HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY Project Name Date 9/21/2012 System Name Floor Area (2) 10 Ton Heat Pumps 4,000 **ENGINEERING CHECKS** SYSTEM LOAD **Number of Systems COIL COOLING PEAK COIL HTG. PEAK Heating System CFM** Sensible Latent **CFM** Sensible 2.129 110,800 7,716 102,768 36.626 110,264 **Output per System Total Room Loads** 221,600 **Return Vented Lighting** 0 **Total Output (Btuh)** 55.4 **Return Air Ducts** 5,138 5,513 Output (Btuh/sqft) **Cooling System** Return Fan n 0 119,400 Ventilation 600 18.696 28.973 600 42.388 **Output per System** 238,800 0 **Total Output (Btuh)** Supply Fan 5,138 5,513 19.9 **Supply Air Ducts Total Output (Tons)** Total Output (Btuh/sqft) 59.7 201.0 65,599 163,678 Total Output (sqft/Ton) **TOTAL SYSTEM LOAD** 131,741 Air System 4,000 **HVAC EQUIPMENT SELECTION CFM per System** Carrier 50HJQ0012-5/6 135,522 73,945 8.000 40,586 Airflow (cfm) 2.00 Airflow (cfm/sqft) 402.0 Airflow (cfm/Ton) 7.5 % 135,522 73,945 40,586 **Total Adjusted System Output** Outside Air (%) (Adjusted for Peak Design conditions) 0.15 Outside Air (cfm/sqft) Jul 2 PM Jan 1 AM **TIME OF SYSTEM PEAK** Note: values above given at ARI conditions HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak) -8 °F 54 °F 110 °F 110 °F Outside Air Supply Fan 600 cfm Heating Coil 109 °F 8.000 cfm ROOM 60 °F 59 °F COOLING SYSTEM PSYCHROMETICS (Airstream Temperatures at Time of Cooling Peak) 90 / 78 °F 47 / 47 °F 47 / 47 °F 63 / 57 °F Outside Air Supply Fan 47 / 47 °F 600 cfm Cooling Coil 8,000 cfm ROOM 69.5 % 60 / 54 °F 61 / 54 °F EnergyPro 5.1 by EnergySoft User Number: 5196 RunCode: 2012-09-21T11:24:17 ID: Page 1 of 8

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY Project Name Date 9/21/2012 System Name Floor Area (1) 10 Ton Heat Pump 2,000 **ENGINEERING CHECKS** SYSTEM LOAD **Number of Systems COIL COOLING PEAK COIL HTG. PEAK Heating System CFM** Sensible Latent **CFM** Sensible 1.535 110,800 3,719 58.083 19.500 63,242 **Output per System Total Room Loads** 110,800 **Return Vented Lighting** 0 **Total Output (Btuh)** 55.4 **Return Air Ducts** 2,904 3,162 Output (Btuh/sqft) **Cooling System** Return Fan n 0 119,400 Ventilation 500 8.486 15.633 500 40.521 **Output per System** 0 **Total Output (Btuh)** 119,400 Supply Fan 2.904 10.0 **Supply Air Ducts** 3,162 **Total Output (Tons)** Total Output (Btuh/sqft) 59.7 201.0 35,133 110,087 Total Output (sqft/Ton) **TOTAL SYSTEM LOAD** 72,377 Air System 4,000 **HVAC EQUIPMENT SELECTION CFM per System** Carrier 50HJQ0012-5/6 76,771 45,822 4.000 20,293 Airflow (cfm) 2.00 Airflow (cfm/sqft) 402.0 Airflow (cfm/Ton) 12.5 % 76,771 45,822 20,293 **Total Adjusted System Output** Outside Air (%) (Adjusted for Peak Design conditions) 0.25 Outside Air (cfm/sqft) Jul 3 PM Jan 1 AM **TIME OF SYSTEM PEAK** Note: values above given at ARI conditions HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak) -8 °F 60 °F 110 °F 110 °F Outside Air Supply Fan 500 cfm Heating Coil 109 °F 4.000 cfm ROOM 69 °F 70 °F COOLING SYSTEM PSYCHROMETICS (Airstream Temperatures at Time of Cooling Peak) 91 / 78 °F 58 / 58 °F 58 / 58 °F 77 / 67 °F Outside Air Supply Fan 59 / 58 °F 500 cfm Cooling Coil 4,000 cfm ROOM 62.2 % 74 / 65 °F 75 / 65 °F EnergyPro 5.1 by EnergySoft User Number: 5196 RunCode: 2012-09-21T11:24:17 ID: Page 2 of 8

ROOM LOAD S	SUMMARY													
Project Name								Date	0/0//0	2.12				
System Name								Floor	9/21/2	012				
(2) 10 Ton Heat Pur	nps							1 1001	4,000					
ROOM LOAD SUMM	ARY								-,					
			ROOM	M COOLING	G PEAK	COIL	COOLING	PEAK	COIL H	TG. PEAK				
Zone Name	Room Name	Mult.	CFM	Sensible	Latent	CFM	Sensible	Latent	CFM	Sensible				
Processing	Process	1	7,716		36,626	7,716	102,768	36,626	2,129	110,264				
				PAGE TOT		7,716	102,768	36,626		110,264				
				TOTA	\L *	7,716	102,768	36,626	2,129	110,264				

ROOM LOAD S	SUMMARY													
Project Name								Date						
System Name								Floor	9/21/2012 Floor Area					
(1) 10 Ton Heat Pun	пр							1 1001	2,000					
ROOM LOAD SUMM	ARY													
			ROOM	M COOLING	3 PEAK	COIL	COOLING	PEAK	COIL H	TG. PEAK				
Zone Name	Room Name	Mult.	CFM	Sensible	Latent	CFM	Sensible	Latent	CFM	Sensible				
Retail	Retail	1	3,719	58,083	19,500	3,719	58,083	19,500	1,535	63,242				
	<u> </u>	<u> </u>												
				PAGE TOT	AL	3,719	58,083	19,500	1,535	63,242				
				TOTA	\L *	3,719	58,083	19,500	1,535	63,242				

ROOM HEATING PEAK LO	ADS						
Project Name						Da	te 9/21/2012
ROOM INFORMATION		DES	SIGN CONDITIO	NS		<u> </u>	
Room Name	Process	Tim	e of Peak				Jan 1 AM
Floor Area			door Dry Bulb Te	mpe	rature		-8 °F
Indoor Dry Bulb Temperature	60 °F		•				
, ,							
Conduction	Area		U-Value		∆T °F		Btu/hr
R-13 Wall Metal Stud	3,100.0	X	0.2170	X	68	=	45,717
R-19 Metal Rafters	4,000.0	Х	0.1210	X	68	=	32,893
Slab-On-Grade	perim = 206.7	Х	0.7300	X	68	=	10,255
		X		X		=	
		Х		X		=	
		Х		X		_	
		X		X		=	
		X		X		_	
		X		X		_	
		X		X		İ	
		X		X		=	
		X		X		=	
		X		X		=	
		1				=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		Х		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
Items shown with an asterisk (*) denote conductio	n through an interior surf	ace to	another room		Page To	tal	88,864
Infiltration: 1.00 X 1.00	50 X 4,000 X		15.00 X 0.	300	/ 60] x	68	3 = 21,400
Schedule Air Sensible Fraction			ling Height AC		ΔΊ		
TOTAL HOURLY HEAT LOSS FOR RO	OOM						110,264
EnergyPro 5.1 by EnergySoft User Number: 51	96 RunCode: 201	2-09-2	21T11:24:17	ID:			Page 5 of 8

ROOM HEATING PEAK L	OADS						
Project Name						Da	ete 9/21/2012
ROOM INFORMATION			SIGN CONDITIO	NS			
Room Name	Retail	Tim	e of Peak				Jan 1 AM
Floor Area	2,000.0 ft ²	Out	door Dry Bulb Te		-8 °F		
Indoor Dry Bulb Temperature	70 °F						
Our duration	A		III Walasa		ΔT°F		Dt /le
Conduction	Area	J	U-Value	v			Btu/hr
R-13 Wall Metal Stud	1,550.0	1	0.2170	X	78	=	26,222
R-19 Metal Rafters	2,000.0		0.1210	X	78	=	18,866
Slab-On-Grade	perim = 103.3		0.7300	X	78	=	5,879
		X		X		=	
		X		X		=	
		Х		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		Х		X		=	
		Х		X		=	
		Х		Х		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X			
		X		X		=	_
		x		X			
						=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
Items shown with an asterisk (*) denote conduc	ction through an interior surf	ace to	another room		Page To	otal	50,967
Schedule Air Sen	1.050 X 2,000 X sible Area		15.00 X 0.	<i>300</i>	/ 60] X	78	B = 12,275
Fraction			•				
TOTAL HOURLY HEAT LOSS FOR I	ROOM						63,242
EnergyPro 5.1 by EnergySoft	5196 RunCode: 201	2-09-	21T11:24:17	ID:			Page 6 of 8

ROOM COOL	ING P	E	AK LO	4D	S												
Project Name															Da		1/2012
ROOM INFORMAT	ION					DE	SIGN	CO	NDIT	101	NS						
Room Name					Proces		ne of P										Jul 2 PM
Floor Area					4,000.0 ft		ıtdoor I	-			-						90 °F
Indoor Dry Bulb Tem	perature)			60 ºI	- Ou	ıtdoor \			Tei	mpera						78 °F
Conduction					Area	_		J-Va	lue			D	ETD)1	. [Btu/hr
R-13 Wall Metal Stud					750).O X			0.21	_	X			31.9	=	<u> </u>	5,185
R-13 Wall Metal Stud 800.0).O X			0.21	70	X			42.0	=	<u> </u>	7,289
R-13 Wall Metal Stud					750).O X			0.21	70	x _			34.6	=	<u> </u>	5,631
R-13 Wall Metal Stud					800	— ·			0.21		X _			34.6	=		6,006
R-19 Metal Rafters					4,000).O X			0.12	10	x _			63.3	=	<u> </u>	30,639
						X					x _				=	<u> </u>	
						X					X				=	<u> </u>	
						X					X				=	<u> </u>	
						X					X				=	<u> </u>	
4 Design Fording at 7	F):((Р	age	Total			54,750
1. Design Equivalent Titems shown with an aste	ı emperatu erisk (*) de	re L note	ם) merence שוונ e conduction	בום) throı	ugh an interior su	rface t	o anothe	er roc	om.								
Solar Gain		(Orientatio	1	Area	_	SGI	F		ę	sc			eightin Factor			Btu/hr
						X			X			X				= [
						X			X			Х				= [
						Х			X			X				= [
						X			Х			Χ				=	
						X			Х			X				=	
						X			X			X				=	
						X			X			X				=	
						X			Х			Χ				= [
						Х			X			X				= [
													Pa	ige Tot	al		0
1.1	Sched.		•											Weigl	_	3	D. (I.
Internal Gain	Frac.]	Area		Heat Gain			., Г		40	D . 44			Fac			Btu/hr
Lights	1.00	1		_			•	. [3.4		Btu/V		X		1.00		
Occupants	1.00	1	4,00			Btu/c		/			Sqft/d		X		1.00		
Receptacle	1.00	1					s/Sqft	X	3.4		Btu/V		X		1.00	_	
Process	1.00	1	4,00				s/Sqft	F	3.4		Btu/V		X X		1.00	-	
Process Lighting	1.00	^	4,00	0 X	0.000	wall	s/Sqft	X	3.4	13	Btu/V	vall	^		0.00	00 =	0
Infiltration:[1.00 Schedule	X	1.05 Air Sensibl		4,000 Area		1: eiling Hei	5.00	x	O.		60]	X	Δ		31 =	9,718
	Fraction						ciiiig i ici	giit		7101							
TOTAL HOURLY S			HEAT GA ned.	N F	OR ROOM												102,768
Latent Gain	•	Fra			Area I	Heat (Gain										Btu/hr
Occupants	1.0		х		4,000 X			Btul	h/occ		/	100)	Sqft/c	occ.	=	19,000
Receptacle	1.0	00	x		4,000 X				ts/Sq		x 🗀	3.413		Btu/W		=	0
Process	1.0		x		4,000 X				ts/Sq			3.413	_	Btu/W		=	0
2													_			_	
Infiltration:	1.00	X	4,70	6 X	4,000	х	1.	5.00	\mathbf{x}	(0.30	/60]	X	0.	.0124	48 =	17,626
	Schedule Fraction		Air Sensibl)	Area		eiling Hei		J L	AC		,	-	Δ\			· · · · · · · · · · · · · · · · · · ·
TOTAL HOURLY L	ATENT											_					36,626
EnergyPro 5.1 by Energy	ySoft U	ser	Number: 51	96	RunCode: 2	012-0	9-21T11:	:24:1	17		ID:						Page 7 of 8

ROOM COOLI	ING P	E	AK LO	۱D	S											
Project Name														Date		1/2012
ROOM INFORMATI	ION					DE	SIGN C	ONE	ITIC	NS						
Room Name					Retail		ne of Pea									Jul 3 PM
Floor Area					2,000.0 ft ²		tdoor Dr	-		_						91 °F
Indoor Dry Bulb Tem	perature	•			74 °F	Ou	tdoor W			empe			1			78 °F
Conduction					Area	\neg	<u>U-'</u>	Value		1 [D	ETD		г		Btu/hr
R-13 Wall Metal Stud					375.	_			.2170	1 1			32.7	=		2,662
R-13 Wall Metal Stud					400.	<u>0</u> X			.2170	- ^`			27.5	=		2,385
R-13 Wall Metal Stud					400.	<u>0</u> X		0.	.2170	X			32.7	=		2,840
R-13 Wall Metal Stud					375.	⊣ ^`			.2170	1 ~~ H			21.5	=		1,752
R-19 Metal Rafters					2,000.	<u>0</u> X		0.	.1210	X			47.7	=		11,546
						_ X				X				=		
						_ X				Х				=		
						_ X				X				= _		
						X				X				= _		
		_		,							P	age	Total	L		21,184
 Design Equivalent T Items shown with an aste 	emperatu erisk (*) de	re L note	Ofference (DI e conduction	±ΤD) throι	igh an interior surf	ace to	another	room.								
Solar Gain			Orientation		Area	_	SGF			sc			eighting Factor			Btu/hr
						X		Х	ζ		X			=	: L	
						X		Х	C		X			=	: [
						X		Х			Х			=	: [
						X		Х			Х			=	. [
						Х		Х			Х			=		
						X		Х			Х			=		
						X		Х			Х			=		
						X		Х			Х			=	<u>.</u> [
						X		Х			Х			=	. [
						•						Pa	ge Tot	al		0
	Sched.												Weigl	hting		
Internal Gain	Frac.	1	Area	1	Heat Gain					1			Fac		7	Btu/hr
Lights	1.00	1		_			s/Sqft)	` <u> </u>	3.413		/Watt	X		1.000	7	10,918
Occupants	1.00	1	2,00			3tu/o			30	•	t/occ.	X		1.000		16,500
Receptacle	1.00	1		-			s/Sqft)		3.413	1	/Watt	X		1.000	7	6,826
Process	1.00	1	2,00	-			s/Sqft)		3.413		/Watt	X		1.000	-	0
Process Lighting	1.00	X	2,00	0 X	0.000	Vatts	s/Sqft)	(3.413	Btu	/Watt	X		0.000	일 =	0
Infiltration:	1.00	x	1.05	0 x	2,000	,	15.	00 X		0.30	/ 60]	X		17	7] _	2,655
	Schedule	J ^^	Air Sensible		Area		eiling Heigh			CH	, 55]	^	Δ			2,000
TOTAL HOURLY S	Fraction	<u> </u>	JEAT CAI	N E	OR ROOM											50,000
TOTAL HOURLY S			ied.	IN F	ON NOOW											58,083
Latent Gain		Fra		-	Area H	eat (Gain			_		_				Btu/hr
Occupants	1.0	00	Х		2,000 X		200 Bt	tuh/o	cc.	/	30)	Sqft/o	CC.	=	13,200
Receptacle	1.0	00	Х		2,000 X		0.000 W	atts/	Sqft	X	3.413	3	Btu/W	/att	=	0
Process	1.0	00	Х		2,000 X		0.000 W	atts/	Sqft	X	3.413	3	Btu/W	/att	=	0
		_		_											_	
Infiltration:[1.00	X	4,70		2,000			00 X		0.30	/60]	X		.00893	3 =	6,300
	Schedule Fraction		Air Sensible	•	Area	C	eiling Heigh	nt	A	CH			ΔV	٧		
TOTAL HOURLY LA		HE	AT GAIN	FOF	ROOM											19,500
EnergyPro 5.1 by Energy	/Soft U	ser	Number: 519	6	RunCode: 20	12-09	9-21T11:2	4:17		ID:						Page 8 of 8