Verifying HVAC Equipment Selection

Brett Dillon, IBS Advisors

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Quality Passion Knowledge

Manual S Speedsheet

OEM Performance Data

AHRI

Manual J outputs

Manual J

Building Loads				
Total Heating Required With Outside Air:	77,382	Btuh	77.382	MBH
Total Sensible Gain:	40,543	Btuh	85	%
Total Latent Gain:	6,918	Btuh	15	%
Total Cooling Required With Outside Air:	47,460	Btuh	3.96	Tons (Based On Sensible + Latent)
			4.50	Tons (Based On 75% Sensible Capacity)

Manual J

Heating Summary

Structure	19612	Btuh
Ducts	5617	Btuh
Central vent (70 cfm)	***2675***	Btuh
Humidification	0	Btuh
Piping	0	Btuh
Equipment load	27904	Btuh

Manual J

Sensible Cooling Equipment Load Sizing

Structure	16027	Btuh
Ducts	6780	Btuh
Central vent (70 cfm)	***1773***	Btuh
Blower	0	Btuh
Use manufacturer's data	n	
Rate/swing multiplier	1.04	
Equipment sensible load	25465	Btuh

Manual J

Latent Cooling Equipment Load Sizing

Structure	1108	Btuh
Ducts	702	Btuh
Central vent (70 cfm)	1139	Btuh
Equipment latent load	2950	Btuh
Equipment total load	28414	Btuh
Req. total capacity at 0.70 SHR	3.0	ton

AHRI

AHRI Certified Reference Number: 4584871 Date: 1/18/2013

Product: Split System: Air-Cooled Condensing Unit, Coil with Blower
Outdoor Unit Model Number: CA16NA042**A**
Indoor Unit Model Number: CSPH*4212A**
Furnace Model Number: 58PH*090-16
Manufacturer: CARRIER AIR CONDITIONING
Trade/Brand name: 16 SEER PURON AC

Manufacturer responsible for the rating of this system combination is CARRIER AIR CONDITIONING

Rated as follows in accordance with AHRI Standard 210/240-2008 for Unitary Air-Conditioning and Air-Source Heat Pump Equipment and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity (Btuh):	40500
EER Rating (Cooling):	13.00
SEER Rating (Cooling):	15.50

OEM Performance Data

4584871	CA16NA042****A	CSPH*4212A**	58PH*090–16	40,500	13.0	15.5

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)					
		95 (35)			105 (40.6)		
CFM	EWB °F (°C)	Capacity MBtuh		Total System KW**	Capacity MBtuh		Total System KW**
		Total	Sens‡		Total	Sens‡	
6A**30 Outdoor Section With CNPV*3717A** Indoor Section							
1050	72 (22.2)	37.27	18.94	2.95	35.20	18.24	3.28
	67 (19.4)	33.87	23.61	2.93	31.96	22.90	3.26
	63 (17.2)††	31.40	22.64	2.92	29.62	21.92	3.25
	62 (16.7)	31.00	28.17	2.91	29.47	29.47	3.25
	57 (13.9)	30.85	30.85	2.91	29.43	29.43	3.25
1200	72 (22.2)	37.82	19.99	3.01	35.67	19.28	3.35
	67 (19.4)	34.40	25.30	2.99	32.44	24.58	3.32
	63 (17.2)††	31.93	24.22	2.98	30.09	23.48	3.31
	62 (16.7)	32.12	32.12	2.98	30.60	30.60	3.32
	57 (13.9)	32.07	32.07	2.98	30.55	30.55	3.32
1350	72 (22.2)	38.19	20.99	3.08	35.98	20.27	3.41
	67 (19.4)	34.80	26.93	3.05	32.78	26.19	3.39
	63 (17.2)††	32.32	25.72	3.04	30.43	24.97	3.38
	62 (16.7)	33.12	33.12	3.05	31.51	31.51	3.38
	57 (13.9)	33.08	33.08	3.04	31.47	31.47	3.38

COOLING INDOOR MODEL	CAPACITY	POWER	FURNACE MODEL
CNPV*4824A**	0.98	0.90	58PH*090–16
CNPV*6024A**	1.00	0.92	58PH*090–16
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Manual J vs Equipment

	Manual J Btu/hr	Equipment Btu/hr
Sensible	25,465	23,590
Latent	2,950	7,340
Total	28,415	30,930

	AHRI	OEM
Total Cooling	40,500	30,930
MJ	28,415	28,415
% Difference	42.53%	8.85%

Manual S Speedsheet

- www.acca.org/industry/system-design/speedsheets

Microsoft Excel - Manual S

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Name						Outdoor Design Temperature - Summer			
City						Indoor Design Temperature - Summer			
State						Indoor Design %RH - Summer			
Altitude		Altitude Adj.	1.00			Outdoor Design Temperature - Winter			
Proposed Equipment	Manufacturer		Furnace #					AFUE	
	Manufacturer		AHU/Coil #					SEER	
	Manufacturer		Condenser #					HSPF	
	Manufacturer		Package #						

Manual J Load	Heat Loss	Design TD For Airflow	Design CFM	Return Air (F wb)	Total BTUH	Sensible BTUH	Latent BTUH	SHR
		#DIV/0!	#DIV/0!	#N/A				#DIV/0!

Manufacturers Performance Data (A)	Lower CFM	Return Air (F wb)	Total BTUH	Sensible BTUH	Latent BTUH	SHR
Entering Coil Temperature = 75 (F db)						
Rated CFM @ Rated RA Temperature						#DIV/0!
Rated CFM @ Design RA Temperature		#N/A	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Rated CFM @ Rated RA Temperature						#DIV/0!

Manufacturers Performance Data (B)	Higher CFM	Return Air (F wb)	Total BTUH	Sensible BTUH	Latent BTUH	SHR
Entering Coil Temperature = 75 (F db)						
Rated CFM @ Rated RA Temperature						#DIV/0!
Rated CFM @ Design RA Temperature		#N/A	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Rated CFM @ Rated RA Temperature						#DIV/0!

Manufacturers Cooling Performance	Design CFM	Design (F wb)	Total BTUH	Sensible BTUH	Latent BTUH	SHR
Interpolated Equipment Capacity	#DIV/0!	#N/A	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Excess Latent Capacity Calculation				#DIV/0!	#DIV/0!	
Capacity @ Design CFM / RA (F wb)				#DIV/0!	#DIV/0!	#DIV/0!
Equipment Capacity as a % of Design			#DIV/0!	#DIV/0!	#DIV/0!	

Heat Pump Data	Capacity @ 47 °F db	Capacity @ 17 °F db	Balance Point	Supplemental Heat Required
			#DIV/0!	

Furnace Data	Input Capacity	Output Capacity	AFUE	Desired Temp. Rise	Calculated Airflow
					#DIV/0!

Manual S

Ready

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