1	0.0	Jan 0000	145	4.4	144.9	1.00
C008 PLUMBING ROOM	1	0.0	Jan 0000	189	5.7	430.8	0.44
C101 CUST	1	0.1	Jan 1100	0	0.0	46.9	0.00
C102 CUST STOR	1	0.1	Jan 1100	0	0.0	50.7	0.00
C112 TLT	1	0.5	Jan 1100	0	0.0	246.8	0.00
C113 TLT	1	0.5	Jan 1100	0	0.0	246.3	0.00
C104 Vest	1	9.3	Jul 1800	1886	57.0	446.6	4.22
C106K STOR	1	0.6	Jul 2100	126	3.8	70.3	1.80
C106A CUBBIES	1	0.5	Jul 1400	30	0.4	188.7	0.16
C106C LOCKERS	1	0.2	Jul 1400	5	0.1	75.1	0.07
C106G TLT	1	0.9	Aug 2000	87	2.6	155.4	0.56
C108 TLT	1	0.3	Jul 2100	60	1.8	73.6	0.81
C107 TLT	1	0.3	Jul 2100	60	1.8	73.6	0.81
D101 VEST	1	3.3	Jul 1800	682	20.6	160.3	4.26
C302 MECHANICAL	1	7.8	Jul 1400	226	6.8	2746.9	0.08
1-CB102 MAINTENANCE	1	0.5	Jul 1500	136	4.1	43.0	3.16
1-LRS1 STAIR	1	7.4	Jul 1400	1184	35.8	247.4	4.79
1-LR104 FIELD MAINT GAR	1	5.5	Jul 1400	990	29.9	1017.5	0.97
1-LR101 VEST	1	6.9	Jul 1100	416	12.6	133.6	3.11
1-LR201 VEST	1	7.1	Jul 1100	416	12.6	136.5	3.05
1-LR105 TLT	1	0.5	Aug 0800	70	2.1	53.1	1.31
1-M101 MAINT GARAGE	1	13.2	Jul 1400	2861	86.4	1680.1	1.70
1-M101a Toilet	1	1.4	Aug 0100	206	6.2	85.3	2.42
C005A - ELECT VOC	1	0.2	Jan 1100	0	0.0	93.7	0.00
C015B CUST	1	0.0	Jan 0000	39	1.2	72.7	0.54

Zone Sizing Summary for Heating Only Spaces - Areas C an

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/13/2023
01:44PM

Air System Information

Air System Name **Heating Only Spaces - Areas C an**
Equipment Class **TERM**
Air System Type **2P-FC**

Number of zones **1**
Floor Area **10200.7** ft²
Location **Boston, Massachusetts**

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**

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Coil Load	Zone CFM/ft ²
Zone 1	0.0	0.0	-1.0 / -1.0	-1.0 / -1.0	0.00	Des 0000	1.00

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @30.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 1	305.9	71.1 / 100.0	20.40	10229	1.513	1.200	55

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft ²)
Zone 1	53.3	Jul 1400	308.5	10200.7

Zone Sizing Summary for Heating Only Spaces - Areas C and D

Project Name: 60-20-409 NEMT
Prepared by: TMP Consulting Engineers, Inc.

03/13/2023
01:44PM

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
C001 ELECT - MAIN ELECT	1	0.0	Jan 0000	168	5.1	601.1	0.28
C005 ELECT - MAIN STANDB	1	0.5	Jan 1100	58	1.8	242.5	0.24
C006 ELECT - LIFE SAFETY	1	0.5	Jan 1100	0	0.0	218.6	0.00
C007 Generator Panels	1	0.0	Jan 0000	145	4.4	144.9	1.00
C008 PLUMBING ROOM	1	0.0	Jan 0000	189	5.7	430.8	0.44
C101 CUST	1	0.1	Jan 1100	0	0.0	46.9	0.00
C102 CUST STOR	1	0.1	Jan 1100	0	0.0	50.7	0.00
C112 TLT	1	0.5	Jan 1100	0	0.0	246.8	0.00
C113 TLT	1	0.5	Jan 1100	0	0.0	246.3	0.00
C104 Vest	1	9.3	Jul 1800	1886	57.0	446.6	4.22
C106K STOR	1	0.6	Jul 2100	126	3.8	70.3	1.80
C106A CUBBIES	1	0.5	Jul 1400	30	0.4	188.7	0.16
C106C LOCKERS	1	0.2	Jul 1400	5	0.1	75.1	0.07
C106G TLT	1	0.9	Aug 2000	87	2.6	155.4	0.56
C108 TLT	1	0.3	Jul 2100	60	1.8	73.6	0.81
C107 TLT	1	0.3	Jul 2100	60	1.8	73.6	0.81
D101 VEST	1	3.3	Jul 1800	682	20.6	160.3	4.26
C302 MECHANICAL	1	7.8	Jul 1400	226	6.8	2746.9	0.08
1-CB102 MAINTENANCE	1	0.5	Jul 1500	136	4.1	43.0	3.16
1-LRS1 STAIR	1	7.4	Jul 1400	1184	35.8	247.4	4.79
1-LR104 FIELD MAINT GAR	1	5.5	Jul 1400	990	29.9	1017.5	0.97
1-LR101 VEST	1	6.9	Jul 1100	416	12.6	133.6	3.11
1-LR201 VEST	1	7.1	Jul 1100	416	12.6	136.5	3.05
1-LR105 TLT	1	0.5	Aug 0800	70	2.1	53.1	1.31
1-M101 MAINT GARAGE	1	13.2	Jul 1400	2861	86.4	1680.1	1.70
1-M101a Toilet	1	1.4	Aug 0100	206	6.2	85.3	2.42
C005A - ELECT VOC	1	0.2	Jan 1100	0	0.0	93.7	0.00
C015B CUST	1	0.0	Jan 0000	39	1.2	72.7	0.54
D001 CUST STORAGE	1	0.0	Jan 0000	189	5.7	418.7	0.45