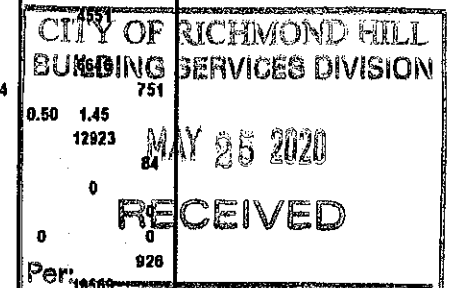


SITE NAME: BALTRIO				18 DENHAM DRIVE				DATE Sep-10				WINTER NATURAL AIR CHANGE RATE 0.332				HEAT LOSS AT °F. 78				CSA-F280-12							
BUILDER: GREENPARK HOMES				TYPE: AVIGNON 3				GFA: 8495				LO# 83730				SUMMER NATURAL AIR CHANGE RATE 0.107				HEAT GAIN AT °F. 14				SB-12 PACKAGE A1			
ROOM USE			MBR		ENS		WICS		BED-2		BED-3		BED-4		ENS-2		BED-5		ENS-3		ENS-4		FAM		H-OFF		
EXP. WALL			25		37		0		22		75		38		17		21		0		0		25		30		
CLG. HT.			10		9		9		9		9		9		9		10		9		9		14		11		
GRS.WALL AREA	FACTORS		250		333		0		198		675		342		153		210		0		0		350		330		
GLAZING	LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		
NORTH	21.8	16.3	0	0	0	0	0	0	0	0	0	23	501	374	24	523	390	0	0	0	0	0	0	0	0	0	0
EAST	21.8	41.8	73	1590	3054	22	479	920	0	0	0	24	523	1004	22	479	920	0	0	0	12	281	502	0	0	0	0
SOUTH	21.8	25.2	0	0	0	24	523	604	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST	21.8	41.8	0	0	0	0	0	0	0	0	0	23	501	962	46	1002	1924	0	0	0	51	1111	2133	0	0	0	0
SKYLT.	36.1	102.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	25.8	4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.6	0.8	177	808	143	287	1311	233	0	0	0	174	795	141	607	2773	492	272	1243	220	141	644	114	159	728	129	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.3	0.6	425	558	257	310	407	187	216	284	131	370	486	224	472	620	285	336	441	203	70	92	42	346	455	209	58
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0	395	1031	183	312	815	144	0	0	0	0	0	0	58
BASEMENT/CRAWL HEAT LOSS			0			0			0			0			0			0			0			0			0
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0			0			0
SUBTOTAL HT LOSS			2957			2720			284			1804			5906			4023			998			2292			76
SUB TOTAL HT GAIN			3454			1945			131			1389			3216			2882			659			2471			35
LEVEL FACTOR / MULTIPLIER	0.20	0.34				0.20	0.34		0.20	0.34		0.20	0.34		0.20	0.34		0.20	0.34		0.20	0.34		0.20	0.34		0.30
AIR CHANGE HEAT LOSS			1001			921			98			811			2000			1362			338			776			26
AIR CHANGE HEAT GAIN			264			149			10			105			246			220			50			189			3
DUCT LOSS			0			0			0			0			791			539			0			0			0
DUCT GAIN			0			0			0			0			463			427			0			0			8
HEAT GAIN PEOPLE	240		2			480			0			1			240			1			0			1			0
HEAT GAIN APPLIANCES/LIGHTS			926			0			0			926			926			926			0			926			0
TOTAL HT LOSS BTU/H			3959			3642			380			2415			8696			5924			1335			3068			102
TOTAL HT GAIN x 1.3 BTU/H			6661			2721			183			3430			6618			6104			922			4874			92

ROOM USE		ENS-5		DIN		KIT		LIV		LAUN		PWD		FOY		MUD		BAS-2		HALL		WUB		BAS	
EXP. WALL		0		42		58		44		23		11		7		36		131		37		25		123	
CLG. HT.		9		11		11		14		9		11		11		13		10		9		10		10	
GRS.WALL AREA	FACTORS	0		462		616		816		207		121		77		468		917		333		250		881	
GLAZING	LOSS GAIN	LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN	
NORTH	21.8 16.3	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		12 261 195		0 0 0		0 0 0	
EAST	21.8 41.8	0 0 0		0 0 0		86 1873 3598		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		5 109 209		0 0 0		0 0 0		0 0 0	
SOUTH	21.8 25.2	0 0 0		0 0 0		25 545 629		52 1133 1309		0 0 0		8 174 201		0 0 0		0 0 0		0 0 0		27 588 680		0 0 0		0 0 0	
WEST	21.8 41.8	0 0 0		57 1242 2384		0 0 0		77 1877 3221		11 240 460		0 0 0		16 349 669		0 0 0		0 0 0		0 0 0		0 0 0		10 218 418	
SKYLT.	36.1 102.0	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0	
DOORS	25.8 4.0	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		48 1241 220		60 1551 275		20 517 92		0 0 0		40 1034 183		20 517 92	
NET EXPOSED WALL	4.6 0.8	0 0 0		405 1850 328		505 2307 409		487 2225 395		196 895 159		113 516 92		13 59 11		408 1864 331		0 0 0		294 1343 238		210 959 170		0 0 0	
NET EXPOSED BSMT WALL ABOVE GR	3.7 0.7	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		393 1448 257		0 0 0		0 0 0		369 1359 241	
EXPOSED CLG	1.3 0.6	80 105 48		0 0 0		0 0 0		0 0 0		126 166 76		0 0 0		0 0 0		0 0 0		0 0 0		662 870 400		0 0 0		0 0 0	
NO ATTIC EXPOSED CLG	2.8 1.3	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0	
EXPOSED FLOOR	2.6 0.5	0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0	
BASEMENT/CRAWL HEAT LOSS		0		0		0		0		0		0		0		0		4029		0		0		0	
SLAB ON GRADE HEAT LOSS		0		0		0		0		0		0		0		0		0		0		248		0	
SUBTOTAL HT LOSS		105		3092		4725		5035		1301		691		1649		3415		6102		3062		2241		751	
SUB TOTAL HT GAIN		48		2713		4836		4925		695		293		900		606		558		1513		354		751	
LEVEL FACTOR / MULTIPLIER	0.20 0.34			0.30 0.55		0.30 0.55		0.30 0.55		0.20 0.34		0.30 0.55		0.30 0.55		0.30 0.55		0.50 1.45		0.20 0.34		0.50 1.45		0.50 1.45	
AIR CHANGE HEAT LOSS		38		1686		2576		2745		440		377		899		1862		8874		1037		0		12923	
AIR CHANGE HEAT GAIN		4		207		354		376		53		22		69		46		43		116		0		84	
DUCT LOSS		0		0		0		0		0		0		0		0		0		0		0		0	
DUCT GAIN		0		0		0		0		0		0		0		0		0		0		0		0	
HEAT GAIN PEOPLE	240	0		0		0		0		0		0		0		0		0		0		0		0	
HEAT GAIN APPLIANCES/LIGHTS		0		926		926		926		926		926		0		926		926		0		926		926	
TOTAL HT LOSS BTU/H		141		4778		7392		7780		1741		1067		2548		5277		14976		4089		2488		2288	
TOTAL HT GAIN x 1.3 BTU/H		68		4989		7691		6095		2176		410		1259		648		1084		2116		460		2288	

TOTAL HEAT GAIN BTU/H: 75480 TONS: 6.29 LOSS DUE TO VENTILATION LOAD BTU/H: 3256 STRUCTURAL HEAT LOSS: 109822 TOTAL COMBINED HEAT LOSS BTU/H: 113178

SITE COPY



SITE NAME: BALTRIO
BUILDER: GREENPARK HOMES

18 DENHAM DRIVE
TYPE: AVIGNON 3

DATE: Sep-19

GFA: 6495

LO# 83730

FURNACE 1

HEATING CFM 1131 COOLING CFM 1131
TOTAL HEAT LOSS 52,461 TOTAL HEAT GAIN 32,633
AIR FLOW RATE CFM 21.56 AIR FLOW RATE CFM 34.66

furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure for s/a & r/a 0.35

#GOODMAN
GMCE960603BNA 60
FAN SPEED LOW
MEDLOW
MEDIUM
MEDIUM HIGH 1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 57,600
DESIGN CFM = 1131
CFM @ .6" E.S.P.

TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	8	6	5
R/A	0	0	3	3	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

plenium pressure s/a 0.18
max s/a dif press. loss 0.02
min adjusted pressure s/a 0.16
r/a pressure 0.17
r/a grille press. loss 0.02
adjusted pressure r/a 0.15

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ROOM NAME	LAUN	BED-5	BED-5	BED-4	BED-4	ENS-4	ENS-5	LIV	LIV	FOY	DIN	DIN	HALL	BAS	BAS	BAS	BAS	LIV	BAS
RM LOSS MBH	1.74	1.53	1.53	2.96	2.96	0.32	0.14	2.59	2.59	2.55	2.39	2.39	4.10	4.41	4.41	4.41	4.41	2.59	4.41
CFM PER RUN HEAT	38	33	33	64	64	7	3	56	56	55	52	52	88	95	95	95	95	56	95
RM GAIN MBH	2.18	2.49	2.49	3.05	3.05	0.09	0.07	2.70	2.70	1.26	2.50	2.50	2.12	0.55	0.55	0.55	0.55	2.70	0.55
CFM PER RUN COOLING	75	86	86	106	106	3	2	94	94	44	87	87	73	19	19	19	19	94	19
ADJUSTED PRESSURE	0.17	0.16	0.16	0.16	0.16	0.17	0.17	0.16	0.16	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH	45	39	50	53	51	63	23	45	30	25	36	31	30	35	23	24	36	37	28
EQUIVALENT LENGTH	150	180	160	170	180	120	120	140	150	150	130	110	190	120	110	150	160	150	140
TOTAL EFFECTIVE LENGTH	195	219	210	223	231	183	143	185	180	175	166	141	220	155	133	174	196	187	168
ADJUSTED PRESSURE	0.09	0.07	0.08	0.07	0.07	0.09	0.12	0.09	0.09	0.1	0.11	0.07	0.1	0.12	0.09	0.08	0.08	0.09	0.1
ROUND DUCT SIZE	5	6	6	6	6	4	4	6	6	4	5	5	6	5	5	6	6	6	5
HEATING VELOCITY (ft/min)	279	168	168	326	326	80	34	286	286	631	382	382	449	698	698	484	484	286	698
COOLING VELOCITY (ft/min)	551	438	438	540	540	34	23	479	479	505	639	639	372	140	140	97	97	479	140
OUTLET GRILL SIZE	3X10	4X10	4X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	4X10	4X10	4X10	3X10
TRUNK	B	A	A	E	E	D	D	B	B	A	A	A	E	C	C	B	B	E	C

RUN #
ROOM NAME
RM LOSS MBH
CFM PER RUN HEAT
RM GAIN MBH
CFM PER RUN COOLING
ADJUSTED PRESSURE
ACTUAL DUCT LGH
EQUIVALENT LENGTH
TOTAL EFFECTIVE LENGTH
ADJUSTED PRESSURE
ROUND DUCT SIZE
HEATING VELOCITY (ft/min)
COOLING VELOCITY (ft/min)
OUTLET GRILL SIZE
TRUNK

Calculated Size > 5.3"Ø MUST BE ROUNDED TO 6"Ø
RUN # 1, 11, 12, 14, 15 & 19 MUST BE 6"Ø

SUPPLY AIR TRUNK SIZE

TRUNK	STATIC	ROUND	RECT	VELOCITY	TRUNK	STATIC	ROUND	RECT	VELOCITY
CFM	PRESS.	DUCT	DUCT	(ft/min)	CFM	PRESS.	DUCT	DUCT	(ft/min)
TRUNK A 225	0.07	8.3	8	506	TRUNK G 0	0.00	0	0	0
TRUNK B 565	0.07	11.7	16	636	TRUNK H 0	0.00	0	0	0
TRUNK C 285	0.10	8.3	8	641	TRUNK I 0	0.00	0	0	0
TRUNK D 1132	0.07	15.2	20	784	TRUNK J 0	0.00	0	0	0
TRUNK E 837	0.07	13.6	22	665	TRUNK K 0	0.00	0	0	0
TRUNK F 0	0.00	0	0	0	TRUNK L 0	0.00	0	0	0

RETURN AIR TRUNK SIZE

TRUNK	STATIC	ROUND	RECT	VELOCITY
CFM	PRESS.	DUCT	DUCT	(ft/min)
TRUNK O 0	0.06	0	0	0
TRUNK P 0	0.06	0	0	0
TRUNK Q 0	0.06	0	0	0
TRUNK R 0	0.06	0	0	0
TRUNK S 0	0.06	0	0	0
TRUNK T 0	0.06	0	0	0
TRUNK U 0	0.06	0	0	0
TRUNK V 0	0.06	0	0	0
TRUNK W 0	0.06	0	0	0
TRUNK X 1131	0.06	15.8	30	679
TRUNK Y 361	0.06	10.3	12	542
TRUNK Z 0	0.06	0	0	0
DROP 1131	0.06	15.8	24	679

RETURN AIR #

1	2	3	4	5	6	BR
AIR VOLUME 130	130	130	165	145	235	196
PLENUM PRESSURE 0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH 64	43	43	38	17	26	20
EQUIVALENT LENGTH 155	155	185	175	220	215	180
TOTAL EFFECTIVE LH 219	198	228	213	237	241	200
ADJUSTED PRESSURE 0.07	0.07	0.06	0.07	0.06	0.06	0.07
ROUND DUCT SIZE 6.8	6.8	7	7.4	7.3	8.8	7.9
INLET GRILL SIZE 8	8	8	8	8	8	8
INLET GRILL SIZE X	X	X	X	X	X	X
INLET GRILL SIZE 14	14	14	14	14	30	24

SITE NAME: BALTRIO
BUILDER: GREENPARK HOMES

18 DENHAM DRIVE
TYPE: AVIGNON 3

DATE: Sep-19

GFA: 6495 LO# 83730

FURNACE 2

HEATING CFM 1504 COOLING CFM 1504
TOTAL HEAT LOSS 56,449 TOTAL HEAT GAIN 41,441
AIR FLOW RATE CFM 26.64 AIR FLOW RATE CFM 36.29

furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure for s/a & r/a 0.35

#GOODMAN
GMEC960804CNA 80
FAN SPEED LOW
MEDLOW
MEDIUM
MEDIUM HIGH 1504
HIGH 1615
AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = 76,800
DESIGN CFM = 1504
CFM @ .6" E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	10	4
R/A	0	0	3	2	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

plenium pressure s/a 0.18
max s/a dif press. loss 0.03
min adjusted pressure s/a 0.15
r/a pressure 0.17
r/a grille press. loss 0.02
adjusted pressure r/a 0.15

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	BED-3	BED-3	ENS-3	ENS-4	BED-2	BED-2	MBR	MBR	WICS	ENS	ENS	KIT	KIT	FAM	FAM	H-OFF	PWD	BAS-2	BAS-2	BAS-2	BAS-2	MUD	BED-3	MBR
RM LOSS MBH	2.90	2.90	0.10	0.32	1.21	1.21	1.32	1.32	0.19	1.82	1.82	2.43	2.43	2.41	2.41	1.75	1.07	3.74	3.74	3.74	3.74	2.64	2.90	1.32
CFM PER RUN HEAT	77	77	3	9	32	32	35	35	5	49	49	65	65	64	64	47	28	100	100	100	100	70	77	35
RM GAIN MBH	2.21	2.21	0.05	0.09	1.72	1.72	2.22	2.22	0.09	1.36	1.36	2.56	2.56	3.33	3.33	2.05	0.41	0.50	0.50	0.50	0.50	0.42	2.21	2.22
CFM PER RUN COOLING	80	80	2	3	62	62	81	81	3	49	49	93	93	121	121	74	15	18	18	18	18	15	80	81
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.17	0.17	0.16	0.16	0.16	0.16	0.17	0.17	0.16
ACTUAL DUCT LGH.	74	73	46	72	69	54	50	73	33	80	71	52	46	43	57	66	54	68	41	44	68	14	64	77
EQUIVALENT LENGTH	170	160	140	180	210	150	150	120	190	140	140	150	130	130	110	150	100	130	140	120	120	100	180	130
TOTAL EFFECTIVE LENGTH	244	233	186	252	279	204	200	193	223	220	211	202	176	173	167	216	154	198	181	164	188	114	244	207
ADJUSTED PRESSURE	0.07	0.07	0.09	0.07	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.08	0.11	0.08	0.09	0.1	0.09	0.15	0.07	0.08
ROUND DUCT SIZE	6	6	4	4	6	5	6	6	4	5	5	6	6	6	6	5	4	6	6	6	6	5	6	6
HEATING VELOCITY (ft/min)	393	393	34	103	163	235	178	178	57	360	360	331	331	326	326	345	321	510	510	510	510	514	393	178
COOLING VELOCITY (ft/min)	408	408	23	34	316	455	413	413	34	360	360	474	474	617	617	543	172	92	92	92	92	110	408	413
OUTLET GRILL SIZE	4X10	4X10	3X10	3X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10	3X10	3X10	4X10	4X10	4X10	4X10	3X10	4X10	4X10
TRUNK	D	D	D	C	C	D	D	B	B	A	A	C	C	B	B	A	A	C	D	B	A	E	D	B

RUN #	25	26	27	28
ROOM NAME	WICS	KIT	H-OFF	MUD
RM LOSS MBH	0.19	2.43	1.75	2.64
CFM PER RUN HEAT	5	65	47	70
RM GAIN MBH	0.09	2.56	2.05	0.42
CFM PER RUN COOLING	3	93	74	15
ADJUSTED PRESSURE	0.17	0.16	0.17	0.17
ACTUAL DUCT LGH.	65	37	70	10
EQUIVALENT LENGTH	150	120	140	130
TOTAL EFFECTIVE LENGTH	215	157	210	140
ADJUSTED PRESSURE	0.08	0.1	0.08	0.12
ROUND DUCT SIZE	4	5	5	5
HEATING VELOCITY (ft/min)	57	477	345	514
COOLING VELOCITY (ft/min)	34	683	543	110
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10
TRUNK	B	D	A	E

RUN #16, 26 & 27 MUST BE 6"Ø

SUPPLY AIR TRUNK SIZE												RETURN AIR TRUNK SIZE											
	TRUNK	STATIC	ROUND	RECT		VELOCITY		TRUNK	STATIC	ROUND	RECT		VELOCITY		TRUNK	STATIC	ROUND	RECT		VELOCITY			
	CFM	PRESS.	DUCT	DUCT		(ft/min)		CFM	PRESS.	DUCT	DUCT		(ft/min)		CFM	PRESS.	DUCT	DUCT		(ft/min)			
TRUNK A	320	0.08	9.2	10	x	8	576	TRUNK G	0	0.00	0	0	x	8	0	TRUNK O	0	0.05	0	0	x	8	0
TRUNK B	628	0.08	11.8	16	x	8	707	TRUNK H	0	0.00	0	0	x	8	0	TRUNK P	0	0.05	0	0	x	8	0
TRUNK C	271	0.06	9.2	10	x	8	488	TRUNK I	0	0.00	0	0	x	8	0	TRUNK Q	0	0.05	0	0	x	8	0
TRUNK D	737	0.06	13.4	20	x	8	663	TRUNK J	0	0.00	0	0	x	8	0	TRUNK R	0	0.05	0	0	x	8	0
TRUNK E	1505	0.06	17.6	28	x	10	774	TRUNK K	0	0.00	0	0	x	8	0	TRUNK S	0	0.05	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0	TRUNK T	0	0.05	0	0	x	8	0

RETURN AIR #	1	2	3	4	5	BR									
AIR VOLUME	185	205	130	405	385	0	0	0	0	0	0	0	0	0	194
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	40	51	61	62	68	1	1	1	1	1	1	1	1	1	20
EQUIVALENT LENGTH	220	175	175	150	190	0	0	0	0	0	0	0	0	0	260
TOTAL EFFECTIVE L.H	260	226	236	212	258	1	1	1	1	1	1	1	1	1	280
ADJUSTED PRESSURE	0.06	0.07	0.06	0.07	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.05
ROUND DUCT SIZE	8	8	7	10.3	10.5	0	0	0	0	0	0	0	0	0	8.5
INLET GRILL SIZE	8	8	8	8	8	0	0	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	30	14	14	30	30	0	0	0	0	0	0	0	0	0	24

TYPE: AVIGNON 3
SITE NAME: BALTRIO

LO # 83730
18 DENHAM DRIVE

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES 9.32.3.1(1)

a) ☒ Direct vent (sealed combustion) only

b) ☐ Positive venting induced draft (except fireplaces)

c) ☐ Natural draft, B-vent or induced draft gas fireplace

d) ☐ Solid Fuel (including fireplaces)

e) ☐ No Combustion Appliances

HEATING SYSTEM

☒ Forced Air ☐ Non Forced Air

☐ Electric Space Heat

HOUSE TYPE 9.32.1(2)

☒ I Type a) or b) appliance only, no solid fuel

☐ II Type I except with solid fuel (including fireplaces)

☐ III Any Type c) appliance

☐ IV Type I, or II with electric space heat

☐ Other: Type I, II or IV no forced air

SYSTEM DESIGN OPTIONS O.N.H.W.P.

☐ 1 Exhaust only/Forced Air System

☐ 2 HRV with Ducting/Forced Air System

☒ 3 HRV Simplified/connected to forced air system

☐ 4 HRV with Ducting/non forced air system

☐ Part 6 Design

TOTAL VENTILATION CAPACITY 9.32.3.3(1)

Basement + Master Bedroom	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	7	@ 10.6 cfm	74.2	cfm
Other Rooms	6	@ 10.6 cfm	63.6	cfm
Table 9.32.3.A.		TOTAL	222.6	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4.(1)

1	Bedroom	31.8	cfm
2	Bedroom	47.7	cfm
3	Bedroom	63.6	cfm
4	Bedroom	79.5	cfm
5	Bedroom	95.4	cfm
	TOTAL	95.4	cfm

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	222.6	cfm
Less Principal Ventil. Capacity	155	cfm
Required Supplemental Capacity	67.6	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

155.0 cfm 3.0 sones ☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM	ΔT °F	FACTOR	% LOSS
155.0 CFM	78 F	1.08	0.25

SUPPLEMENTAL FANS NUTONE

Location	Model	cfm	HVI	Sones
ENS	QTXEN050C	50	☒	0.3
ENS-2	QTXEN050C	50	☒	0.3
ENS-4	QTXEN050C	50	☒	0.3
PWD	QTXEN050C	50	☒	0.3

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 65H

155 cfm high 64 cfm low

75 % Sensible Efficiency ☒ HVI Approved
@ 32 deg F (0 deg C)

LOCATION OF INSTALLATION

Lot: Concession

Township: Plan:

Address:

Roll # Building Permit #

BUILDER: GREENPARK HOMES

Name:

Address:

City:

Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:

Address:

City:

Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.

Name: HVAC Designs Ltd.

Signature: *Michael O'Rourke*

HRAI # 001820

Date: September-19

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																												
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																												
LO#: 83730		Model: AVIGNON 3		Date: 09/19/2019																																																								
Builder: GREENPARK HOMES																																																												
Volume Calculation			Air Change & Delta T Data																																																									
House Volume <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Level</th> <th>Floor Area (ft²)</th> <th>Floor Height (ft)</th> <th>Volume (ft³)</th> </tr> </thead> <tbody> <tr> <td>Bsmt</td> <td>2979</td> <td>10</td> <td>29790</td> </tr> <tr> <td>First</td> <td>2979</td> <td>11</td> <td>32769</td> </tr> <tr> <td>Second</td> <td>3516</td> <td>9</td> <td>31644</td> </tr> <tr> <td>Third</td> <td>0</td> <td>9</td> <td>0</td> </tr> <tr> <td>Fourth</td> <td>0</td> <td>9</td> <td>0</td> </tr> <tr> <td colspan="2"></td> <td>Total:</td> <td>94,203.0 ft³</td> </tr> <tr> <td colspan="2"></td> <td>Total:</td> <td>2667.5 m³</td> </tr> </tbody> </table>			Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	2979	10	29790	First	2979	11	32769	Second	3516	9	31644	Third	0	9	0	Fourth	0	9	0			Total:	94,203.0 ft³			Total:	2667.5 m³	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>WINTER NATURAL AIR CHANGE RATE</td> <td>0.332</td> </tr> <tr> <td>SUMMER NATURAL AIR CHANGE RATE</td> <td>0.107</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5">Design Temperature Difference</th> </tr> <tr> <th></th> <th>Tin °C</th> <th>Tout °C</th> <th>ΔT °C</th> <th>ΔT °F</th> </tr> <tr> <td>Winter DTDh</td> <td>22</td> <td>-21</td> <td>43</td> <td>78</td> </tr> <tr> <td>Summer DTDc</td> <td>23</td> <td>31</td> <td>8</td> <td>14</td> </tr> </table>		WINTER NATURAL AIR CHANGE RATE	0.332	SUMMER NATURAL AIR CHANGE RATE	0.107	Design Temperature Difference						Tin °C	Tout °C	ΔT °C	ΔT °F	Winter DTDh	22	-21	43	78	Summer DTDc	23	31	8	14
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5.2.3.1 Heat Loss due to Air Leakage			6.2.6 Sensible Gain due to Air Leakage																																																									
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ 0.332 x 740.98 x 43 °C x 1.2 = 12777 W = 43594 Btu/h			$HG_{satb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ = 0.107 x 740.98 x 8 °C x 1.2 = 731 W = 2493 Btu/h																																																									
5.2.3.2 Heat Loss due to Mechanical Ventilation			6.2.7 Sensible heat Gain due to Ventilation																																																									
$HL_{valrb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 155 CFM x 78 °F x 1.08 x 0.25 = 3256 Btu/h			$HL_{valrb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 155 CFM x 14 °F x 1.08 x 0.25 = 578 Btu/h																																																									
5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)																																																												
$HL_{airr} = \text{Level Factor} \times HL_{airbv} \times \{ (HL_{agcr} + HL_{bgcr}) \div (HL_{agctvel} + HL_{bgctvel}) \}$																																																												
Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)																																																								
1	0.5	43,594	14,989	1.454																																																								
2	0.3		23,985	0.545																																																								
3	0.2		25,748	0.339																																																								
4	0		0	0.000																																																								
5	0		0	0.000																																																								
*HLairbv = Air leakage heat loss + ventilation heat loss *For a balanced or supply only ventilation system HLairve = 0																																																												



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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: AVIGNON 3	18 DENHAM DRIVE	BUILDER: GREENPARK HOMES
SFQT: 6495	LO# 83730	SITE: BALTRIO

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-6	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	74

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	WEST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	3.57	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	AVERAGE	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft³):	94203.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 62.0 ft	WIDTH: 65.0 ft	EXPOSED PERIMETER:	254.0 ft

2012 OBC - COMPLIANCE PACKAGE

Component	Compliance Package A1	
	Nominal	Min. Eff.
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.22
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.65
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22	17.03
Basement Walls Minimum RSI (R)-Value	20 ci	21.12
Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value	-	-
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value	10	10
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value	10	11.13
Windows and Sliding Glass Doors Maximum U-Value	0.28	-
Skylights Maximum U-Value	0.49	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE

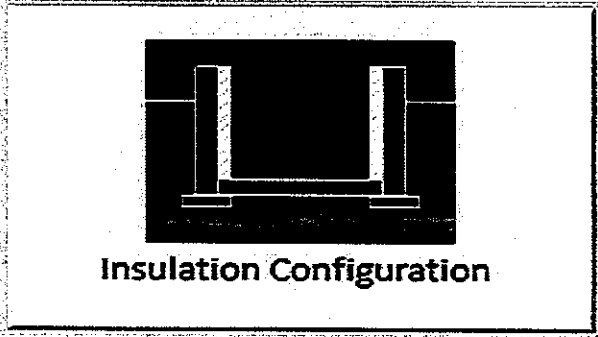
Michael O'Rourke



HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	Richmond Hill	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	18.9	 Insulation Configuration
Floor Width (m):	19.8	
Exposed Perimeter (m):	0.0	
Wall Height (m):	3.0	
Depth Below Grade (m):	2.13	
Window Area (m ²):	1.4	
Door Area (m ²):	7.4	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):		2514

TYPE: AVIGNON 3
LO# 83730

18 DENHAM DRIVE



HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description				
Province:	Ontario			
Region:	Richmond Hill			
Weather Station Location:	Open flat terrain, grass			
Anemometer height (m):	10			
Local Shielding				
Building Site:	Suburban, forest			
Walls:	Heavy			
Flue:	Heavy			
Highest Ceiling Height (m):	7.01			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	2667.5			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	3555.9 cm ²		
	3.57	ACH @ 50 Pa		
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust		
	73.2	73.2		
Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0
Natural Infiltration Rates				
Heating Air Leakage Rate (ACH/H):	0.332			
Cooling Air Leakage Rate (ACH/H):	0.107			

TYPE: AVIGNON 3
LO# 83730

18 DENHAM DRIVE

TOWN OF RICHMONDHILL REVIEW NOTES FOR HOMES CONSTRUCTED AS PER SB-12 PRESCRIPTIVE COMPLIANCE PACKAGE

1. HVAC equipment selection and calculation as per F280-9.33.2.2
2. Furnace shall comply with 12.3.5(2)
3. Indoor air temperature shall be controlled by at least one programmable thermostat comply to 12.3.1.3(2)
4. Laundry drier exhaust duct shall be provided as per 6.2.3.8(7)
5. Kitchen hood exhaust duct shall be provided as per 9.32.3.10, 9.32.3.5(2)
6. Minimum R12 insulation value required for ducts installed at unheated or exposed condition- 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5
7. Continuity of air barrier system behind a bath tub, shower enclosure or fire place shall be provided as per 9.25.3.3(3)
8. Penetration of air barrier system by ducts, wire, conduit or building materials shall be sealed as per 9.25.3.3(9)&(10)
9. Controlling switches for Primary ventilation fan shall be labeled as per 9.32.3.4(4)
10. 6.2.4.5. Volume control damper installation
11. Space between studs and joists used as return ducts shall be separated from unused portion as per 6.2.4.7(6)
12. Fire stop shall be provided around duct penetrating floors as per 9.10.16
13. Warm air supply outlets shall be provided in each finished room located adjacent to unheated space, exterior air or exterior soil as per 6.2.4.4
14. Provided clearance around ducts as per 6.2.4.10
15. Exhaust air outlet shall be provided to each kitchen, bath room and water closet room- 9.32.3.5
16. Duct sizing of Principal exhaust fan must be as per 9.32.3.4.(9). Suitably upsize flexible ducts as per 9.32.3.4.B. Principal Exhaust fan must be provided with speed controller as per 9.32.3.4.(6)
17. Door Undercuts shall be provided for rooms without direct return air grill (F-326)
30 cfm air flow-1/2", 60 cfm -3/4", 90 cfm-1" & 120 cfm 1-1/4"
18. Combustion air supply shall be provided to the Furnace and Hot water tank
19. HRV installation, testing, startup and commissioning shall be as per 9.32.3.11,
9.32.3.11(7)&(10)
20. HRV duct connection shall be as per 9.32.3.6(3)&9.32.3.4(7).
21. Supply air grill at finished basement shall be at low level. Return air grill for Finished or Unfinished basement shall be at low level, HRAI Digest 2005, clause 7.7(3)
22. Minimum 5' of return air duct from the AHU shall be provided with acoustic lining and enlarge the duct to compensate for the lining space
23. Minimum one return air grill shall be provided at the interior areas without air supply outlets. HRAI Digest 2005, clause 8.1
24. Supply air branch duct longer than 50' (from diffuser to heating unit) shall be sized to accommodate 10% higher than actual outlet flow rate HRAI digest 2005, clause 4.4
25. Minimum one return air inlet shall be provided in rooms where one half of the floor area is located over space that are not heated to indoor design temperature (e.g. above garage). HRAI digest 2005, clause 8.3
26. Drain water heat recovery shall be installed as per Article 3.1.1.12
27. Exhaust fans shall be selected as per Table 9.32.3.9
28. Maintain integrity of structure when routing ducts and pipes through structure as per 9.23.5.1
29. Air supply outlet shall not be installed on a furnace plenum or trunk duct. (HRAI Digest 2005, 4.6)
30. Exterior insulation effective R value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.
31. Return air intake shall be provided as recommended in HRAI digest 2005 section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.
32. Return air intake shall not be located back to back in a partition wall- HRAI Dig. 2005, 8.2
33. Supply air outlets in the basement shall be within 4' of exterior wall, HRAI Digest 2005, 7.6
34. For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV /ERV manufacturer.