Metro-West Building Officials

October 10, 2022

GOOD DAY TO OUR MEMBERSHIP:

Just a reminder and information for attendees at our monthly meetings at the Grafton Public Library. The following information:

1. Absolutely **no smoking on premises** or **throwing cigarette** on town property.
2. Please use the rear parking lot when attending the meetings. The front parking spaces are for the general public and seniors using the library.
3. On receiving credit for attending our seminars

    - **Current Members** will receive credit when attending in-person and via online (zoom) meeting, **you must provide your full name and membership number as your screen name so we may properly credit you**

    - Non-members will receive two (2) free seminars whether in person or online. **Must** inform Mr. Berger you are planning to attend meeting for pre-registration send email to robert.berger@mwboa.org subject line non-member attending monthly meeting

    - If you exceed your two (2) free seminars, you can either join or pay $25.00 per seminar to MWBOA to receive credit from the Commonwealth or ICC.

Thank you for you cooperation

we look forward to seeing you at the next meeting

Best Regards

Tin Htway

Tin Htway
Vice President

Provider No. 2510 Course No.

Metro-West Building Officials Meeting Notice

October 18, 2022
9:00 AM -12:00 PM

Place: Grafton Library
35 Grafton Common
Grafton, MA 01519

or

Join by Zoom

This month's presentation's

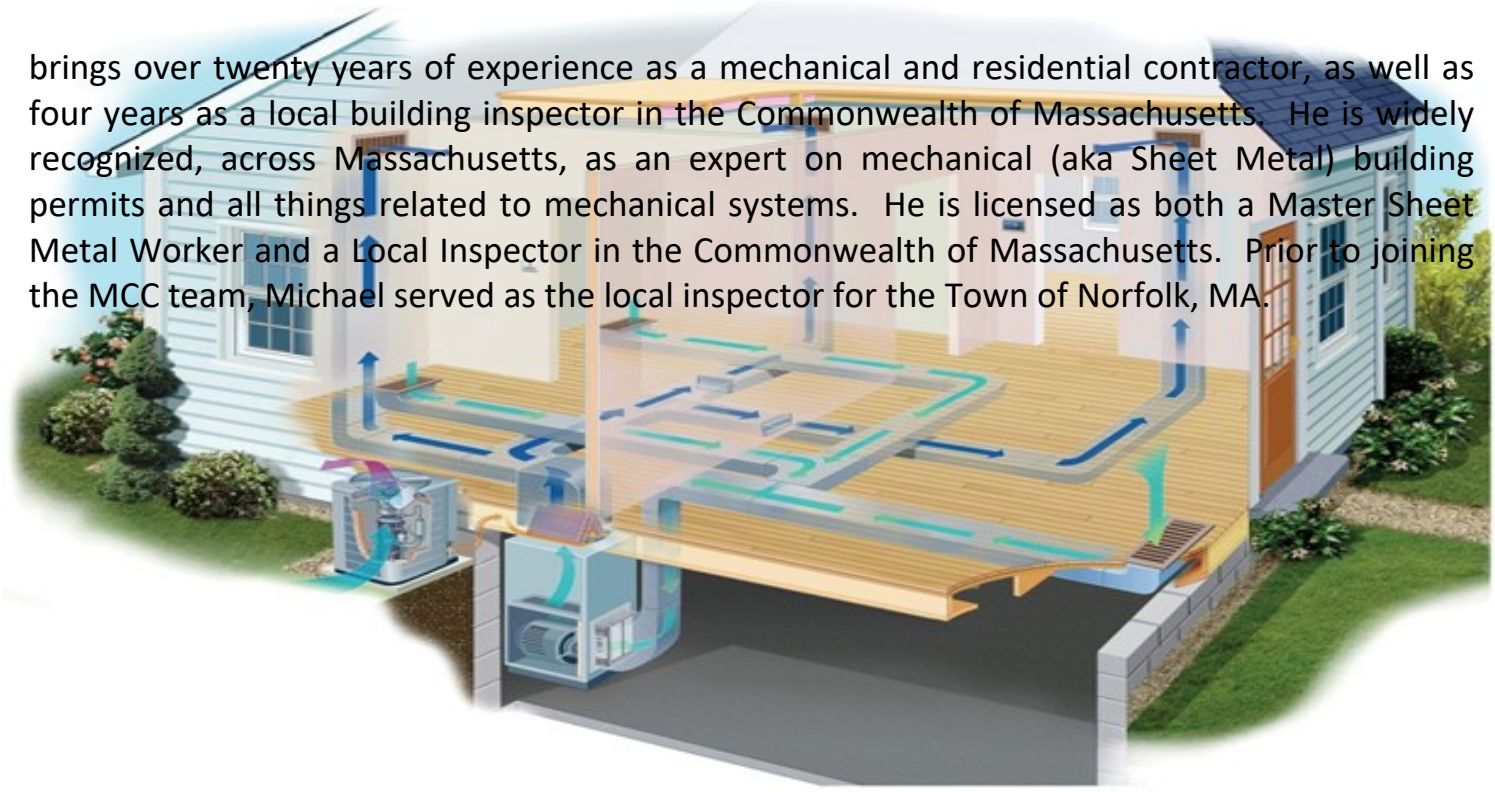
Building Code; Mechanical / HVAC Systems; Residential Construction

This seminar is offered to Metro-West Building Officials & code enforcement officials to help explain manual J, D and S relating to residential HVAC systems

present by

Michael S. Brogan

brings over twenty years of experience as a mechanical and residential contractor, as well as four years as a local building inspector in the Commonwealth of Massachusetts. He is widely recognized, across Massachusetts, as an expert on mechanical (aka Sheet Metal) building permits and all things related to mechanical systems. He is licensed as both a Master Sheet Metal Worker and a Local Inspector in the Commonwealth of Massachusetts. Prior to joining the MCC team, Michael served as the local inspector for the Town of Norfolk, MA.



MICHAEL S. BROGAN

1116 Great Plain Ave, Ste 207 • Needham, MA 02492
(617) 930-9004 • mbrogan@planreviewers.com

PROFESSIONAL PROFILE

Michael Brogan brings over twenty years of experience as a mechanical and residential contractor, as well as four years as a local building inspector in the Commonwealth of Massachusetts. He is widely recognized, across Massachusetts, as an expert on mechanical (aka Sheet Metal) building permits and all things related to mechanical systems. He is licensed as both a Master Sheet Metal Worker and a Local Inspector in the Commonwealth of Massachusetts. Prior to joining the MCC team, Michael served as the local inspector for the Town of Norfolk, MA.

EXPERTISE

Building code; mechanical / HVAC systems; residential construction

NOTABLE PROFESSIONAL EXPERIENCE

- Operations Manager, Municipal Code Consulting LLC (2019 – Present)
- Building Inspector / Plans Examiner, Municipal Code Consulting LLC (2018 – Present)
- Building / Mechanical Inspector, Town of Norfolk MA (2015 – 2018)
- Owner, Michael Brogan Contracting, Norfolk MA (2000 – Present)
- Owner, Airworks HVAC & Plumbing Inc, Norfolk MA (1994 – Present)

RELEVANT LICENSES / CERTIFICATIONS

- MA Certified Building Official – Local Inspector
- MA Master Sheet Metal Worker – Unrestricted
- MA Pipefitter License

RELEVANT PROJECTS

- Rosebrook Place, Wareham MA – Pre-occupancy commissioning of a 65-unit residential structure (all life safety and fire protection systems)
- Aquinnah Wampanoag Casino, Aquinnah MA – Design plan review and coordination of inspections for the proposed casino
- 400 Ocean Ave, Revere MA – Plan review of a new high-rise hotel (mechanical and architectural features)
- 1827 Bridge Street, Dracut MA – Plan review of mechanical systems for a new ~100,000 square foot assisted living facility with approx. 180 residential units
- Longplex, Tiverton RI – Inspection of mechanical and life safety systems
- Sugarbush Meadow, Sunderland MA – Principal mechanical plans examiner and building inspections (all phases)

Fresh Air
Cooler By Design

Manual S Compliance Report

1stfl

company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Cooling Equipment

Design Conditions

Outdoor design DB:	83.0 °F	Sensible gain:	9000	Btuh	Entering coil DB:	76.3°F
Outdoor design WB:	69.7 °F	Latent gain:	1654	Btuh	Entering coil WB:	62.9°F
Indoor design DB:	75.0 °F	Total gain:	10654	Btuh		
Indoor RH:	50 %	Estimated airflow:	473	cfm		

need to be filled in for ac equipment

Manufacturer's Performance Data at Actual Design Conditions

Equipment type: Split AC
Manufacturer: American Standard Model: 4A7A3018H1+C(A,C,D,E)30B44+S9X2B040U3PS+TDR
Actual airflow: 473 cfm

Sensible capacity:	12070	Btuh	134% of load		
Latent capacity:	2130	Btuh	129% of load		
Total capacity:	14200	Btuh	133% of load	SHR:	85%

70-85% correct value

Heating Equipment

Design Conditions

Outdoor design DB:	6.7 °F	Heat loss:	20145	Btuh	Entering coil DB:	68.4°F
Indoor design DB:	70.0 °F					

Manufacturer's Performance Data at Actual Design Conditions

Equipment type: Gas furnace
Manufacturer: American Standard Model: ADH1B040A9H21B*
Actual airflow: 473 cfm

Output capacity:	38000	Btuh	189% of load	Temp. rise:	50 °F

needs to be completed

must have this statement

Meets all requirements of ACCA Manual S.

Fresh Air
Cooler By Design

Manual S Compliance Report

2nd fl

company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Cooling Equipment

Design Conditions

Outdoor design DB:	83.0 °F	Sensible gain:	9678	Btuh	Entering coil DB:	76.4°F
Outdoor design WB:	69.7 °F	Latent gain:	1500	Btuh	Entering coil WB:	63.0°F
Indoor design DB:	75.0 °F	Total gain:	11178	Btuh		
Indoor RH:	50%	Estimated airflow:	470	cfm		

Manufacturer's Performance Data at Actual Design Conditions

Equipment type: Split AC
Manufacturer: American Standard Model: 4A7A3018H1+C(A,C,D,E)30A2G+S9X2B040U3PS+TDR

Actual airflow:	470	cfm		
Sensible capacity:	11985	Btuh	124% of load	
Latent capacity:	2115	Btuh	141% of load	
Total capacity:	14100	Btuh	126% of load	SHR: 85%

Heating Equipment

Design Conditions

Outdoor design DB:	6.7 °F	Heat loss:	22886	Btuh	Entering coil DB:	67.5°F
Indoor design DB:	70.0 °F					

Manufacturer's Performance Data at Actual Design Conditions

Equipment type: Gas furnace
Manufacturer: American Standard Model: ADD2A040A9242A*

Actual airflow:	470	cfm		
Output capacity:	32000	Btuh	140% of load	Temp. rise: 50 °F

Meets all requirements of ACCA Manual S.

must have this statement

Residential Plans Examiner Review Form for HVAC System Design (Loads, Equipment, Ducts)

Form RPER 1 15 Mar 09

Air Conditioning Contractors of America

Header Information

Contractor: company name your name

Mechanical license: **must have lic. type and #**

Building plan #:

Home address (Street or Lot#, Block, Subdivision): 123 main st, 1stfl

REQUIRED ATTACHMENTS	ATTACHED
Manual J1 Form (and supporting worksheets):	Yes ☐ No ☐
or MJ1AE Form* (and supporting worksheets):	Yes ☐ No ☐
OEM performance data (heating, cooling, blower):	Yes ☐ No ☐
Manual D Friction Rate Worksheet:	Yes ☐ No ☐
Duct distribution sketch:	Yes ☐ No ☐

HVAC LOAD CALCULATION (IRC M1401.3)

Design Conditions

Winter Design Conditions

Outdoor temperature:	7	°F
Indoor temperature:	70	°F
Total heat loss:	20145	Btuh

Summer Design Conditions

Outdoor temperature:	83	°F
Indoor temperature:	75	°F
Grains difference:	25 gr/lb @ 50% RH	
Sensible heat gain:	10227	Btuh
Latent heat gain:	1880	Btuh
Total heat gain:	12106	Btuh

Building Construction Information

Building

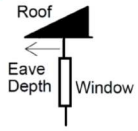
Orientation: Front Door faces Southwest
North, East, West, South, Northeast, Northwest, Southeast, Southwest

Number of bedrooms:	3	
Conditioned floor area:	1008	ft²
Number of occupants:	2	

total number of occupant 1 more bedrooms

Windows

Eave overhang depth:	0	ft
Internal shade: Blinds, drapes, etc.	none	
Number of skylights:	0	



HVAC EQUIPMENT SELECTION (IRC M1401.3)

Heating Equipment Data

Equipment type: Furnace, Heat pump, Boiler, etc.	Gas furnace
Model:	American Standard ADH1B040A9H21B*
Heating output capacity: Heat pumps - capacity at winter design outdoor conditions	38000 Btuh
Aux. heating output capacity:	0 Btuh

Cooling Equipment Data

Equipment type: Air Conditioner, Heat pump, etc.	Split AC
Model:	American Standard 4A7A3018H1
Total cooling capacity:	0 Btuh
Sensible cooling capacity:	0 Btuh
Latent cooling capacity:	0 Btuh

this will only be 0 if under 18k btu

Blower Data

Heating cfm:	473
Cooling cfm:	473
Static pressure: Fan's rated external static pressure for design airflow	0.70 in H2O

HVAC DUCT DISTRIBUTION SYSTEM DESIGN (IRC M1601.1)

Design airflow:	473	cfm	Longest supply duct:	228	ft	Duct Materials Used	
Equipment design ESP:	0.70	in H2O	Longest return duct:	296	ft	Trunk duct:	Sheet metal
Total device pressure losses:	-0.4	in H2O	**Total effective length (TEL):**	524	ft		
Available static pressure (ASP):	0.34	in H2O	**Friction rate:** Friction Rate = ASP ÷ (TEL x 100)	0.065	in/100ft	Branch duct:	Round flex vinyl

must have values

below .60 fails

make sure if flex is used its listed

I declare the load calculation, equipment, equipment selection and duct design were rigorously p listed above. I understand the claims made on these forms will be subject to review and verification.

Contractor's printed name: _____

must be signed

Contractor's signature: _____ Date: _____

Reserved for County, Town Municipality or Authority having jurisdiction use.

*Home qualifies for MJ1AE Form based on Abridged Edition Checklist

Residential Plans Examiner Review Form for HVAC System Design (Loads, Equipment, Ducts)

Air Conditioning Contractors of America

Form RPER 1 15 Mar 09

Header Information

Contractor: company name your name
Mechanical license: **must have lic. type and #**
Building plan #:

Home address (Street or Lot#, Block, Subdivision): 123 main st, 2nd fl

REQUIRED ATTACHMENTS	ATTACHED
Manual J1 Form (and supporting worksheets):	Yes ☐ No ☐
or MJ1AE Form* (and supporting worksheets):	Yes ☐ No ☐
OEM performance data (heating, cooling, blower):	Yes ☐ No ☐
Manual D Friction Rate Worksheet:	Yes ☐ No ☐
Duct distribution sketch:	Yes ☐ No ☐

HVAC LOAD CALCULATION (IRC M1401.3)

Design Conditions

pls check which way front door faces

Winter Design Conditio

Outdoor temperature:	7	°F
Indoor temperature:	70	°F
Total heat loss:	22886	Btuh

Summer Design Conditions

Outdoor temperature:	83	°F
Indoor temperature:	75	°F
Grains difference:	25 gr/lb @ 50% RH	
Sensible heat gain:	10997	Btuh
Latent heat gain:	1705	Btuh
Total heat gain:	12702	Btuh

Building Construction Information

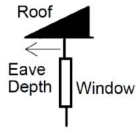
Building

Orientation: (North, East, West, South, Northeast, Northwest, Southeast, Southwest)	Front Door faces Southwest	
Number of bedrooms:	3	
Conditioned floor area:	1008	ft²
Number of occupants:	2	

additional 2 person total of 4

Windows

Eave overhang depth:	0	ft
Internal shade: (Blinds, drapes, etc.)	none	
Number of skylights:	0	



HVAC EQUIPMENT SELECTION (IRC M1401.3)

Heating Equipment Data

Equipment type: (Furnace, Heat pump, Boiler, etc.)	Gas furnace	
Model:	American Standard ADD2A040A9242A*	
Heating output capacity: (Heat pumps - capacity at winter design outdoor conditions)	32000	Btuh
Aux. heating output capacity:	0	Btuh

Cooling Equipment Data

Equipment type: (Air Conditioner, Heat pump, etc.)	Split AC	
Model:	American Standard 4A7A3018H1	
Total cooling capacity:	0	Btuh
Sensible cooling capacity:	0	Btuh
Latent cooling capacity:	0	Btuh

Blower Data

Heating cfm:	470	
Cooling cfm:	470	
Static pressure: (Fan's rated external static pressure for design airflow)	0.70	in H2O

HVAC DUCT DISTRIBUTION SYSTEM DESIGN (IRC M1601.1)

Design airflow:	470	cfm	Longest supply duct:	329	ft	Duct Materials Used	
Equipment design ESP:	0.70	in H2O	Longest return duct:	267	ft	Trunk duct:	Sheet metal
Total device pressure losses:	-0.3	in H2O	**Total effective length (TEL):**	596	ft		
Available static pressure (ASP):	0.36	in H2O	**Friction rate:** (Friction Rate = ASP ÷ (TEL x 100))	0.060	in/100ft	Branch duct:	Round flex vinyl

I declare the load calculation, equipment, equipment selection and duct design were rigorously performed based on the building plan listed above. I understand the claims made on these forms will be subject to review and verification.

Contractor's printed name: _____

Contractor's signature: _____ Date: _____

Reserved for County, Town Municipality or Authority having jurisdiction use.

*Home qualifies for MJ1AE Form based on Abridged Edition Checklist

Fresh Air
Cooler By Design

Load Short Form
Entire House
company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Design Information

	Htg	Clg
Outside db (°F)	7	83
Inside db (°F)	70	75
Design TD (°F)	63	8
Daily range	-	L
Inside humidity (%)	45	50
Moisture difference (gr/lb)	45	25

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	0

will be blank if home has more than 1 system

HEATING EQUIPMENT			COOLING EQUIPMENT		
Make	n/a		Make	n/a	
Trade	n/a		Trade	n/a	
Model	n/a		Cond	n/a	
AHRI ref	n/a		Coil	n/a	
			AHRI ref	n/a	
Efficiency			Efficiency		n/a
Heating input			Sensible cooling		0 Btuh
Heating output		0 Btuh	Latent cooling		0 Btuh
Temperature rise		0 °F	Total cooling		0 Btuh
Actual air flow		0 cfm	Actual air flow		0 cfm
Air flow factor		0 cfm/Btuh	Air flow factor		0 cfm/Btuh
Static pressure		0 in H2O	Static pressure		0 in H2O
Space thermostat	n/a		Load sensible heat ratio		0

ROOM NAME		Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
2nd fl	d	1008	22435	9621	470	470
1stfl	d	1008	20145	9000	473	473
Entire House	d	2016	42581	18620	943	943
Other equip loads			451	57		
Equip. @ 0.88 RSM				16436		
Latent cooling				3045		
TOTALS		2016	43032	19481	943	943

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Fresh Air
Cooler By Design

Load Short Form

1stfl

company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Design Information

	Htg	Clg
Outside db (°F)	7	83
Inside db (°F)	70	75
Design TD (°F)	63	8
Daily range	-	L
Inside humidity (%)	40	50
Moisture difference (gr/lb)	39	25

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	0

HEATING EQUIPMENT

Make	American Standard		
Trade	AMERICAN STANDARD		
Model	ADH1B040A9H21B*		
AHRI ref	5722420		
Efficiency		95 AFUE	
Heating input		40000	Btuh
Heating output		38000	Btuh
Temperature rise		76	°F
Actual air flow		473	cfm
Air flow factor		0.023	cfm/Btuh
Static pressure		0.70	in H2O
Space thermostat			

COOLING EQUIPMENT

Make	American Standard		
Trade	AMERICAN STANDARD		
Cond	4A7A3018H1		
Coil	C(A,C,D,E)30B44+S9X2B040U3PS+TDR		
AHRI ref	10208688		
Efficiency		12.5 EER, 15 SEER	
Sensible cooling		12070	Btuh
Latent cooling		2130	Btuh
Total cooling		14200	Btuh
Actual air flow		473	cfm
Air flow factor		0.053	cfm/Btuh
Static pressure		0.70	in H2O
Load sensible heat ratio		0.84	

must be filled in, good to check to see if it is actually whats there..

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
living	208	4563	3060	107	161
den	196	4211	1574	99	83
kitchen	195	3794	2382	89	125
base stairs	40	0	0	0	0
lav	40	1802	603	42	32
dining	251	4388	1004	103	53
foyer/stairs	78	1389	376	33	20

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

1stfl	d	1008	20145	9000	473	473
Other equip loads			0	0		
Equip. @ 0.88	RSM			7920		
Latent cooling				1654		
TOTALS		1008	20145	9574	473	473

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Fresh Air
Cooler By Design

Load Short Form
2nd fl
company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Design Information

	Htg	Clg
Outside db (°F)	7	83
Inside db (°F)	70	75
Design TD (°F)	63	8
Daily range	-	L
Inside humidity (%)	50	50
Moisture difference (gr/lb)	50	25

masonry type only

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	0

new home should be tight to semi tight older ok to lean towards average and pre 80's may be loose

HEATING EQUIPMENT

Make	American Standard
Trade	AMERICAN STANDARD
Model	ADD2A040A9242A*
AHRI ref	2016744

Efficiency	80 AFUE	
Heating input	40000	Btuh
Heating output	32000	Btuh
Temperature rise	64	°F
Actual air flow	470	cfm
Air flow factor	0.021	cfm/Btuh
Static pressure	0.70	in H2O
Space thermostat		

COOLING EQUIPMENT

Make	American Standard
Trade	ASPEN
Cond	4A7A3018H1
Coil	C(A,C,D,E)30A2G+S9X2B040U3PS+TDR
AHRI ref	10208692

Efficiency	11.8 EER, 14 SEER	
Sensible cooling	11985	Btuh
Latent cooling	2115	Btuh
Total cooling	14100	Btuh
Actual air flow	470	cfm
Air flow factor	0.049	cfm/Btuh
Static pressure	0.70	in H2O
Load sensible heat ratio	0.87	

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
bed3	132	3692	2463	77	120
laundry	42	1217	259	25	13
bed2	120	2652	1413	56	69
closet2	49	1638	234	34	11
m bath	80	1712	365	36	18
wi	60	1909	276	40	14
bath	63	1612	319	34	16
stair an hall	140	0	0	0	0
bed4	70	2029	647	42	32
master	252	5975	3642	125	178

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

2nd fl	d	1008	22435	9621	470	470
Other equip loads			451	57		
Equip. @ 0.88	RSM			8516		
Latent cooling				1500		
TOTALS		1008	22886	10016	470	470

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Fresh Air
Cooler By Design

Component Constructions
Entire House
company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Design Conditions

Location:
Worcester Regional AP, MA, US
Elevation: 1017 ft
Latitude: 42°N

must be your area

Outdoor:	**Heating**	**Cooling**
Dry bulb (°F)	7	83
Daily range (°F)	-	16 (L)
Wet bulb (°F)	-	70
Wind speed (mph)	15.0	7.5

these values are from location data

Indoor:	**Heating**	**Cooling**
Indoor temperature (°F)	70	75
Design TD (°F)	63	8
Relative humidity (%)	45	50
Moisture difference (gr/lb)	44.6	24.9

Infiltration:

Method	Simplified
Construction quality	Average
Fireplaces	0

Construction descriptions	**Or**	**Area** ft²	**U-value** Btuh/ft²-°F	**Insul R** ft²-°F/Btuh	**Htg HTM** Btuh/ft²	**Loss** Btuh	**Clg HTM** Btuh/ft²	**Gain** Btuh
Walls								
12F-0sw: Frm wall, vnl ext, 1/2" wood shth, r-21 cav ins, 1/2" gypsum board int fnsh, 2"x6" wood frm, 16" o.c. stud	n	499	0.065	21.0	4.11	2053	0.68	337
	e	388	0.065	21.0	4.11	1596	0.68	262
	s	468	0.065	21.0	4.11	1926	0.68	316
	w	385	0.065	21.0	4.11	1584	0.68	260
	all	1740	0.065	21.0	4.11	7159	0.68	1176
Partitions								
(none)								
Windows								
10C-w: 2 glazing, clr low-e outr, air gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.24); 6.67 ft head ht	n	35	0.300	0	19.0	665	4.89	171
2 glazing, clr low-e outr, argon gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk: 2 glazing, clr low-e outr, argon gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk; 6.67 ft head ht	n	42	0.300	0	19.0	798	8.13	341
	e	60	0.300	0	19.0	1139	30.6	1833
	s	87	0.300	0	19.0	1652	15.5	1347
	w	42	0.300	0	19.0	798	30.6	1283
	all	231	0.300	0	19.0	4387	20.8	4805
Doors								
11D0: Door, wd sc type	s	21	0.390	0	24.7	518	8.42	177
	w	21	0.390	0	24.7	518	8.42	177
	all	42	0.390	0	24.7	1037	8.42	354
Ceilings								
16B-50ad: Attic ceiling, asphalt shingles roof mat, r-50 ceil ins, 1/2" gypsum board int fnsh		1008	0.020	50.0	1.27	1276	0.90	909
		1008	0.020	50.0	1.27	1276	0.90	909
	all	2016	0.020	50.0	1.27	2552	0.90	1818
Floors								
19A-0bswp: Part floor, hrd wd flr fnsh, frm flr, 10" thkns, 1/2" gypsum board int fnsh		1008	0.295	0	7.01	7071	0.89	894
19A-38bswp: Flr floor, frm flr, 10" thkns, hrd wd flr fnsh, r-38 cav ins, tight bsmt ovr		1008	0.029	38.0	1.58	1591	0.20	201

wall r value

window u values

attic r value

floor insulation r value

Fresh Air
Cooler By Design

Component Constructions
1stfl
company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Design Conditions

Location:
Worcester Regional AP, MA, US
Elevation: 1017 ft
Latitude: 42°N

Outdoor:	**Heating**	**Cooling**
Dry bulb (°F)	7	83
Daily range (°F)	-	16 (L)
Wet bulb (°F)	-	70
Wind speed (mph)	15.0	7.5

Indoor:	**Heating**	**Cooling**
Indoor temperature (°F)	70	75
Design TD (°F)	63	8
Relative humidity (%)	40	50
Moisture difference (gr/lb)	38.9	24.9

Infiltration:	
Method	Simplified
Construction quality	Average
Fireplaces	0

Construction descriptions	**Or**	**Area** ft²	**U-value** Btuh/ft²-°F	**Insul R** ft²-°F/Btuh	**Htg HTM** Btuh/ft²	**Loss** Btuh	**Clg HTM** Btuh/ft²	**Gain** Btuh
Walls								
12F-0sw: Frm wall, vnl ext, 1/2" wood shth, r-21 cav ins, 1/2" gypsum board int fnsh, 2"x6" wood frm, 16" o.c. stud	n	241	0.065	21.0	4.11	992	0.68	163
	e	200	0.065	21.0	4.11	823	0.68	135
	s	219	0.065	21.0	4.11	901	0.68	148
	w	185	0.065	21.0	4.11	761	0.68	125
	all	845	0.065	21.0	4.11	3477	0.68	571
Partitions								
(none)								
Windows								
10C-w: 2 glazing, clr low-e outr, air gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.24); 6.67 ft head ht	n	35	0.300	0	19.0	665	4.89	171
2 glazing, clr low-e outr, argon gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk: 2 glazing, clr low-e outr, argon gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk; 6.67 ft head ht	n	12	0.300	0	19.0	228	8.13	98
	e	24	0.300	0	19.0	456	30.6	733
	s	48	0.300	0	19.0	912	15.5	743
	w	18	0.300	0	19.0	342	30.6	550
	all	102	0.300	0	19.0	1937	20.8	2124
Doors								
11D0: Door, wd sc type	s	21	0.390	0	24.7	518	8.42	177
	w	21	0.390	0	24.7	518	8.42	177
	all	42	0.390	0	24.7	1037	8.42	354
Ceilings								
16B-50ad: Attic ceiling, asphalt shingles roof mat, r-50 ceil ins, 1/2" gypsum board int fnsh		1008	0.020	50.0	1.27	1276	0.90	909
Floors								
19A-38bswp: Flr floor, frm flr, 10" thkns, hrd wd flr fnsh, r-38 cav ins, tight bsmt ovr		1008	0.029	38.0	1.58	1591	0.20	201

Fresh Air
Cooler By Design

Component Constructions
2nd fl
company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Design Conditions

Location:
Worcester Regional AP, MA, US
Elevation: 1017 ft
Latitude: 42°N

Outdoor:	**Heating**	**Cooling**
Dry bulb (°F)	7	83
Daily range (°F)	-	16 (L)
Wet bulb (°F)	-	70
Wind speed (mph)	15.0	7.5

Indoor:	**Heating**	**Cooling**
Indoor temperature (°F)	70	75
Design TD (°F)	63	8
Relative humidity (%)	50	50
Moisture difference (gr/lb)	50.4	24.9

Infiltration:	
Method	Simplified
Construction quality	Average
Fireplaces	0

Construction descriptions	**Or**	**Area** ft²	**U-value** Btuh/ft²-°F	**Insul R** ft²-°F/Btuh	**Htg HTM** Btuh/ft²	**Loss** Btuh	**Clg HTM** Btuh/ft²	**Gain** Btuh
Walls								
12F-0sw: Frm wall, vnl ext, 1/2" wood shth, r-21 cav ins, 1/2" gypsum board int fnsh, 2"x6" wood frm, 16" o.c. stud	n	258	0.065	21.0	4.11	1062	0.68	174
	e	188	0.065	21.0	4.11	774	0.68	127
	s	249	0.065	21.0	4.11	1025	0.68	168
	w	200	0.065	21.0	4.11	823	0.68	135
	all	895	0.065	21.0	4.11	3682	0.68	605
Partitions								
(none)								
Windows								
2 glazing, clr low-e outr, argon gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk: 2 glazing, clr low-e outr, argon gas, wd frm mat, clr innr, 1/4" gap, 1/8" thk; 6.67 ft head ht	n	30	0.300	0	19.0	570	8.13	244
	e	36	0.300	0	19.0	684	30.6	1100
	s	39	0.300	0	19.0	741	15.5	604
	w	24	0.300	0	19.0	456	30.6	733
	all	129	0.300	0	19.0	2450	20.8	2681
Doors								
(none)								
Ceilings								
16B-50ad: Attic ceiling, asphalt shingles roof mat, r-50 ceil ins, 1/2" gypsum board int fnsh		1008	0.020	50.0	1.27	1276	0.90	909
Floors								
19A-0bswp: Part floor, hrd wd flr fnsh, frm flr, 10" thkns, 1/2" gypsum board int fnsh		1008	0.295	0	7.01	7071	0.89	894

no r value do to in conditioned space

Fresh Air
Cooler By Design

Project Summary
Entire House
company name

company addresss, town your company is in License: **must have lic. type and #**

Job: 1234
Date: Dec. 30th 2018
By: mb

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Notes:

Design Information

Weather: Worcester Regional AP, MA, US — very important

Winter Design Conditions

Outside db	7	°F
Inside db	70	°F
Design TD	63	°F

Summer Design Conditions

Outside db	83	°F
Inside db	75	°F
Design TD	8	°F
Daily range	L	
Relative humidity	50	%
Moisture difference	25	gr/lb

Heating Summary

Structure	37088	Btuh
Ducts	5492	Btuh
Central vent (7 cfm)	451	Btuh
Humidification	0	Btuh
Piping	0	Btuh
Equipment load	43032	Btuh

Sensible Cooling Equipment Load Sizing

Structure	14760	Btuh
Ducts	3860	Btuh
Central vent (7 cfm)	57	Btuh
Blower	0	Btuh
Use manufacturer's data	n	
Rate/swing multiplier	0.88	
Equipment sensible load	16436	Btuh

Infilt

If new home must have mechanical ventilation

Method	
Construction quality	
Fireplaces	

	Heating	Cooling
Area (ft²)	2016	2016
Volume (ft³)	16128	16128
Air changes/hour	0.41	0.21
Equiv. AVF (cfm)	110	56

Latent Cooling Equipment Load Sizing

Structure	2376	Btuh
Ducts	668	Btuh
Central vent (7 cfm)	109	Btuh
Equipment latent load	3045	Btuh
Equipment Total Load (Sen+Lat)	19481	Btuh
Req. total capacity at 0.70 SHR	2.0	ton

Heating Equipment Summary

Make	n/a		
Trade	n/a		
Model	n/a		
AHRI ref	n/a		
Efficiency		n/a	
Heating input			
Heating output		0	Btuh
Temperature rise		0	°F
Actual air flow		0	cfm
Air flow factor		0	cfm/Btuh
Static pressure		0	in H2O
Space thermostat	n/a		

Cooling Equipment Summary

Make	n/a		
Trade	n/a		
Cond	n/a		
Coil	n/a		
AHRI ref	n/a		
Efficiency		n/a	
Sensible cooling		0	Btuh
Latent cooling		0	Btuh
Total cooling		0	Btuh
Actual air flow		0	cfm
Air flow factor		0	cfm/Btuh
Static pressure		0	in H2O
Load sensible heat ratio		0	

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Fresh Air
Cooler By Design

Project Summary
1stfl
company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Notes:

Design Information

Weather: Worcester Regional AP, MA, US

Winter Design Conditions

Outside db	7	°F
Inside db	70	°F
Design TD	63	°F

Summer Design Conditions

Outside db	83	°F
Inside db	75	°F
Design TD	8	°F
Daily range	L	
Relative humidity	50	%
Moisture difference	25	gr/lb

Heating Summary

Structure	17378	Btuh
Ducts	2768	Btuh
Central vent (0 cfm)	0	Btuh
Outside air		
Humidification	0	Btuh
Piping	0	Btuh
Equipment load	20145	Btuh

Sensible Cooling Equipment Load Sizing

Structure	7069	Btuh
Ducts	1930	Btuh
Central vent (0 cfm)	0	Btuh
Outside air		
Blower	0	Btuh
Use manufacturer's data	n	
Rate/swing multiplier	0.88	
Equipment sensible load	7920	Btuh

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	0

	Heating	Cooling
Area (ft²)	1008	1008
Volume (ft³)	8064	8064
Air changes/hour	0.82	0.42
Equiv. AVF (cfm)	110	56

Latent Cooling Equipment Load Sizing

Structure	1320	Btuh
Ducts	334	Btuh
Central vent (0 cfm)	0	Btuh
Outside air		
Equipment latent load	1654	Btuh
Equipment Total Load (Sen+Lat)	9574	Btuh
Req. total capacity at 0.85 SHR	0.8	ton

Heating Equipment Summary

Make	American Standard
Trade	AMERICAN STANDARD
Model	ADH1B040A9H21B*
AHRI ref	5722420

Efficiency	95	AFUE
Heating input	40000	Btuh
Heating output	38000	Btuh
Temperature rise	76	°F
Actual air flow	473	cfm
Air flow factor	0.023	cfm/Btuh
Static pressure	0.70	in H2O
Space thermostat		

Cooling Equipment Summary

Make	American Standard
Trade	AMERICAN STANDARD
Cond	4A7A3018H1
Coil	C(A,C,D,E)30B44+S9X2B040U3PS+TDR
AHRI ref	10208688

Efficiency	12.5 EER, 15 SEER	
Sensible cooling	12070	Btuh
Latent cooling	2130	Btuh
Total cooling	14200	Btuh
Actual air flow	473	cfm
Air flow factor	0.053	cfm/Btuh
Static pressure	0.70	in H2O
Load sensible heat ratio	0.84	

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Fresh Air
Cooler By Design

Project Summary
2nd fl
company name

company addresss, town your company is in License: **must have lic. type and #**

Job: 1234
Date: Dec. 30th 2018
By: mb

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Notes:

Design Information

Weather: Worcester Regional AP, MA, US

Winter Design Conditions

Outside db	7	°F
Inside db	70	°F
Design TD	63	°F

Summer Design Conditions

Outside db	83	°F
Inside db	75	°F
Design TD	8	°F
Daily range	L	
Relative humidity	50	%
Moisture difference	25	gr/lb

mechanical ventilation

Heating Summ

Structure	19711	Btuh
Ducts	2725	Btuh
Central vent (7 cfm)	451	Btuh
Outside air		
Humidification	0	Btuh
Piping	0	Btuh
Equipment load	22886	Btuh

Sensible Cooling Equipment Load Sizing

Structure	7691	Btuh
Ducts	1930	Btuh
Central vent (7 cfm)	57	Btuh
Outside air		
Blower	0	Btuh
Use manufacturer's data	n	
Rate/swing multiplier	0.88	
Equipment sensible load	8516	Btuh

Infiltration

Method	Simplified
Construction quality	Average
Fireplaces	0

	Heating	Cooling
Area (ft²)	1008	1008
Volume (ft³)	8064	8064
Air changes/hour	0.58	0.30
Equiv. AVF (cfm)	78	40

Latent Cooling Equipment Load Sizing

Structure	1057	Btuh
Ducts	334	Btuh
Central vent (7 cfm)	109	Btuh
Outside air		
Equipment latent load	1500	Btuh
Equipment Total Load (Sen+Lat)	10016	Btuh
Req. total capacity at 0.85 SHR	0.8	ton

Heating Equipment Summary

Make	American Standard
Trade	AMERICAN STANDARD
Model	ADD2A040A9242A*
AHRI ref	2016744

Efficiency	80	AFUE
Heating input	40000	Btuh
Heating output	32000	Btuh
Temperature rise	64	°F
Actual air flow	470	cfm
Air flow factor	0.021	cfm/Btuh
Static pressure	0.70	in H2O
Space thermostat		

Cooling Equipment Summary

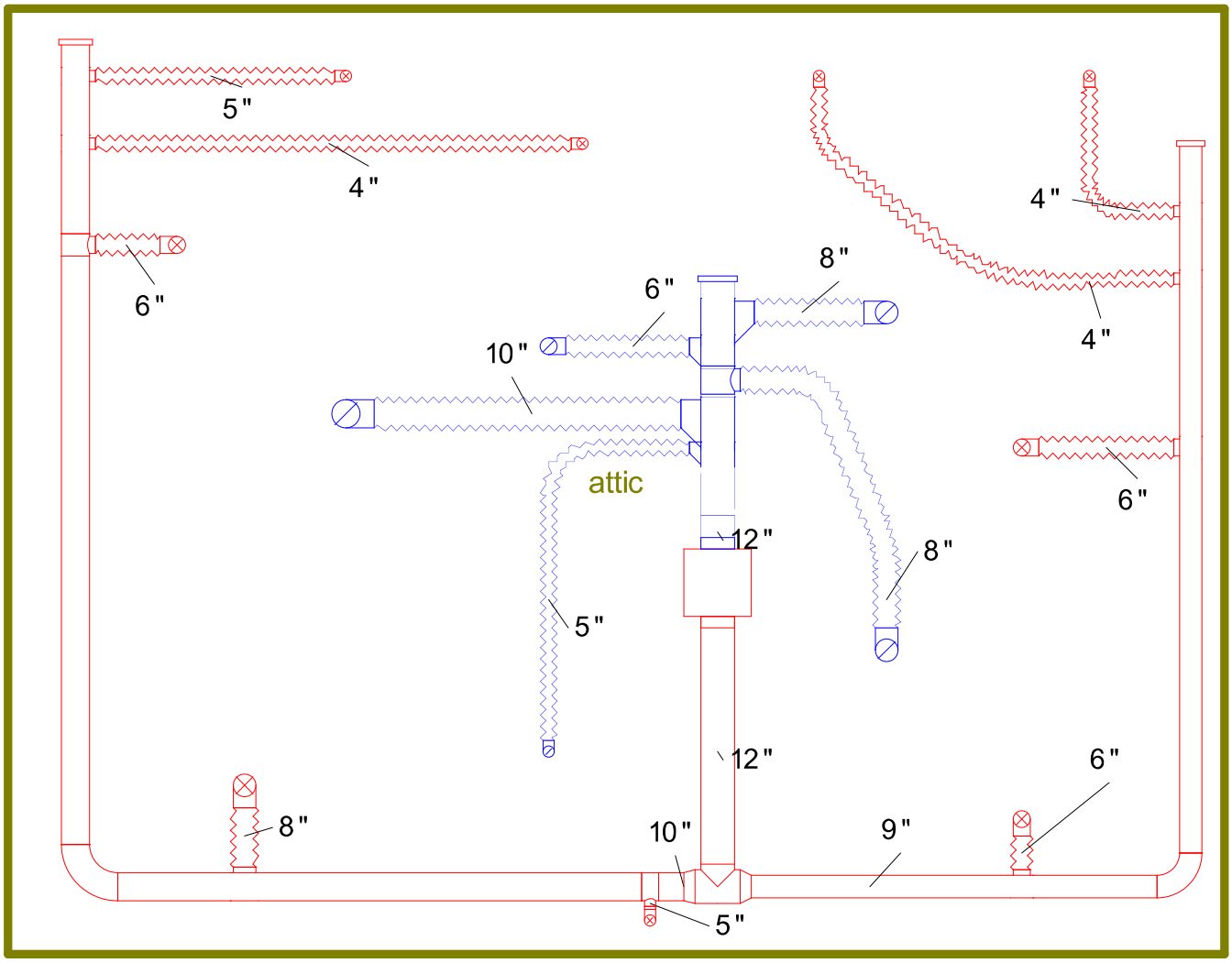
Make	American Standard
Trade	ASPEN
Cond	4A7A3018H1
Coil	C(A,C,D,E)30A2G+S9X2B040U3PS+TDR
AHRI ref	10208692

Efficiency	11.8 EER, 14 SEER	
Sensible cooling	11985	Btuh
Latent cooling	2115	Btuh
Total cooling	14100	Btuh
Actual air flow	470	cfm
Air flow factor	0.049	cfm/Btuh
Static pressure	0.70	in H2O
Load sensible heat ratio	0.87	

must be complete

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

attic



Job #: 1234
Performed by mb for:
contractor name
123 main st
town you are working in, ma 12345
Phone: must have contact#

company name

company addresss
town your company is in

Scale: 1 : 63

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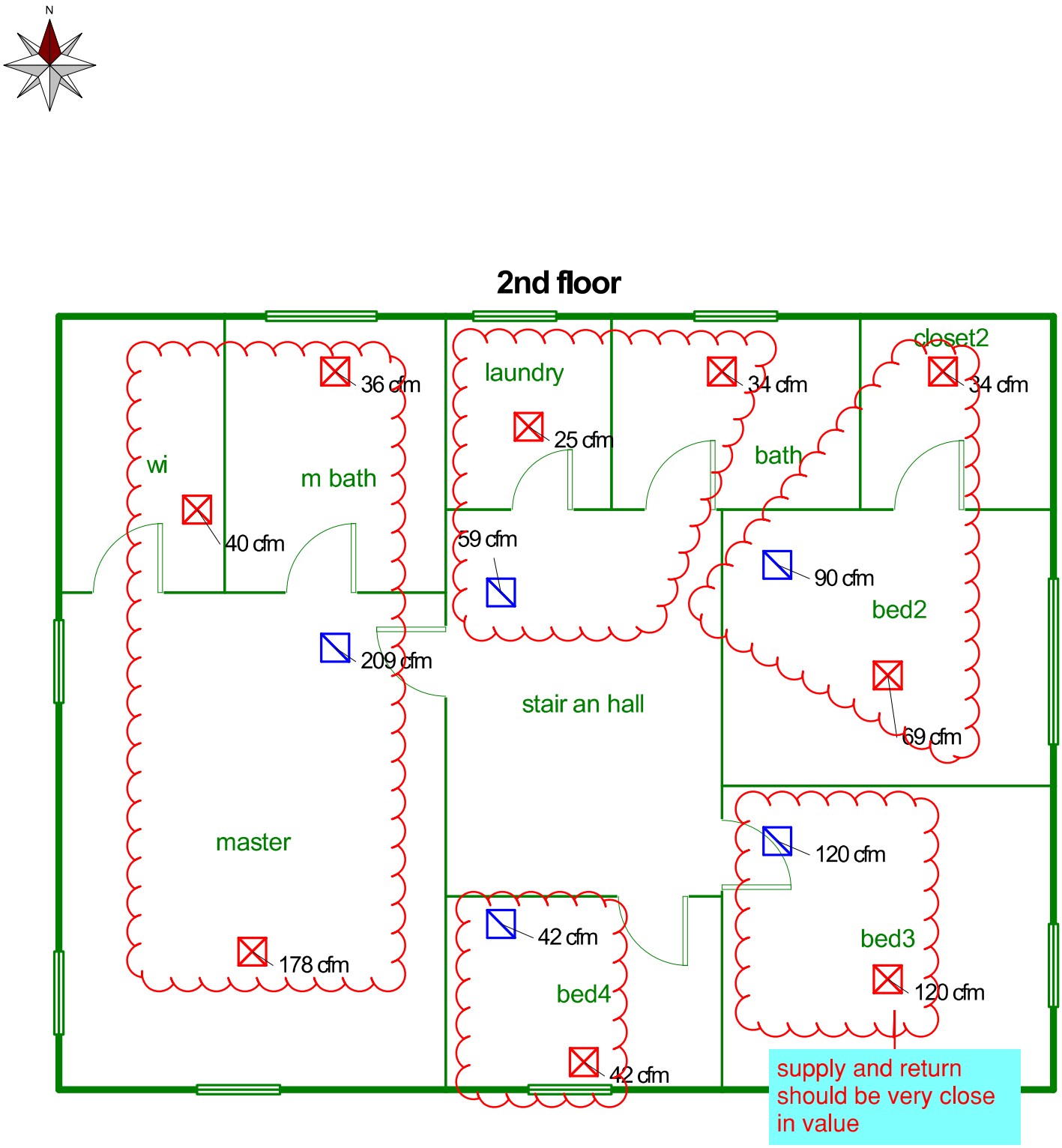
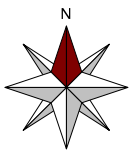
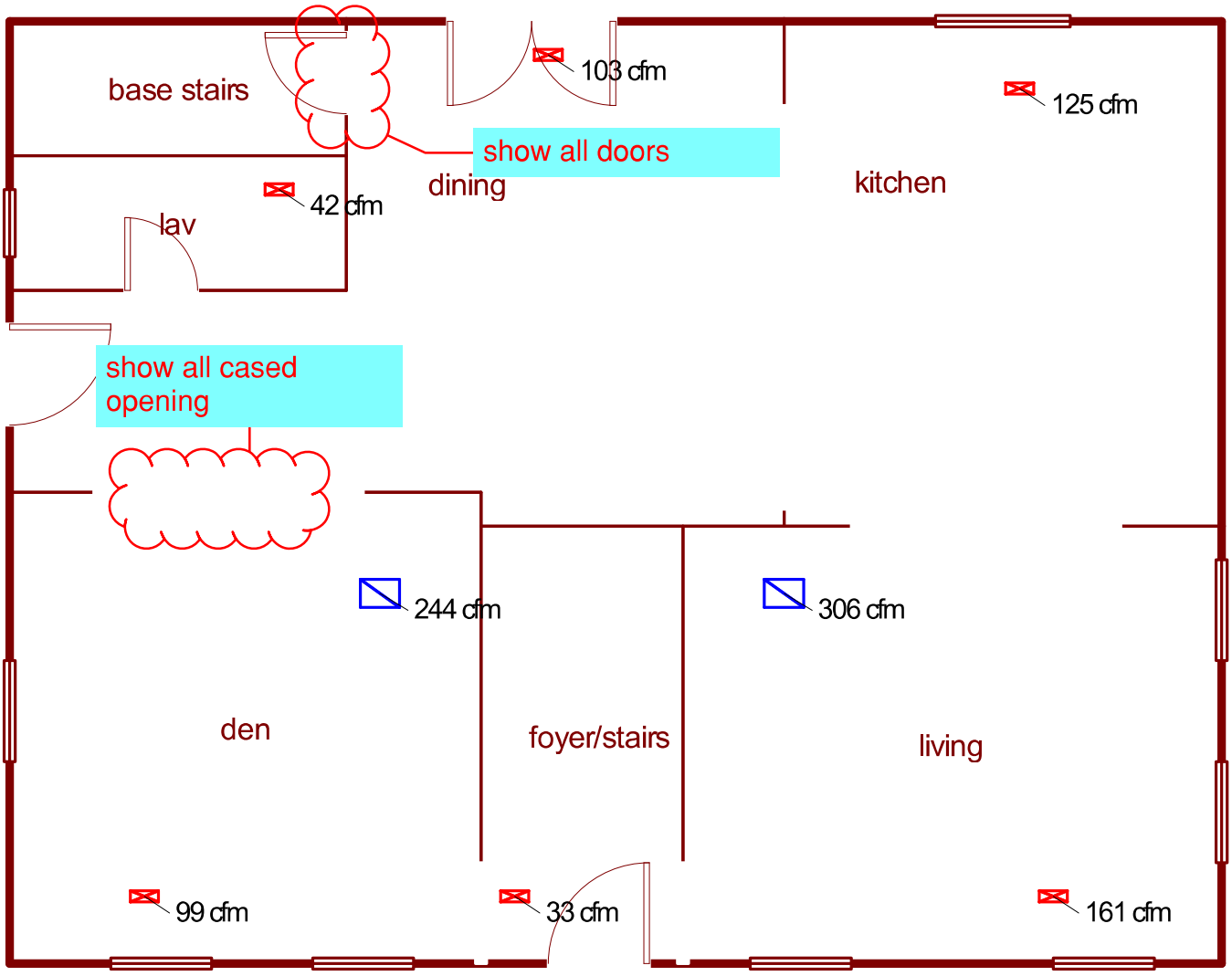


Job #: 1234 **Performed by mb for:** contractor name 123 main st town you are working in, ma 12345 Phone: must have contact#	**company name** company addresss town your company is in	Scale: 1 : 63 Page 2 Right-Suite® Universal 2018 18.0.32 RSU06606 2019-May-12 17:04:55 ...HVAC\shrewburytown templete.rup



1st floor



Job #: 1234
Performed by mb for:
contractor name
123 main st
town you are working in, ma 12345
Phone: must have contact#

company name

company addresss
town your company is in

Scale: 1 : 63

Right-Suite® Universal 2018
18.0.32 RSU06606
2019-May-12 17:04:55
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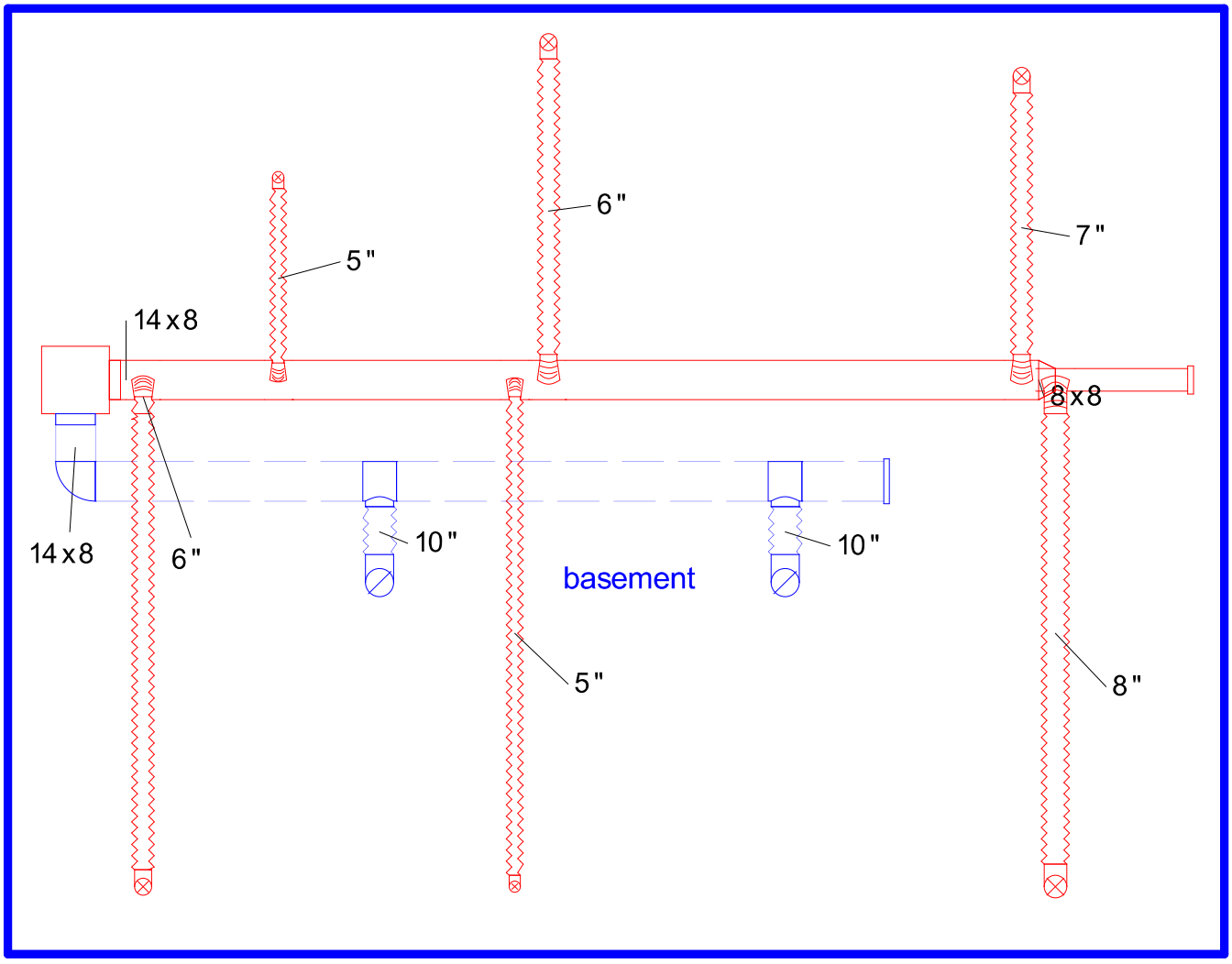
basement



Job #: 1234
Performed by mb for:
contractor name
123 main st
town you are working in, ma 12345
Phone: must have contact#

company name

company addresss
town your company is in

Scale: 1 : 63

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18.0.32 RSU06606
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Duct System Summary

1stfl

company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

	Heating	Cooling
External static pressure	0.70 in H2O	0.70 in H2O
Pressure losses	0.36 in H2O	0.36 in H2O
Available static pressure	0.34 in H2O	0.34 in H2O
Supply / return available pressure	0.148 / 0.192 in H2O	0.148 / 0.192 in H2O
Lowest friction rate	0.065 in/100ft	0.065 in/100ft
Actual air flow	473 cfm	473 cfm
Total effective length (TEL)	524 ft	

Supply Branch Detail Table

Name	Design (Btuh)	Htg (cfm)	Clg (cfm)	Design FR	Diam (in)	H x W (in)	Duct Matl	Actual Ln (ft)	Ftg.Eqv Ln (ft)	Trunk
den	h 4211	99	83	0.072	6.0	0x 0	VlFx	16.0	190.0	st2
dining	h 4388	103	53	0.075	6.0	0x 0	VlFx	23.0	175.0	st2
foyer/stairs	h 1389	33	20	0.071	5.0	0x 0	VlFx	27.0	180.0	st2
kitchen	c 2382	89	125	0.074	7.0	0x 0	VlFx	36.0	165.0	st2
lav	h 1802	42	32	0.075	5.0	0x 0	VlFx	11.0	185.0	st2
living	c 3060	107	161	0.065	8.0	0x 0	VlFx	43.0	185.0	st2A

flex

Supply Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
st2	Peak AVF	473	473	0.065	608	11.4	8 x 14	ShtMetl	
st2A	Peak AVF	107	161	0.065	362	7.6	8 x 8	ShtMetl	st2

try to keep under 700 fpm

metal

Return Branch Detail Table

Name	Grille Size (in)	Htg (cfm)	Clg (cfm)	TEL (ft)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Stud/Joist Opening (in)	Duct Matl	Trunk
rb23	0x 0	244	167	179.0	0.107	448	10.0	0x 0		VlFx	rt2
rb24	0x 0	229	306	296.0	0.065	561	10.0	0x 0		VlFx	rt2

Return Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
rt2	Peak AVF	473	473	0.065	608	11.4	8 x 14	ShtMetl	

Fresh Air
Cooler By Design

Duct System Summary

2nd fl

company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

	Heating	Cooling
External static pressure	0.70 in H2O	0.70 in H2O
Pressure losses	0.34 in H2O	0.34 in H2O
Available static pressure	0.36 in H2O	0.36 in H2O
Supply / return available pressure	0.199 / 0.161 in H2O	0.199 / 0.161 in H2O
Lowest friction rate	0.060 in/100ft	0.060 in/100ft
Actual air flow	470 cfm	470 cfm
Total effective length (TEL)	596 ft	

Supply Branch Detail Table

Name		Design (Btuh)	Htg (cfm)	Clg (cfm)	Design FR	Diam (in)	H x W (in)	Duct Matl	Actual Ln (ft)	Ftg.Eqv Ln (ft)	Trunk
bath	h	1612	34	16	0.066	***4.0***	***0*** x ***0***	VlFx	54.5	245.0	st3
bed2	c	1413	56	69	0.070	***6.0***	***0*** x ***0***	VlFx	40.0	245.0	st3
bed3	c	2463	77	120	0.081	***6.0***	***0*** x ***0***	VlFx	19.0	225.0	st3
bed4	h	2029	42	32	0.072	***5.0***	***0*** x ***0***	VlFx	11.0	265.0	st4
closet2	h	1638	34	11	0.071	***4.0***	***0*** x ***0***	VlFx	49.0	230.0	st3
laundry	h	1217	25	13	0.064	4.0	0 x 0	VlFx	64.0	245.0	st4
m bath	h	1712	36	18	0.068	5.0	0 x 0	VlFx	59.0	235.0	st4
master	c	3642	125	178	0.078	***8.0***	***0*** x ***0***	VlFx	25.0	230.0	st4
wi	h	1909	40	14	0.060	6.0	0 x 0	VlFx	49.0	280.0	st4

overridden values are ok as long as not to many than design is after thought

Supply Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
st4	Peak AVF	269	254	0.060	493	10.0	0 x 0	ShtMetl	st1
st3	Peak AVF	201	216	0.066	490	9.0	0 x 0	ShtMetl	st1
st1	Peak AVF	470	470	0.060	598	12.0	0 x 0	ShtMetl	

Bold/italic values have been manually overridden

will only display if values have been overridden may be turned off thou

Return Branch Detail Table

Name	Grille Size (in)	Htg (cfm)	Clg (cfm)	TEL (ft)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Stud/Joist Opening (in)	Duct Matl	Trunk
rb1	0x 0	201	209	135.0	0.119	384	***10.0***	***0***x ***0***		VlFx	rt1
rb25	0x 0	59	28	201.0	0.080	302	6.0	0x 0		VlFx	rt1
rb2	0x 0	77	120	196.4	0.082	345	8.0	0x 0		VlFx	rt1
rb5	0x 0	42	32	102.0	0.158	312	5.0	0x 0		VlFx	rt1
rb3	0x 0	90	81	267.0	0.060	257	8.0	0x 0		VlFx	rt1

Return Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
rt1	Peak AVF	470	470	0.060	598	12.0	0 x 0	ShtMetl	

Bold/italic values have been manually overridden

Fresh Air
Cooler By Design

Static Pressure and Friction Rate

1stfl

company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Available Static Pressure

	Heating (in H2O)	Cooling (in H2O)
External static pressure	0.70	0.70
Pressure losses		
Coil	0.12	0.12
Heat exchanger	0	0
Supply diffusers	0.03	0.03
Return grilles	0.03	0.03
Filter	0.15	0.15
Humidifier	0	0
Balancing damper	0.03	0.03
Other device	0	0
Available static pressure	0.34	0.34

should not be over .80 to start

all filters have diff. values

Total Effective Length

	Supply (ft)	Return (ft)
Measured length of run-out	15	3
Measured length of trunk	28	23
Equivalent length of fittings	185	270
Total length	228	296
Total effective length		524

Friction Rate

	Heating (in/100ft)		Cooling (in/100ft)	
Supply Ducts	0.065	OK	0.065	OK
Return Ducts	0.065	OK	0.065	OK

Fitting Equivalent Length Details

Supply 4G=80, 2K0=50, 12H1=20, 1C=35: TotalEL=185

Return 6M=20, 6C6=115, 8B7=65, 6CB=25, 5H1=45: TotalEL=270

must say ok

Fresh Air
Cooler By Design

Static Pressure and Friction Rate

2nd fl

company name

Job: 1234
Date: Dec. 30th 2018
By: mb

company addresss, town your company is in License: **must have lic. type and #**

Project Information

For: contractor name, your co name
123 main st, town you are working in, ma 12345
Phone: must have contact #

Available Static Pressure

	Heating (in H2O)	Cooling (in H2O)
External static pressure	0.70	0.70
Pressure losses		
Coil	0.10	0.10
Heat exchanger	0	0
Supply diffusers	0.03	0.03
Return grilles	0.03	0.03
Filter	0.15	0.15
Humidifier	0	0
Balancing damper	0.03	0.03
Other device	0	0
Available static pressure	0.36	0.36

diff coils will have diff values

all highlighted values are constant

Total Effective Length

	Supply (ft)	Return (ft)
Measured length of run-out	3	5
Measured length of trunk	46	7
Equivalent length of fittings	280	255
Total length	329	267
Total effective length		596

Friction Rate

	Heating (in/100ft)		Cooling (in/100ft)	
Supply Ducts	0.060	OK	0.060	OK
Return Ducts	0.060	OK	0.060	OK

Fitting Equivalent Length Details

Supply 4AD=60, 9I1=85, 8AE=10, 9I2=5, 9I1=85, 1A=35: TotalEL=280

Return 6M=20, 6A6=75, 6AA=10, 10G=75, 6AB=25, 6AA=10, 5D=40: TotalEL=255

below .60 fails

Robert Berger is inviting you to a scheduled Zoom meeting.

Topic: October 18 2022 Metro-West Meeting

Time: Oct 18, 2022 09:00 AM Eastern Time (US and Canada)

Join Zoom Meeting

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