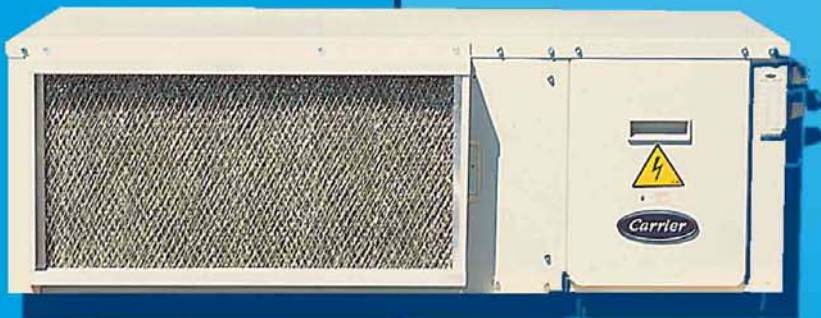




# 50 PH



## ***Water Cooled Package Unit***

## **Compact, Self-Contained unit that offer low installation cost plus dependable performance.**

From carrier's excellence in engineering come a new, compact of single package horizontal and vertical water source units (cooling only / heat pump). System designed for high efficiency year – round cooling and heating. They are ideal for residential, commercial or industrial applications. These units are attractively styled to meet your new construction or renovation needs.

### **Features/Benefits:**

- Heat pump is standard and Cool only is option.
- Compact design – save installation space.
- Factory assembled, internally wired and full charged with R-22.
- Powder painted heavy gauge steel cabinet complies with ASTM B117 for 500 hours salt-spray test.
- Removable access panels for access to the compressor, condenser, fan, electrical control panel.
- Panels for fan section are insulated with 10 mm thick & 70 Kg. /m<sup>3</sup> rubber insulation.
- Panels for compressor section are insulated with 12 mm thick. & 48 Kg./m<sup>3</sup> foam insulation.
- Insulated galvanized steel welded corners condensate pan.
- Fully hermetic reciprocating compressor ensures durable performance.
- Compressors with Internal spring isolators and external neoprene isolators.
- High efficiency AMCA standard evaporator centrifugal fan.
- Easy maintenance and efficient 25 mm washable air filters.
- 50PH-20 up to 50PH-40 is supplied with 3 Speeds direct driven fan with external rotor motor.
- 50PH-50 & 50PH-60 is supplied with 2 Speeds direct driven fan with external rotor motor.
- 50PH-80 is supplied with single Speeds direct driven fan with external rotor motor.
- All three-phase fans are single speed direct driven by external rotor motor.
- Very efficient compact water-cooled coaxial heat exchangers - Copper / Steel.
- Maximum working pressure for condenser water side is 450 PSI.
- Maximum working pressure for condenser refrigerant side is 400PSI.
- Factory assembled, tested and installed control box.

### **Safeties:**

Units are complete with compressor thermal O.L, fan motor thermal O.L, high & low pressure switch, reset relay, blower relay, crankcase heater and solid state anti-short cycle timer.

### **Note:**

Specifications are subject to change without notice according to Carrier policy of continuous development.

## Physical Data (1)

- 1 – Phase power supply Compressors for models sizes 20 – 26 – 32 – 40
- 3 – Phase power supply Compressors for models sizes 50 – 60 – 80

Model NO: 50 PH		20	26	32	40	50	60	80	
NOMINAL COOLING CAPACITY *	Btu/h	20000	26000	32000	40000	50000	60000	80000	
	Kw	5.86	7.62	9.38	11.72	14.65	17.58	23.45	
NOMINAL HEATING CAPACITY *	Btu/h	23000	29000	39000	48000	58000	70000	93000	
	Kw	6.74	8.50	11.43	14.07	17.00	20.51	27.26	
COMPRESSOR CURRENT*	Amps	9.5	11.7	14.6	17	7	7.5	11.5	
FAN MOTOR CURRENT*	Amps	1.7	1.7	3.1	3	3	3	6.6	
OVERALL DIMENSIONS	mm	1200x600x400		1300x650x470		1400x700x530		1700x850x570	
									850x850x650**
UNIT WEIGHT	Kg	105	110	120	140	160	170	200	
REFRIGERANT	R-22								
NOMINAL POWER SUPPLY	V-PH-HZ	200-240/1/50					280-420/3/50		
COMPRESSOR POWER SUPPLY	V-PH-HZ	200-240/1/50					280-420/3/50		
FAN MOTOR POWER SUPPLY	V-PH-HZ	220-1-50							
<b>COMPRESSOR</b>									
Type	Reciprocating Fully Hermetic								
<b>HEAT EXCHANGER (CONDENSER)</b>									
Type	Coaxial								
Material	Copper / Steel								
Qty/Unit		1	1	1	1	1	1	1	
<b>FAN</b>									
Type	Direct driven external rotor motor								
No. of Fans		1	1	1	1	1	1	1	
Speeds		Three Speeds				Two Speeds		Single Speed	
Max. rpm	rpm	1230	1230	1250	1250	1250	1250	1380	
Max. Air Flow***	l/s	375	375	525	660	775	775	1075	
Min. Air Flow***	l/s	200	200	275	300	325	425	750	
Motor Kw	Kw	0.184	0.184	0.35	0.35	0.35	0.35	0.6	
<b>INDOOR COIL (EVAPORATOR)</b>									
Tube-Fin Material	Copper-Aluminum								
FPI-Fin type		DW-16	DW-16	DW-15	DW-15	DW-12	DW-12	DW-15	
No. of Rows		3	3	3	3	4	4	4	
Tube per row		12	12	16	16	20	20	20 / 24	
Tube Pitch - Row Pitch		1" - 0.866"							
Coil Length	mm	600	600	600	600	660	660	800 / 660	
<b>RETURN AIR FILTER</b>									
Type	Washable 25 mm thick								
No.		1	1	1	1	1	1	2	
Size	mm	635x340		635x410		695x470	695x470	510x430 / 590x345	
<b>CONNECTIONS</b>									
Condenser water Inlet - Outlet		1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"	
Drain		3/4"	3/4"	3/4"	3/4"	1"	1"	1"	

\* Data are rated to ARI/ISO/ASHREA 13256-1 at Standard Conditions.

\*\* For 50 PH 80 (vertical installation) the dimensions of fan section & compressor section are the same.

\*\*\* For specific requirements refer to the fan curve performance.

### Note:

Specifications are subject to change without notice according to Carrier policy of continuous development.

- 1- Phase power supply fan motors for all models

## Physical Data (2)

- 3 – Phase power supply Compressors for all models
- 1 – Phase power supply Fan Motors for all models

Model NO: 50 PH		20	26	32	40	50	60	80
NOMINAL COOLING CAPACITY *	Btu/h	20000	26000	32000	40000	50000	60000	80000
	Kw	5.86	7.62	9.38	11.72	14.65	17.58	23.45
NOMINAL HEATING CAPACITY *	Btu/h	23000	29000	39000	48000	58000	70000	93000
	Kw	6.74	8.50	11.43	14.07	17.00	20.51	27.26
COMPRESSOR CURRENT*	Amps	3.5	4	4.7	6.3	7	7.5	11.5
FAN MOTOR CURRENT*	Amps	1.7	1.7	3.1	3	3	3	6.6
OVERALL DIMENSIONS	mm	1200x600x400		1300x650x470		1400x700x530		1700x850x570
UNIT WEIGHT	Kg	105	110	120	140	160	170	200
REFRIGERANT	R-22							
NOMINAL POWER SUPPLY	V-PH-HZ	380-420/3/50						
COMPRESSOR POWER SUPPLY	V-PH-HZ	380-420/3/50						
FAN MOTOR POWER SUPPLY	V-PH-HZ	220-1-50						
<b>COMPRESSOR</b>								
Type	Reciprocating Fully Hermetic							
<b>HEAT EXCHANGER (CONDENSER)</b>								
Type	Coaxial							
Material	Copper / Steel							
Qty/Unit		1	1	1	1	1	1	1
<b>FAN</b>								
Type	Direct driven external rotor motor							
No. of Fans		1	1	1	1	1	1	1
Speeds		Three Speeds			Two Speeds		Single Speed	
Max. rpm	rpm	1230	1230	1250	1250	1250	1250	1380
Max. Air Flow***	l/s	375	375	525	660	775	775	1075
Min. Air Flow***	l/s	200	200	275	300	325	425	750
Motor Kw	Kw	0.184	0.184	0.35	0.35	0.35	0.35	0.6
<b>INDOOR COIL (EVAPORATOR)</b>								
Tube-Fin Material	Copper-Aluminum							
FPI-Fin type		16 - DW	16 - DW	15 - DW	15 - DW	12 - DW	12 - DW	15 - DW
No. of Rows		3	3	3	3	4	4	4
Tube per row		12	12	16	16	20	20	20 /24
Tube Pitch - Row Pitch		1" - 0.866"						
Coil Length	mm	600	600	600	600	660	660	800 / 660
<b>RETURN AIR FILTER</b>								
Type	Washable 25 mm thick							
No.		1	1	1	1	1	1	2
Size	mm	635x340		635x410		695x470	695x470	510x430 /590x345
<b>CONNECTIONS</b>								
Condenser water Inlet - Outlet		1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"
Drain		3/4"	3/4"	3/4"	3/4"	1"	1"	1"

\* Data are rated to ARI/ISO/ASHREA 13256-1 at Standard Conditions.

\*\* For 50 PH 80 (vertical installation) the dimensions of fan section & compressor section are the same.

\*\*\* For specific requirements refer to the fan curve performance.

### Note:

Specifications are subject to change without notice according to Carrier policy of continuous development.

## Physical Data (3)

- 3 – Phase power supply Compressors for all models
- 3 – Phase power supply Fan Motors for all models

Model NO: 50 PH		20	26	32	40	50	60	80
NOMINAL COOLING CAPACITY *	Btu/h	20000	26000	32000	40000	50000	60000	80000
	Kw	5.86	7.62	9.38	11.72	14.65	17.58	23.45
NOMINAL HEATING CAPACITY *	Btu/h	23000	29000	39000	48000	58000	70000	93000
	Kw	6.74	8.50	11.43	14.07	17.00	20.51	27.26
COMPRESSOR CURRENT*	Amps	9.5	11.7	14.7	17	7	7.5	11.5
FAN MOTOR CURRENT*	Amps	1.7	1.7	3.1	3	3	3	6.6
OVERALL DIMENSIONS	mm	1200x600x400		1300x650x470		1400x700x530		1700x850x570
UNIT WEIGHT	Kg	105	110	120	140	160	170	200
REFRIGERANT	R-22							
NOMINAL POWER SUPPLY	V-PH-HZ	380-420/3/50						
COMPRESSOR POWER SUPPLY	V-PH-HZ	380-420/3/50						
FAN MOTOR POWER SUPPLY	V-PH-HZ	380-3-50						
<b>COMPRESSOR</b>								
Type	Reciprocating Fully Hermetic							
<b>HEAT EXCHANGER (CONDENSER)</b>								
Type	Coaxial							
Material	Copper / Steel							
Qty/Unit	1	1	1	1	1	1	1	1
<b>FAN</b>								
Type	Direct driven external rotor motor							
No. of Fans	1	1	1	1	1	1	1	1
Speeds	Single Speed							
Max. rpm	rpm	1230	1230	1250	1250	1250	1250	1380
Max. Air Flow***	l/s	375	375	525	660	775	775	1075
Min. Air Flow***	l/s	200	200	275	300	325	425	750
Motor Kw	Kw	0.184	0.184	0.35	0.35	0.35	0.35	0.6
<b>INDOOR COIL (EVAPORATOR)</b>								
Tube-Fin Material	Copper-Aluminum							
FPI-Fin type	16 - DW	16 - DW	15 - DW	15 - DW	12 - DW	12 - DW	12 - DW	15 - DW
No. of Rows	3	3	3	3	4	4	4	4
Tube per row	12	12	16	16	20	20	20	20 /24
Tube Pitch - Row Pitch	1" - 0.866"							
Coil Length	mm	600	600	600	600	660	660	800 / 660
<b>RETURN AIR FILTER</b>								
Type	Washable 25 mm thick							
No.	1	1	1	1	1	1	1	2
Size	mm	635x340		635x410		695x470	695x470	510x430 /590x345
<b>CONNECTIONS</b>								
Condenser water Inlet - Outlet	1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Drain	3/4"	3/4"	3/4"	3/4"	1"	1"	1"	1"

\* Data are rated to ARI/ISO/ASHREA 13256-1 at Standard Conditions.

\*\* For 50 PH 80 (vertical installation) the dimensions of fan section & compressor section are the same.

\*\*\* For specific requirements refer to the fan curve performance.

### Note:

Specifications are subject to change without notice according to Carrier policy of continuous development.

## Unit Models

Heat Pump
50 PH 20-H
50 PH 26-H
50 PH 32-H
50 PH 40-H
50 PH 50-H
50 PH 60-H
50 PH 80-H

Cool Only
50 PH 20-C
50 PH 26-C
50 PH 32-C
50 PH 40-C
50 PH 50-C
50 PH 60-C
50 PH 80-C

## Electrical Data

Model	V-Ph-Hz	Volt Range		Compressor		Fan Motor (1- Phase)		Fan Motor (3 - Phase)	
		Min	Max	RLA	LRA	Kw	RLA	Kw	RLA
50 PH 20	220-1-50	180	253	9.5	78	0.184	1.70	N/A	
50 PH 20	380-3-50	342	456	3.50	38.00	0.184	1.70	0.147	0.67
50 PH 26	220-1-50	180	253	11.7	73.2	0.184	1.70	N/A	
50 PH 26	380-3-50	342	456	4.00	30.00	0.184	1.70	0.147	0.67
50 PH 32	220-1-50	180	264	14.6	85.8	0.350	3.10	N/A	
50 PH 32	380-3-50	342	456	4.70	39.00	0.350	3.10	0.300	1.40
50 PH 40	220-1-50	180	264	17	105	0.350	3.00	N/A	
50 PH 40	380-3-50	342	456	6.30	50.00	0.350	3.00	0.300	1.35
50 PH 50	380-3-50	342	456	7.00	62.00	0.350	3.00	0.300	1.35
50 PH 60	380-3-50	342	456	7.50	62.00	0.350	3.00	0.300	1.35
50 PH 80	380-3-50	342	440	11.50	78.50	0.600	6.60	0.550	2.50

**RLA:** Rated Load Amps

**LRA:** Locked Rotor Amps

**KW:** Power Consumption

**Note:**

Specifications are subject to change without notice according to Carrier policy of continuous development.

## Selection Procedure

### 1. Determine design conditions:

#### Given:

Total cooling capacity .....	10 KW
Sensible heat capacity.....	7.3 KW
Evaporator air quantity.....	500 L/S
External static pressure.....	75 Pa
Mixed entering air conditions	
Entering air temp (eat DB).....	25.5 C DB
Entering air temp (eat WB).....	17.5 C DB
Condenser entering water	
Temperature.....	30 C
Design temperature rise.....	5.5 C

### 2. Select based on cooling requirements.

- a. Enter 50PH cooling capacity table at given evaporator air quantity (500 L/S), medium speed and condenser entering temperature (30 C). Determine total cooling capacity (TC) and sensible heat capacity (SHC) at given entering air wb (19 C).

50PH 40 unit has capacity of 11.1 KW (TC) and 8.44 KW (SHC) with compressor power of 3.65 KW.

- b. Correct TC value for entering air temperature other than 19 C.

TC" = TC x Total Clg Cap. Multiplier  
 = 11.1 x 0.951  
 = 10.65 KW.  
 Corrected TC = 10.65 KW

- c. Correct SHC value for entering air temperature other than 27 C.

SHC" = SHC x Sen. Clg Cap. Multiplier  
 = 8.44 x 0.962  
 = 8.12 KW.  
 Corrected SHC = 8.12 KW  
 Thus, 50PH 40 units can fulfill the specified load requirement.

- d. Correct Power value for entering air temperature other than 19 C.

KW" = KW x Power Multiplier  
 = 3.65 x 0.997  
 = 3.639 KW.

\* Corrected KW = 3.639 KW

### 3. Determine static pressure

From 50PH 40 fan curve:

Locate on the curve where the specified air quantity (500 L/S) and external static pressure (75 Pa) intersect.

The intersect point is almost at medium speed curve. The fan can satisfy the requirements.

### 4. Determine condenser water requirements.

- a. Required water flow can be determined using the formula below:  

$$= (TC (Kw) + \text{Power Input (Kw)}) / (\text{Water Temp Rise (C)} \times 0.07)$$

$$= (10.56 + 3.639) / (5.5 \times 0.07)$$

$$= 14.199 / 0.385$$

$$= 36.88 \text{ l/min}$$

- b. Enter condenser pressure drop chart at the determined water flow 37.16 l/min. Read from the intersection on the curve to the left scale to obtain the water pressure drop (40.5 KPa). A proper water pump can be selected based on this value.

### Capacity notes

- Performance is based on 27 C DB & 19 C WB temps of air entering indoor unit. Correction is necessary if the air temperature is different.
- Direct interpolation is permissible. Do not extrapolate.
- Nominal cooling capacity is based on max air quantity, 19 C entering wet-bulb and 30 C entering water temperature.
- Nominal heating capacity is based on max air quantity, 15 C entering wet-bulb and 20 C entering water temperature.

## Performance Data

### 50PH – 20

EWT (°C)	Air Flow L/S	Cooling						Heating				
		TC	SHC	SHR	KW	H.Rej.	EER	HC	KW	H.Ext.	LAT	COP
20	375	6.54	4.97	0.76	1.72	8.10	12.99	6.73	2.00	5.06	33.00	3.37
	325	6.40	4.67	0.73	1.70	7.94	12.86	6.67	2.04	4.96	35.00	3.27
	250	6.18	4.33	0.70	1.67	7.67	12.64	6.50	2.10	4.75	39.00	3.10
25	375	6.20	4.84	0.78	1.82	7.85	11.63	7.03	2.04	5.33	34.00	3.45
	325	6.08	4.56	0.75	1.80	7.70	11.54	6.96	2.08	5.22	36.00	3.35
	250	5.86	4.16	0.71	1.76	7.44	11.37	6.80	2.16	2.01	41.00	3.15
30	375	<b>5.85</b>	<b>4.80</b>	<b>0.82</b>	<b>1.92</b>	<b>7.61</b>	<b>10.41</b>	<b>7.29</b>	<b>2.07</b>	<b>5.56</b>	<b>35.00</b>	<b>3.52</b>
	325	5.75	4.43	0.77	1.89	7.47	10.39	7.21	2.12	5.40	37.00	3.40
	250	5.55	4.05	0.73	1.86	7.20	10.19	7.05	2.19	5.20	42.00	3.22
35	375	5.53	4.59	0.83	2.01	7.90	9.40					
	325	5.43	4.29	0.79	1.99	7.23	9.32					
	250	5.23	3.92	0.75	1.95	6.99	9.16					

### 50PH – 26

EWT (°C)	Air Flow L/S	Cooling						Heating				
		TC	SHC	SHR	KW	H.Rej.	EER	HC	KW	H.Ext.	LAT	COP
20	375	8.47	6.10	0.72	2.45	10.24	11.81	8.60	2.60	6.61	36.00	3.31
	325	8.25	5.78	0.70	2.40	10.00	11.74	8.48	2.64	6.44	39.00	3.21
	250	7.80	5.15	0.66	2.35	9.53	11.34	8.27	2.70	6.13	44.00	3.06
25	375	8.05	5.96	0.74	2.50	9.95	11.00	9.01	2.64	6.94	38.00	3.41
	325	7.90	5.61	0.71	2.45	9.73	11.01	8.90	2.68	6.77	41.00	3.32
	250	7.45	4.99	0.67	2.40	9.27	10.60	8.68	2.76	6.46	46.00	3.14
30	375	7.61	5.78	0.76	2.60	9.65	10.00	9.34	2.67	7.22	40.00	3.50
	325	7.46	5.45	0.73	2.55	9.45	9.99	9.22	2.72	7.05	43.00	3.39
	250	7.10	4.83	0.68	2.50	9.00	9.70	9.01	2.79	6.74	48.00	3.23
35	375	7.21	5.62	0.78	2.70	9.36	9.12					
	325	7.05	5.22	0.74	2.65	9.17	9.09					
	250	6.72	4.64	0.69	2.60	8.78	8.83					

#### Legend:

EWT	: Entering water Temperature	°C	H. Rej.	: Heat Rejection	Kw
TC	: Total Cooling Capacity	Kw	EER	: Energy Efficiency Ratio	Btu/Hr per Kw
SHC	: Sensible Heat Capacity	Kw	HC	: Total Heating Capacity	Kw
SHR	: Sensible Heat Ratio		H. Ext.	: Heat Extraction	Kw
KW	: Power Consumption	Kw	COP	: Coefficient Of Performance	Kw per Kw

#### Notes:

- Interpolation is permissible. Extrapolation is not.
- All entering air conditions are 27 °C DB and 19 °C WB in cooling and 20 °C DB and 15 °C WB in heating.
- ISO certified conditions are 30 °C EWT, 27 °C DB and 19 °C WB in cooling and 20 °C EWT, 20 °C DB and 15 °C WB in heating.
- See Performance Data Correction Tables for operation conditions other than those listed above.
- Specifications are subject to change without notice according to Carrier policy of continuous development.

## Performance Data (Cont.)

### 50PH – 32

EWT (°C)	Air Flow L/S	Cooling						Heating				
		TC	SHC	SHR	KW	H.Rej.	EER	HC	KW	H.Ext.	LAT	COP
20	525	10.38	8.30	0.80	2.94	13.04	12.06	<b>11.42</b>	<b>3.30</b>	<b>8.56</b>	<b>34.00</b>	<b>3.46</b>
	430	10.10	7.58	0.75	2.89	12.71	11.94	11.12	3.36	8.20	38.00	3.31
	350	9.70	6.79	0.70	2.83	12.25	11.71	10.90	3.40	7.95	42.00	3.21
25	525	9.88	8.10	0.82	3.08	12.67	10.96	11.92	3.36	9.00	36.00	3.55
	430	9.64	7.42	0.77	3.04	12.38	10.83	11.62	3.42	8.64	40.00	3.40
	350	9.27	6.67	0.72	2.97	11.95	10.66	11.40	3.46	8.39	44.00	3.29
30	525	<b>9.36</b>	<b>7.96</b>	<b>0.85</b>	<b>3.24</b>	<b>12.30</b>	<b>9.87</b>	12.42	3.42	9.44	36.00	3.63
	430	9.15	7.23	0.79	3.20	12.00	9.77	12.12	3.48	9.08	40.00	3.48
	350	8.83	6.45	0.73	3.12	11.65	9.67	11.90	3.52	8.83	44.00	3.38
35	525	8.85	7.70	0.87	3.39	11.94	8.92					
	430	8.65	6.92	0.80	3.35	11.68	8.82					
	350	8.37	6.28	0.75	3.28	11.34	8.71					

### 50PH – 40

EWT (°C)	Air Flow L/S	Cooling						Heating				
		TC	SHC	SHR	KW	H.Rej.	EER	HC	KW	H.Ext.	LAT	COP
20	660	12.70	10.16	0.80	3.56	15.92	12.18	<b>14.05</b>	<b>4.10</b>	<b>10.53</b>	<b>34.50</b>	<b>3.43</b>
	500	12.20	8.91	0.73	3.48	15.34	11.97	13.35	4.24	9.73	39.00	3.15
	400	11.67	8.05	0.69	3.40	14.74	11.72	13.05	4.30	9.33	43.00	3.03
25	660	12.13	9.95	0.82	3.78	15.55	10.96	14.75	4.18	11.08	36.00	3.53
	500	11.66	8.75	0.75	3.69	14.99	10.79	14.05	4.32	10.28	39.00	3.25
	400	11.18	7.83	0.70	3.60	14.44	10.61	13.75	4.38	9.88	43.00	3.14
30	660	<b>11.71</b>	<b>9.95</b>	<b>0.85</b>	<b>4.05</b>	<b>15.16</b>	<b>9.87</b>	15.45	4.26	11.63	37.00	3.63
	500	11.10	8.44	0.76	3.90	14.64	9.72	14.75	4.40	10.83	39.00	3.35
	400	10.68	7.58	0.71	3.82	14.14	9.55	14.45	4.46	10.43	43.00	3.24
35	660	10.90	9.48	0.87	4.22	14.74	8.82					
	500	10.53	8.21	0.78	4.13	14.27	8.71					
	400	10.15	7.41	0.73	4.03	13.80	8.60					

#### Legend:

EWT	: Entering water Temperature	°C	H. Rej.	: Heat Rejection	Kw
TC	: Total Cooling Capacity	Kw	EER	: Energy Efficiency Ratio	Btu/Hr per Kw
SHC	: Sensible Heat Capacity	Kw	HC	: Total Heating Capacity	Kw
SHR	: Sensible Heat Ratio		H. Ext.	: Heat Extraction	Kw
KW	: Power Consumption	Kw	COP	: Coefficient Of Performance	Kw per Kw

#### Notes:

- Interpolation is permissible. Extrapolation is not.
- All entering air conditions are 27 °C DB and 19 °C WB in cooling and 20 °C DB and 15 °C WB in heating.
- ISO certified conditions are 30 °C EWT, 27 °C DB and 19 °C WB in cooling and 20 °C EWT, 20 °C DB and 15 °C WB in heating.
- See Performance Data Correction Tables for operation conditions other than those listed above.
- Specifications are subject to change without notice according to Carrier policy of continuous development.

## Performance Data (Cont.)

### 50PH – 50

EWT (°C)	Air Flow L/S	Cooling						Heating				
		TC	SHC	SHR	KW	H.Rej.	EER	HC	KW	H.Ext.	LAT	COP
20	750	15.69	12.08	0.77	4.70	19.94	11.40	<b>16.98</b>	<b>4.50</b>	<b>12.74</b>	<b>36.00</b>	<b>3.77</b>
	525	14.77	10.19	0.69	4.49	18.83	11.23	16.08	4.68	11.74	39.00	3.44
	400	13.87	9.02	0.65	4.30	17.76	11.02	15.78	4.74	11.24	43.00	3.33
25	750	15.91	12.57	0.79	4.91	19.36	11.07	17.98	4.61	13.44	36.00	3.90
	525	14.07	9.85	0.70	4.70	18.32	10.22	17.08	4.79	12.44	39.00	3.57
	400	13.28	8.76	0.66	4.52	17.37	10.03	16.78	4.85	11.94	43.00	3.46
30	750	<b>14.64</b>	<b>11.86</b>	<b>0.81</b>	<b>5.10</b>	<b>18.77</b>	<b>9.80</b>	<b>18.98</b>	<b>4.72</b>	<b>14.14</b>	<b>37.00</b>	<b>4.02</b>
	525	13.40	9.65	0.72	4.92	17.85	9.30	18.08	4.90	13.14	39.00	3.69
	400	12.61	8.45	0.67	4.70	16.87	9.16	17.78	4.96	12.64	43.00	3.58
35	750	13.34	11.21	0.84	5.31	18.18	8.58					
	525	12.67	9.25	0.73	5.11	17.30	8.47					
	400	11.97	8.14	0.68	4.91	16.43	8.33					

### 50PH – 60

EWT (°C)	Air Flow L/S	Cooling						Heating				
		TC	SHC	SHR	KW	H.Rej.	EER	HC	KW	H.Ext.	LAT	COP
20	750	19.28	13.69	0.71	4.96	23.74	13.28	<b>20.49</b>	<b>4.70</b>	<b>15.36</b>	<b>39.00</b>	<b>4.36</b>
	475	17.30	11.25	0.65	4.64	21.46	12.73	18.99	5.00	13.96	49.00	3.80
25	750	18.44	13.46	0.73	5.26	23.17	11.97	21.69	4.83	16.26	41.00	4.49
	475	16.62	10.80	0.65	4.93	21.07	11.51	20.19	5.13	14.86	49.00	3.94
30	750	<b>17.56</b>	<b>13.17</b>	<b>0.75</b>	<b>5.56</b>	<b>22.60</b>	<b>10.79</b>	22.89	4.96	17.16	43.00	4.61
	475	15.90	10.49	0.66	5.24	20.65	10.36	21.39	5.26	15.76	49.00	4.07
35	750	16.70	12.69	0.76	5.88	22.03	9.70					
	475	15.20	10.18	0.67	5.56	20.23	9.34					

#### Legend:

EWT	: Entering water Temperature	°C	H. Rej.	: Heat Rejection	Kw
TC	: Total Cooling Capacity	Kw	EER	: Energy Efficiency Ratio	Btu/Hr per Kw
SHC	: Sensible Heat Capacity	Kw	HC	: Total Heating Capacity	Kw
SHR	: Sensible Heat Ratio		H. Ext.	: Heat Extraction	Kw
KW	: Power Consumption	Kw	COP	: Coefficient Of Performance	Kw per Kw

#### Notes:

- Interpolation is permissible. Extrapolation is not.
- All entering air conditions are 27 °C DB and 19 °C WB in cooling and 20 °C DB and 15 °C WB in heating.
- ISO certified conditions are 30 °C EWT, 27 °C DB and 19 °C WB in cooling and 20 °C EWT, 20 °C DB and 15 °C WB in heating.
- See Performance Data Correction Tables for operation conditions other than those listed above.
- Specifications are subject to change without notice according to Carrier policy of continuous development.

## Performance Data (Cont.)

### 50PH – 80

EWT (°C)	Air Flow L/S	Cooling						Heating				
		TC	SHC	SHR	KW	H.Rej.	EER	HC	KW	H.Ext.	LAT	COP
20	1075	26.03	20.30	0.78	6.95	32.30	12.79	27.23	7.50	20.40	37.00	3.63
	750	24.20	16.70	0.69	6.72	30.25	12.30	24.73	8.00	18.50	49.00	3.09
25	1075	24.65	19.47	0.79	7.48	31.42	11.25	28.73	7.66	21.60	41.00	3.75
	750	23.07	16.15	0.70	7.25	29.63	10.87	26.23	8.16	19.70	49.00	3.21
30	1075	23.42	18.97	0.81	8.04	30.66	9.95	30.23	7.82	22.80	43.00	3.87
	750	21.93	15.79	0.72	7.79	28.99	9.61	27.73	8.32	20.90	49.00	3.33
35	1075	22.02	18.28	0.83	8.63	29.86	8.71					
	750	20.77	15.16	0.73	8.38	28.38	8.46					

#### Legend:

EWT	: Entering water Temperature	°C	H. Rej.	: Heat Rejection	Kw
TC	: Total Cooling Capacity	Kw	EER	: Energy Efficiency Ratio	Btu/Hr per Kw
SHC	: Sensible Heat Capacity	Kw	HC	: Total Heating Capacity	Kw
SHR	: Sensible Heat Ratio		H. Ext.	: Heat Extraction	Kw
KW	: Power Consumption	Kw	COP	: Coefficient Of Performance	Kw per Kw

#### Notes:

- Interpolation is permissible. Extrapolation is not.
- All entering air conditions are 27 °C DB and 19 °C WB in cooling and 20 °C DB and 15 °C WB in heating.
- ISO certified conditions are 30 °C EWT, 27 °C DB and 19 °C WB in cooling and 20 °C EWT, 20 °C DB and 15 °C WB in heating.
- See Performance Data Correction Tables for operation conditions other than those listed above.
- Specifications are subject to change without notice according to Carrier policy of continuous development.

## Entering Air Correction Factors

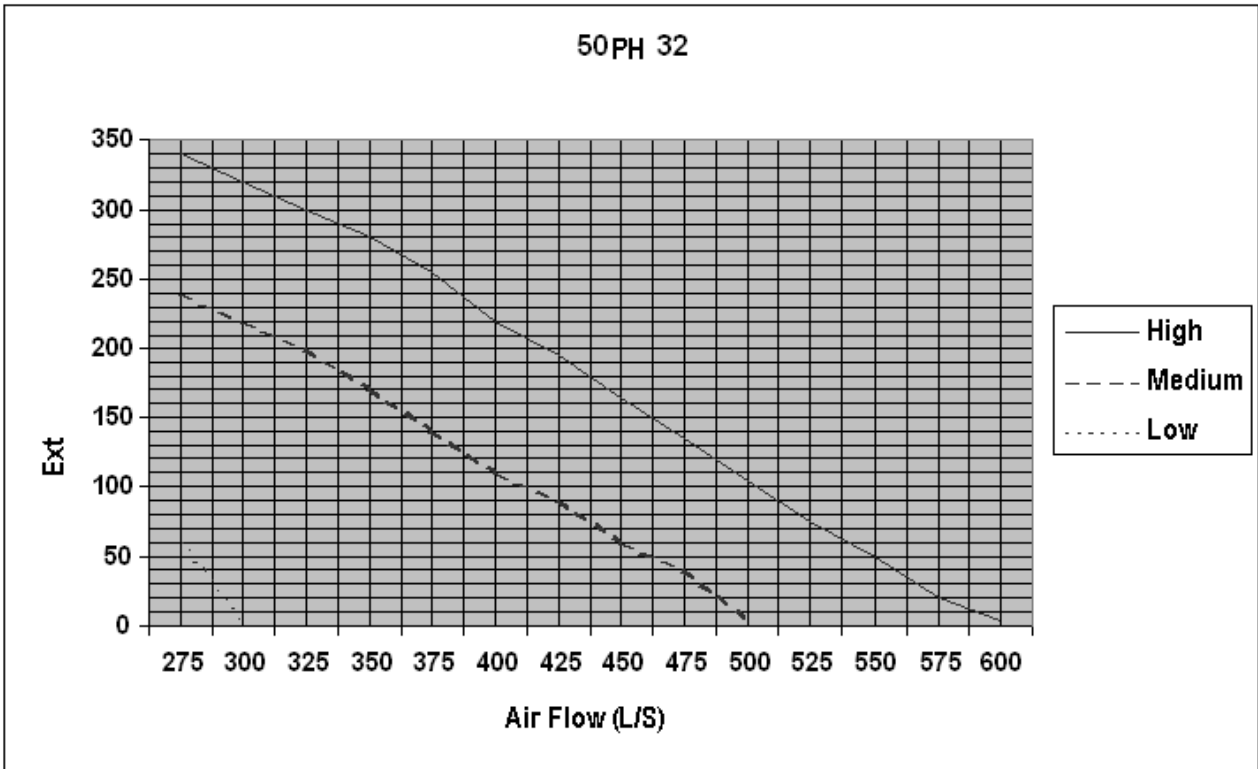
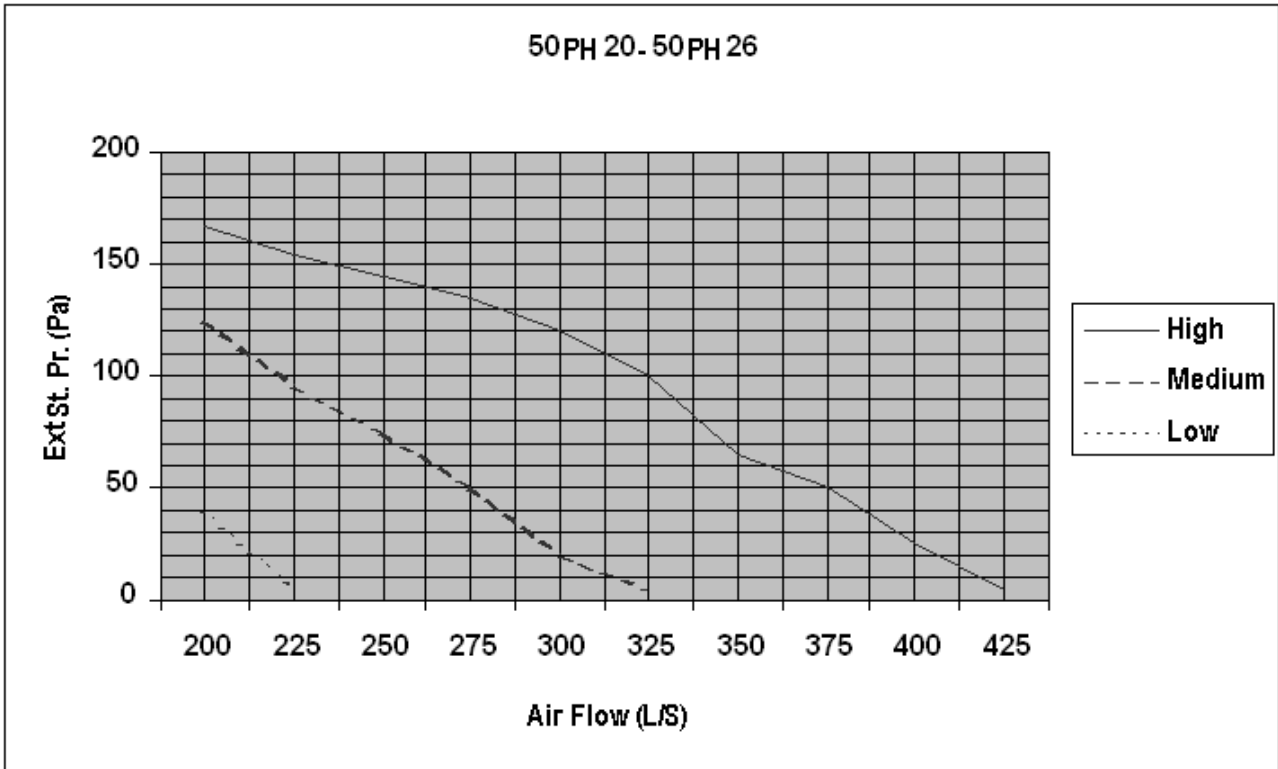
Cooling Corrections											Heating Corrections		
Ent Air WB °C	Total Clg Cap	Sense Clg Cap Multiplier / Entering DB °C								Power	Ent Air DB °C	Htg Cap	Power
		21.1	23.8	25.5	26.6	27	29.4	32.2	35				
15.500	0.852	0.828	0.980	1.051	1.097	1.129	*	*	*	0.996	15.500	1.059	0.947
17.500	0.939	0.662	0.857	0.962	1.031	1.049	*	*	*	0.997	17.500	1.030	0.971
18.300	0.974	0.595	0.808	0.927	1.004	1.017	1.194	*	*	0.998	18.300	1.019	0.981
19.000	1.000	0.539	0.767	0.888	0.967	1.000	1.152	*	*	1.000	20.000	1.000	1.000
19.400	1.004	0.501	0.740	0.861	0.939	0.955	1.124	1.233	1.276	1.002	21.100	0.995	1.010
21.100	1.034		0.636	0.742	0.810	0.844	1.016	1.136	1.220	1.005	23.800	0.980	1.037
23.800	1.069				0.514	0.612	0.826	0.973	1.127	1.010	26.600	0.967	1.063

- **Sensible capacity equal total capacity**  
Entering air corrections should be multiplied directly to the unit performance data to derive performance at entering air condition other than ARI/ISO/ASHREA 13256-1.  
ARI/ISO/ASHREA 13256-1 uses entering air conditions of Clg 27 °C DB and 19-°C WB and Htg 20 °C DB and 15 °C WB.

# Fan Performance

**Notes:**

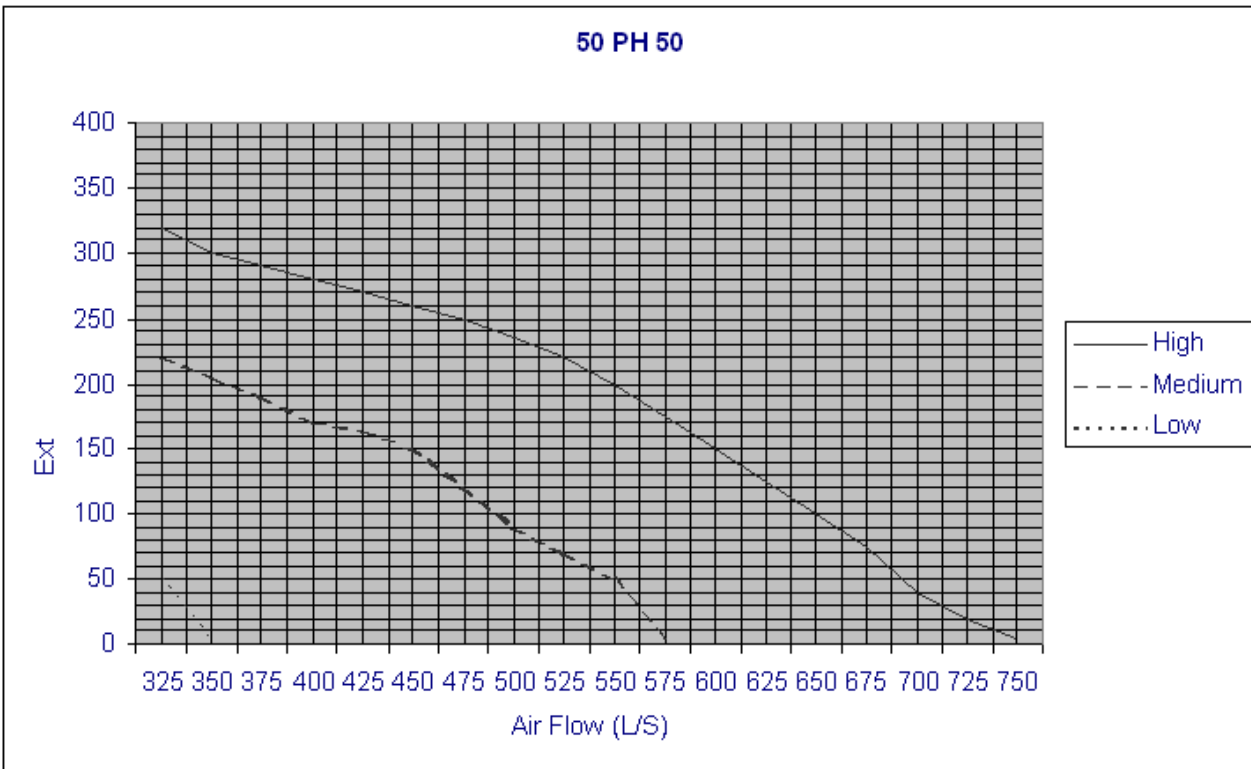
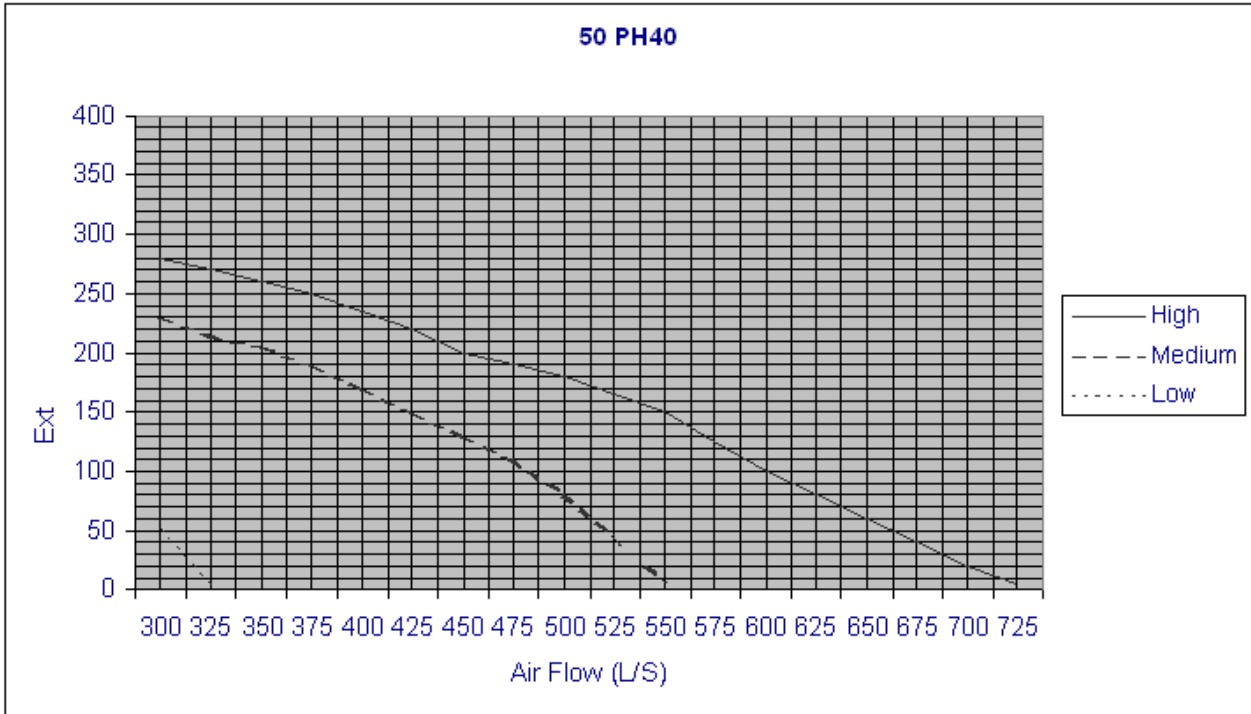
- \* The fan performance curve for high, medium and low speed and unit external static pressure are based on dry coil and clean filters.
- \* 3 – Phase fan motor is single speed, use only performance curve at high speed.



# Fan Performance

## Notes:

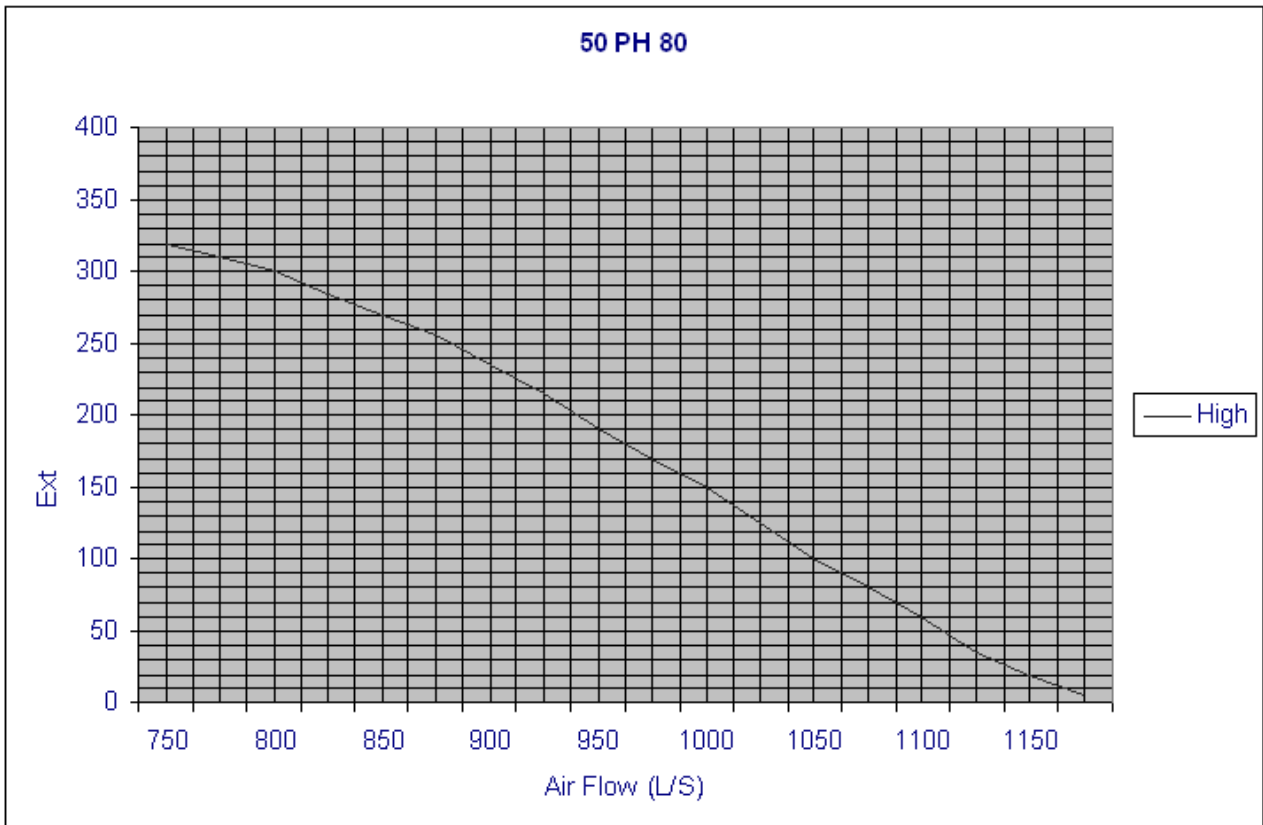
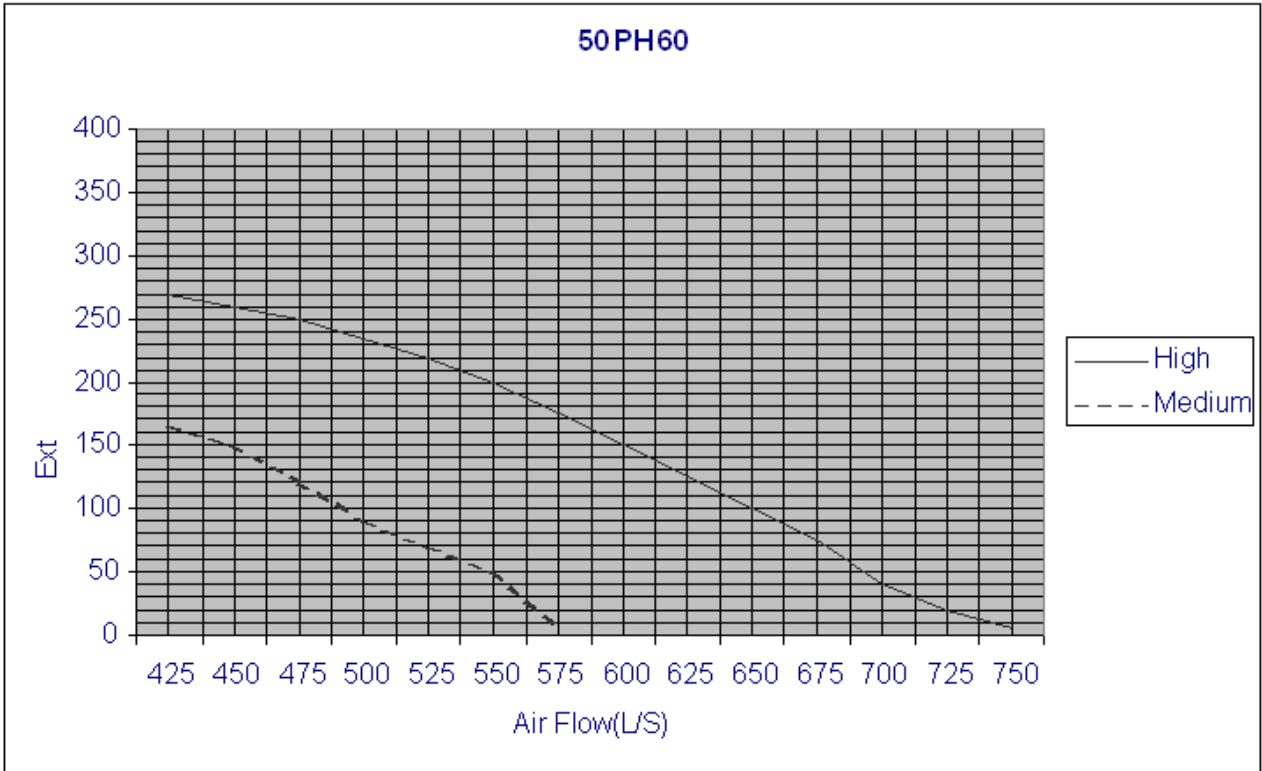
- \* The fan performance curve for high, medium and low speed and unit external static pressure are based on dry coil and clean filters.
- \* 3 – Phase fan motor is single speed, use only performance curve at high speed.



# Fan Performance

**Note:**

- \* The fan performance curve for high, medium and low speed and unit external static pressure are based on dry coil and clean filters.
- \* 3 – Phase fan motor is single speed, use only performance curve at high speed.



# Fan Performance

## Notes:

- 1- The following condenser pressure drop values are based on the fouling factor of 0.044 m<sup>2</sup> K/Kw.
- 2- Water flow rate can be calculated using the formula below:  
Water Flow (L/min) = (TC+Power Input) / (Water Temp. Rise X 0.07)

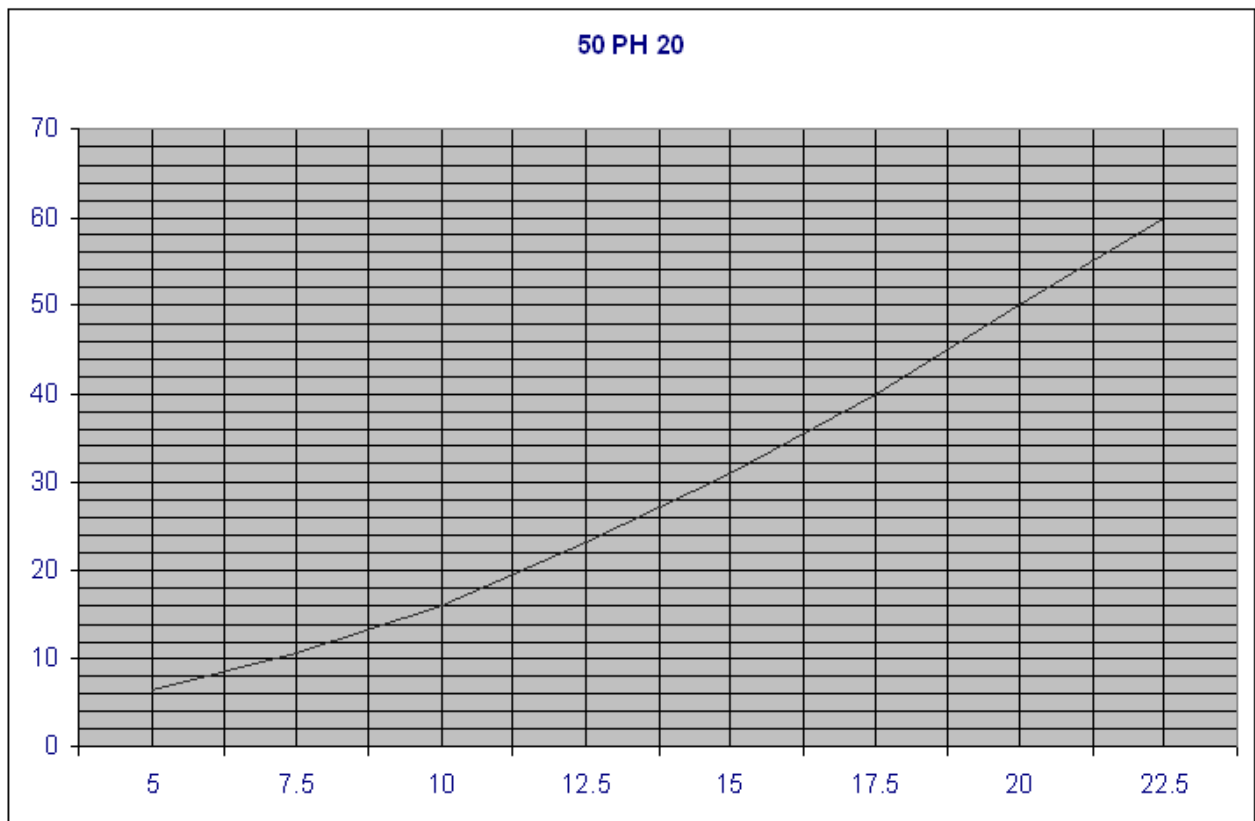
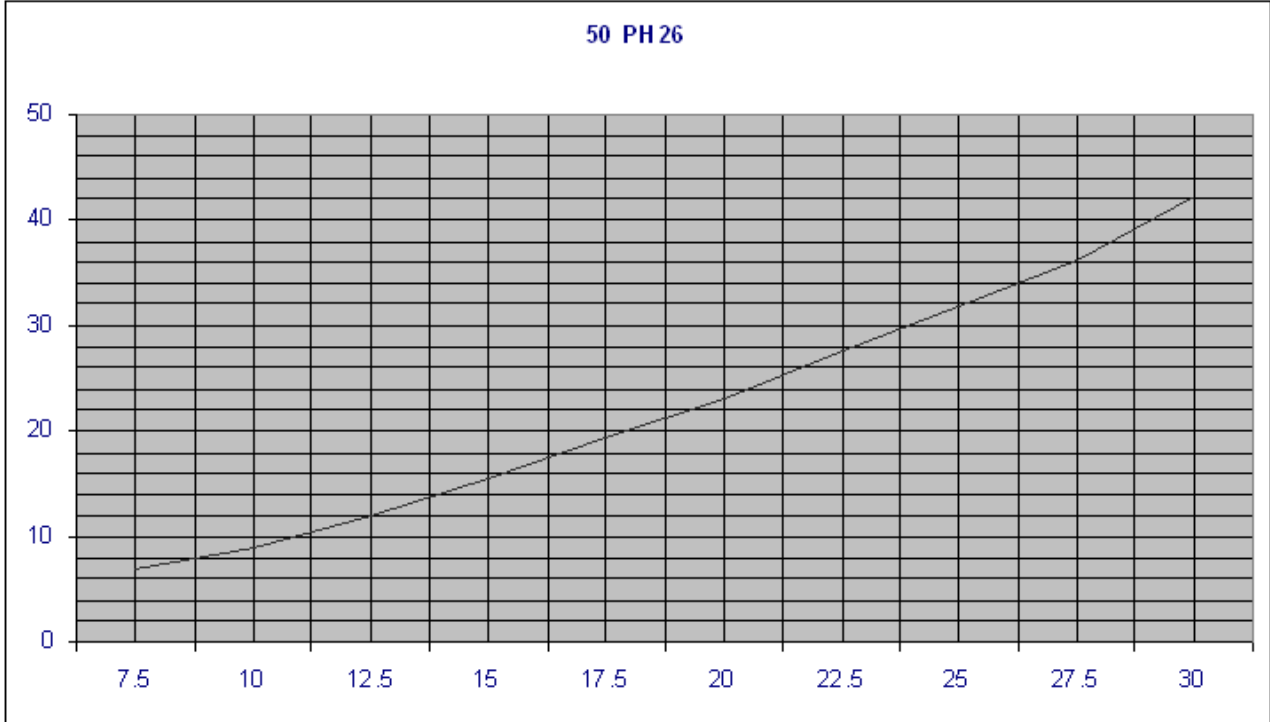
### Where:

TC = Total cooling capacity (Kw)

Power Input = Compressor power input (Kw)

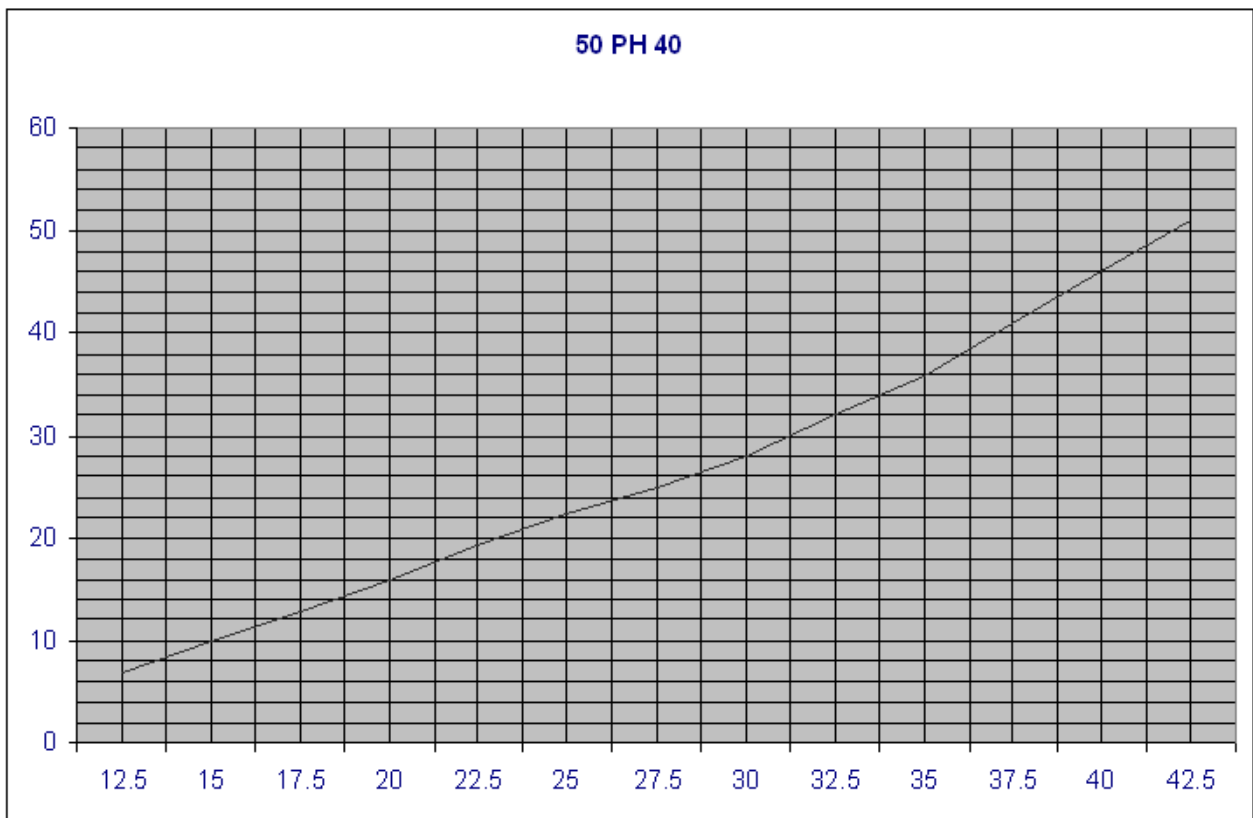
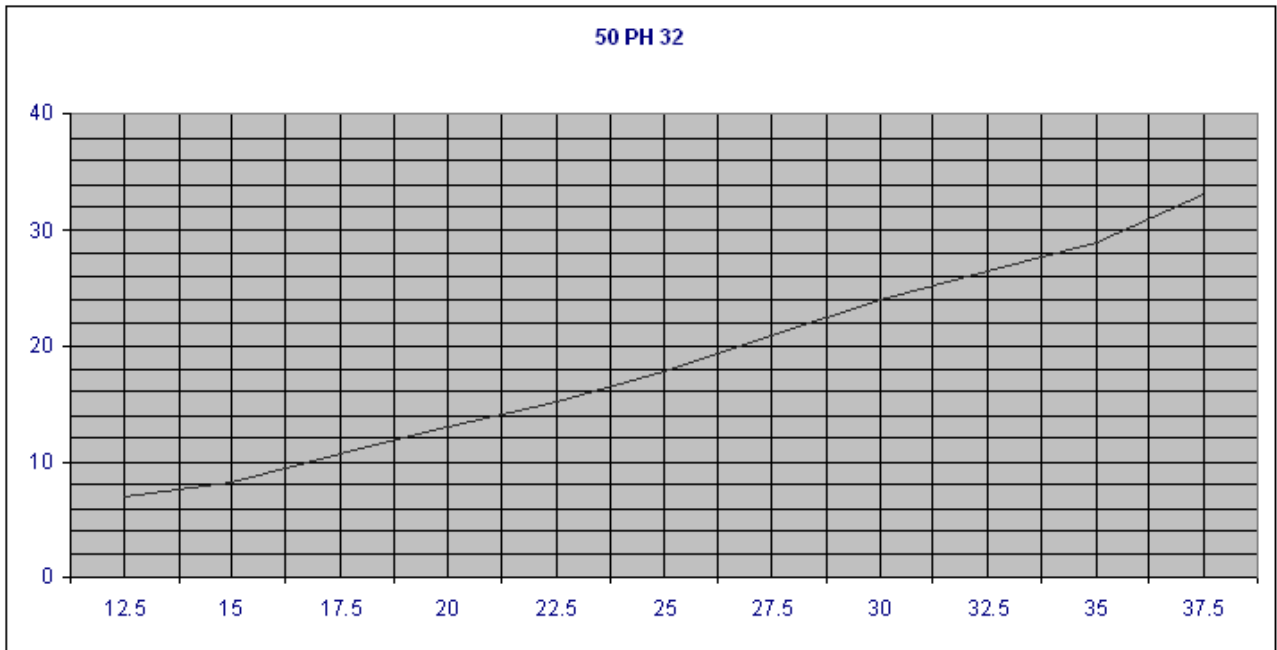
Water Temp. Rise = Condenser Water Leaving temp. - Condenser Water Entering Temp. (oC)

## Water Pressure Drop Thru Condenser



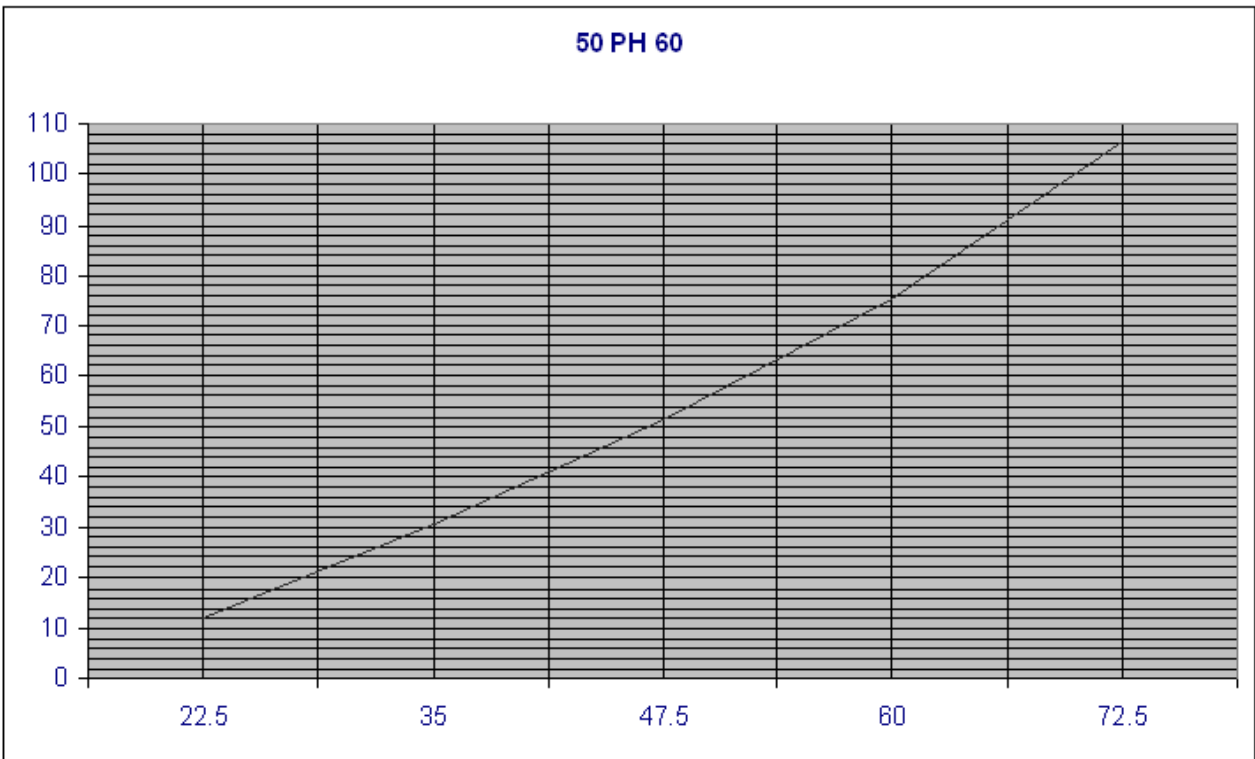
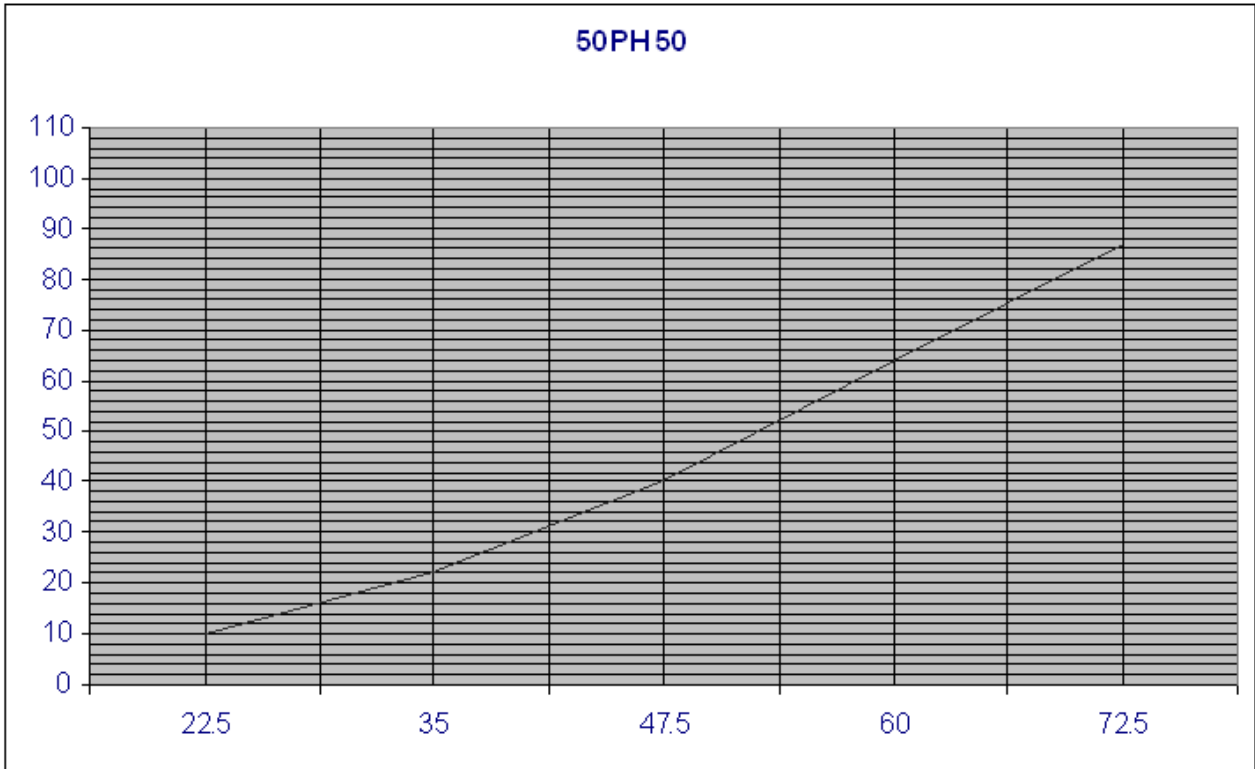
# Fan Performance

Water Pressure Drop Thru Condenser.



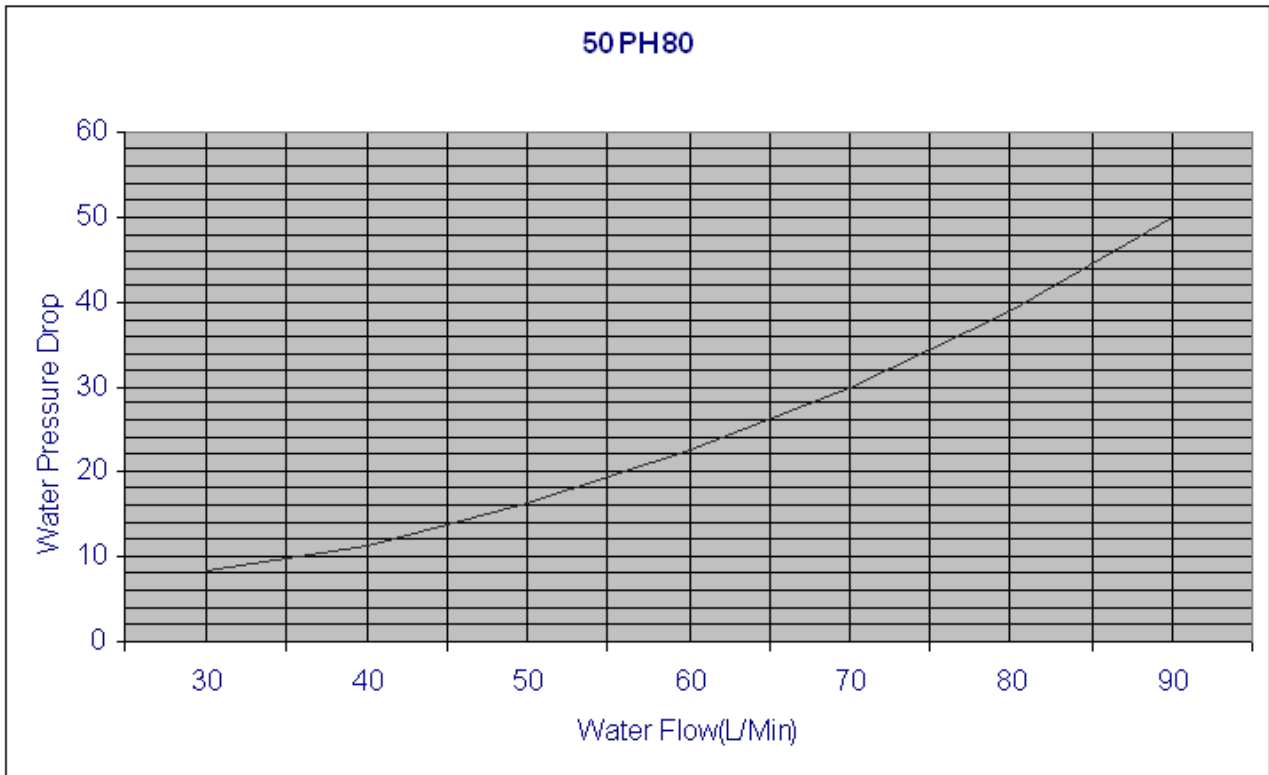
# Condenser Performance

Water Pressure Drop Thru Condenser.

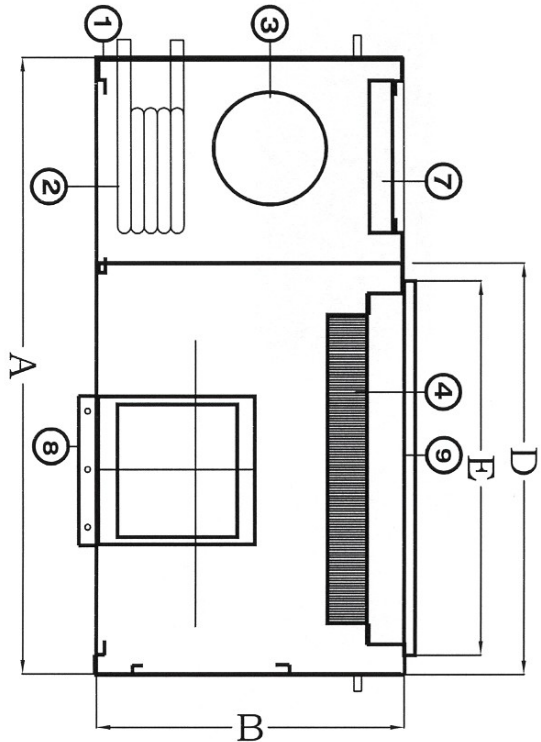
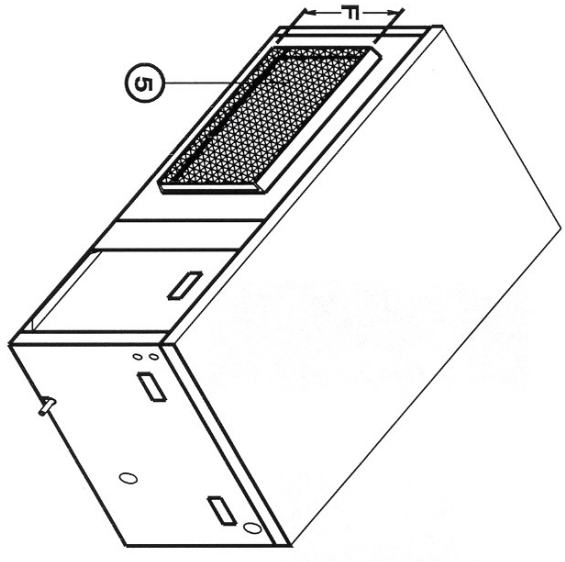
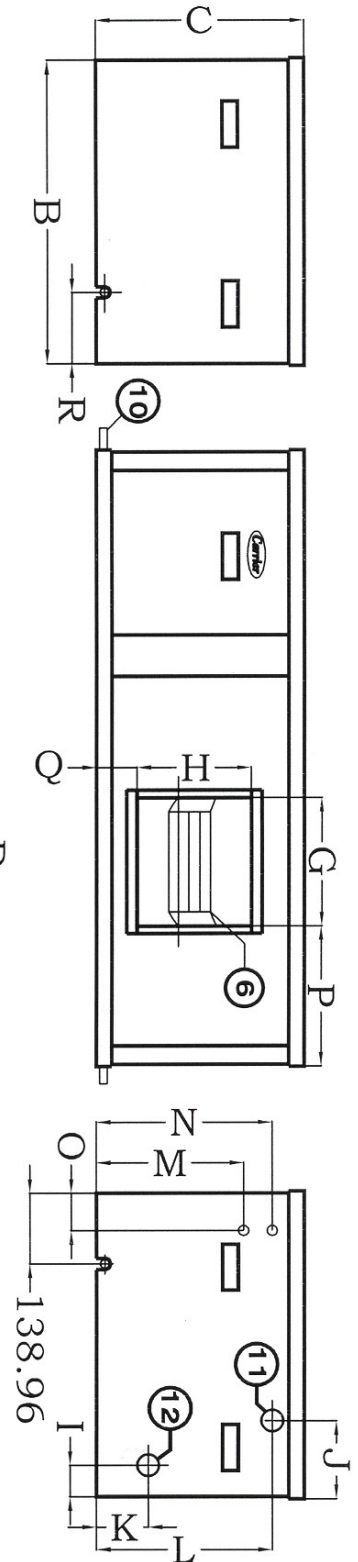


## Condenser Performance

Water Pressure Drop Thru Condenser.



# DIMENSIONS & CONSTRUCTION 50PH 20-26-32-40-50-60 -80 HORIZONTAL TYPE



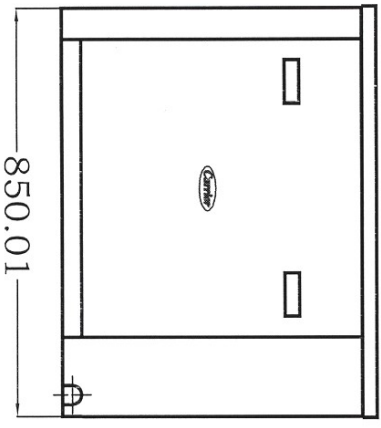
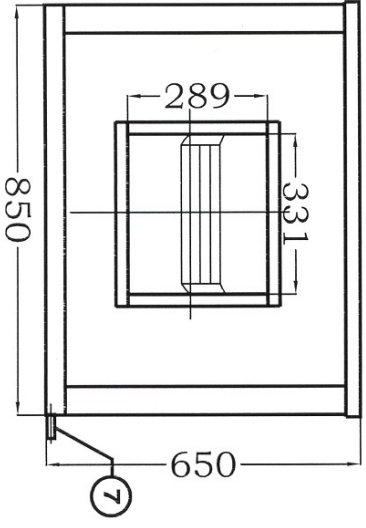
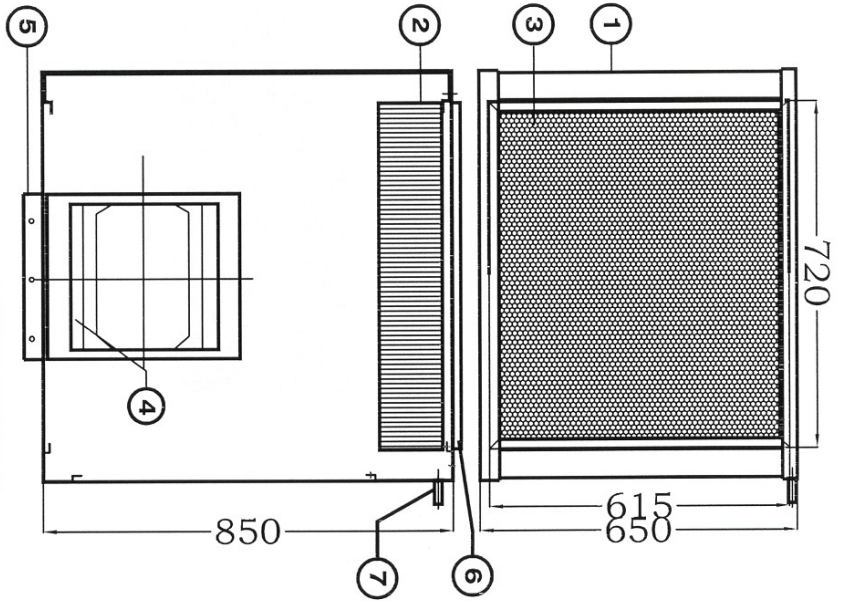
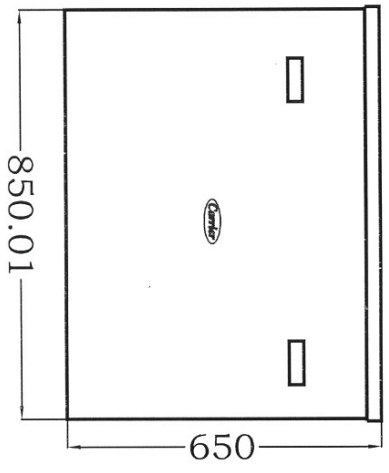
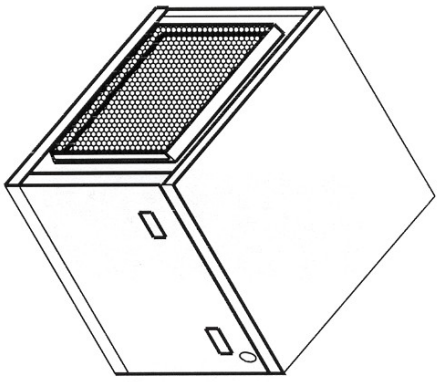
- LEGEND**
- 1- CABINET
  - 2- CONDENSER
  - 3- COMPRESSOR
  - 4- EVAPORATOR COIL
  - 5- AIR FILTER
  - 6- BLOWERS & MOTOR
  - 7- CONTROL BOX
  - 8-DISCHARGE AIR DUCT CONNECTION
  - 9-SUCTION AIR DUCT CONNECTION
  - 10-DRAIN TUBE
  - 11-WATER OUTLET
  - 12-WATER INLET

MODELS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
20	1200	600	400	800	635	365	230	205	106	188	65	345	282	337	48	205	124	144
26	1200	600	400	800	635	365	230	205	86	120	173	340	282	337	48	205	124	144
32	1300	650	470	800	635	412	232	262	92	100	108	394	352	407	48	205	152	144
40	1300	650	470	800	635	412	298	262	100	110	101	419	352	407	48	172.5	152	144
50	1400	700	530	850	685	472	331	289	100	122	95	463	412	467	48	180.5	180.5	169
60	1400	700	530	850	685	472	331	289	100	122	93	470	412	467	48	180.5	180.5	169
80	1700	850	570	1005	840	512	331	289	100	166	86	505	452	507	48	172	149	169

**DIMENSIONS & CONSTRUCTION 50PH 80 EVAP. VERTICAL TYPE**

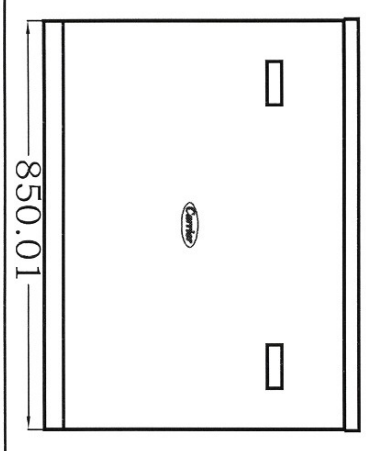
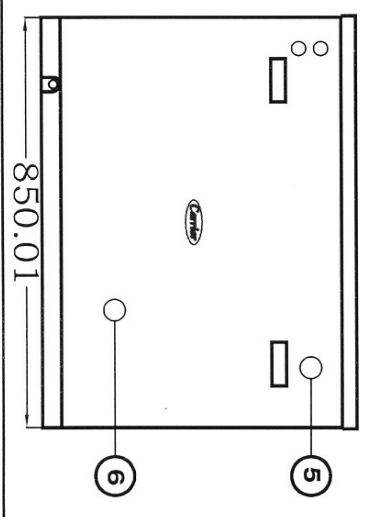
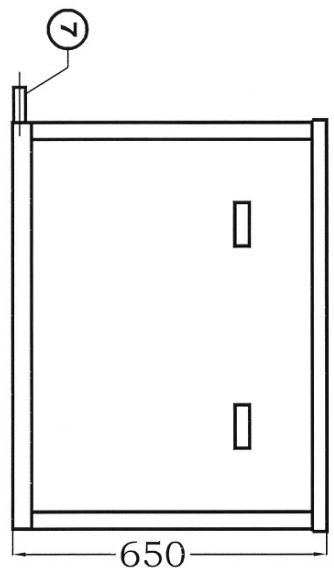
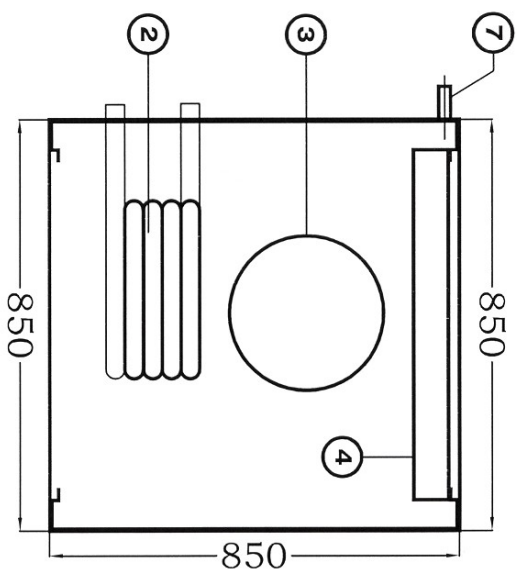
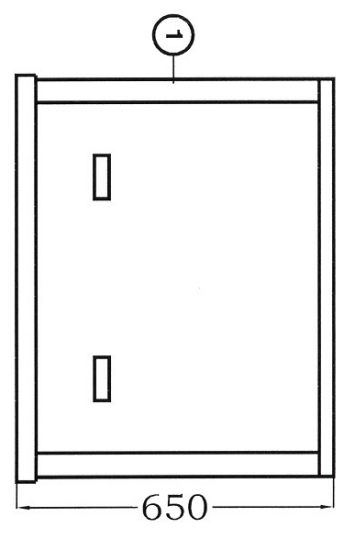
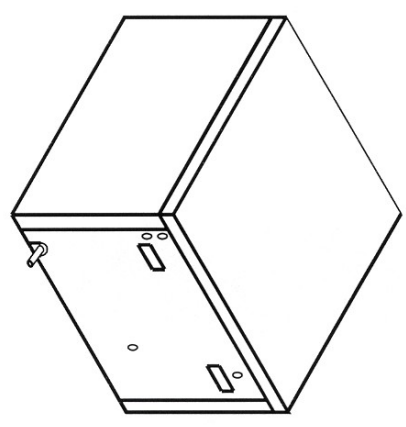
**LEGEND**

- 1- CABINET
- 2- EVAPORATOR COIL
- 3- AIR FILTER
- 4- BLOWER & MOTOR
- 5- DISCHARGE AIR DUCT CONNECTION
- 6- SUCTION AIR DUCT CONNECTION
- 7- EVAP. DRAIN CONNECTION 1"



**DIMENSIONS & CONSTRUCTION 50PH 80 COND. VERTICAL TYPE**

- LEGEND**
- 1- CABINET
  - 2- CONDENSER
  - 3- COMPRESSOR
  - 4- CONTROL BOX
  - 5- WATER OUT LET 1 1/4"
  - 6- WATER IN LET 1 1/4"
  - 7- COND. DRAIN CONNECTION 1 "



## WIRING DIAGRAM 50PH 20-26-32-40

**LEGEND:**

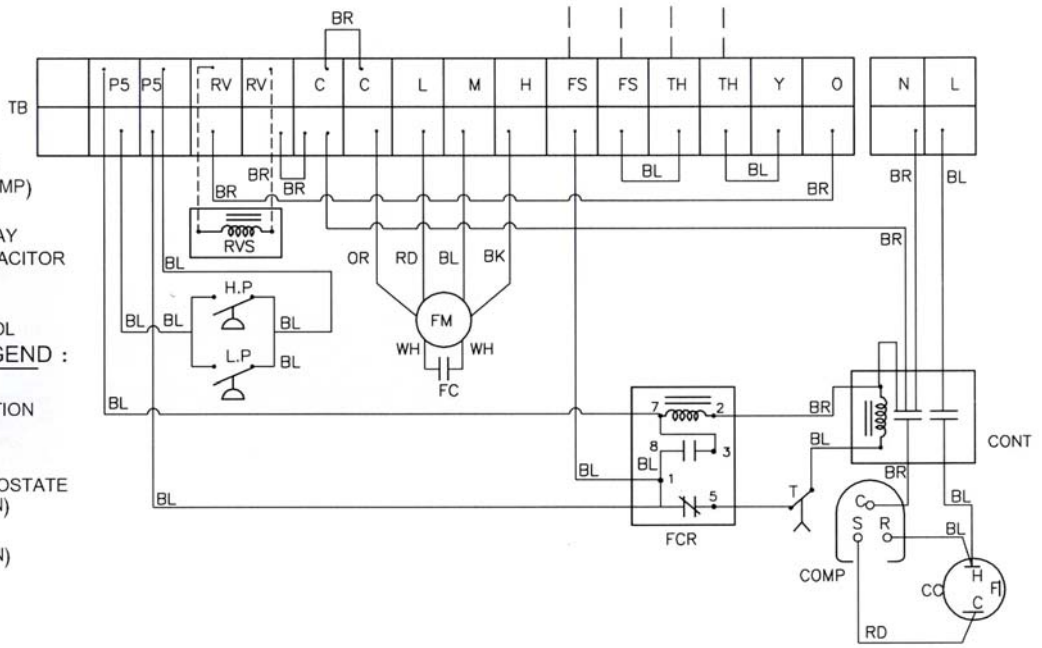
- COMP : COMPRESSOR
- FM : FAN MOTOR
- FC : FAN CAPACITOR
- HP : HIGH PRESSURE
- LP : LOW PRESSURE
- RVS : REVERSING VALVE  
(ONLY FOR HEAT PUMP)
- CONT : CONTACTOR
- FCR : FAN CONTROL RELAY
- CC : COMPRESSOR CAPACITOR
- TB : TERMINAL BLOCK
- T : TIMER
- PS : PRESSURE CONTROL

**TERMINAL BLOCK LEGEND :**

- L : LIVE CONNECTION
- N : NEUTRAL CONNECTION
- O : HEAT CONTROL
- Y : COOL CONTROL
- TH : ANTIFREEZ THERMOSTATE  
(FIELD INSTALATION)
- FS : FLOW SWITCH  
(FIELD INSTALATION)

**WIRE COLOURS:**

- BL : BLUE
- RD : RED
- BK : BLACK
- WH : WHITE
- OR : ORANGE



03501511

## WIRING DIAGRAM 50PH 50-60-80

**LEGEND:**

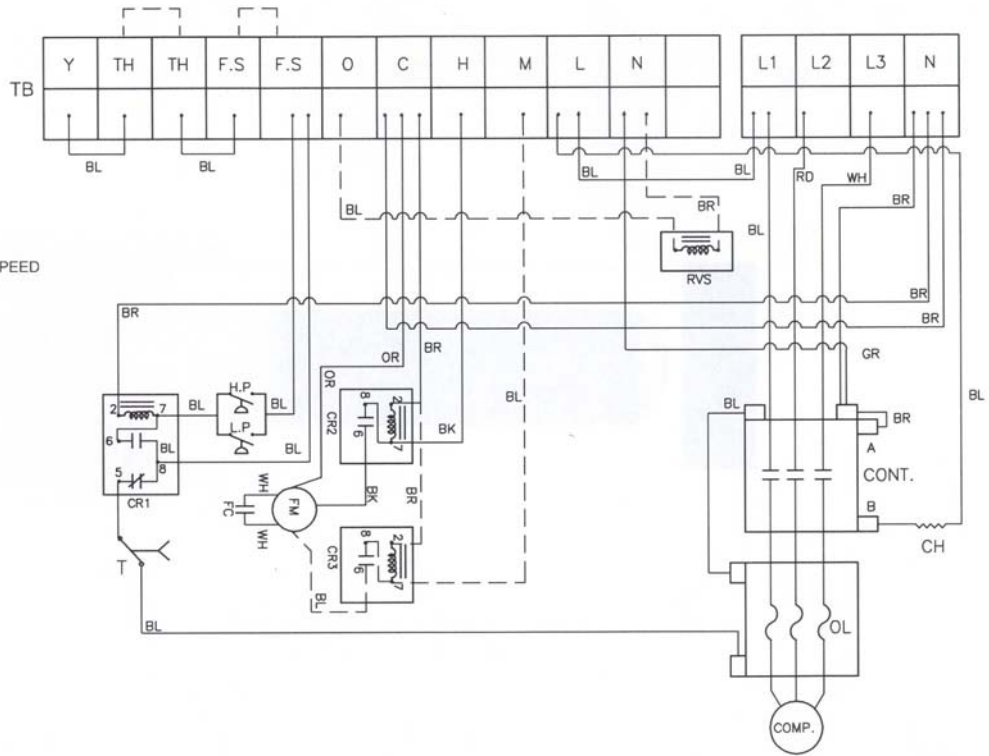
- COMP : COMPRESSOR
- FM : FAN MOTOR
- FC : FAN CAPACITOR
- HP : HIGH PRESSURE
- LP : LOW PRESSURE
- RVS : REVERSING VALVE  
(ONLY FOR HEAT PUMP)
- CONT : CONTACTOR
- CR : CONTROL RELAY
- TB : TERMINAL BLOCK
- T : TIMER
- OL : OVER LOAD
- CR3 : CONTROL RELAY FOR MID. SPEED  
(ONLY FOR 50PH 50,60)
- AB : AUXILIARY CONTACT (NC)
- CH : CRANKCAS HEATER

**TERMINAL BLOCK LEGEND**

- L : LIVE CONNECTION
- N : NEUTRAL CONNECTION
- O : HEAT CONTROL
- Y : COOL CONTROL
- TH : ANTIFREEZ THERMOSTATE  
(FIELD INSTALATION)
- FS : FLOW SWITCH  
(FIELD INSTALATION)
- C : COMMON
- H : HIGH FAN SPEED
- M : MEDIUM FAN SPEED

**WIRE COLOURS:**

- BL : BLUE
- RD : RED
- BK : BLACK
- WH : WHITE
- OR : ORANGE
- BR : BROWN



03501512

# Guide Specifications

## General

- 1-1 Furnish and install Carrier Water Source Package Units, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.
- 1-2 Horizontal/vertical water source Package units  
Units shall be supplied completely factory built and shall be factory run tested under normal operating conditions at nominal water flow rates. This testing shall generate a report card to be shipped with each unit stating performance in both heating and cooling modes. Serial numbers will be recorded by factory and furnished to contractor for ease of unit warranty status. Units tested without water flow ARE NOT acceptable.
- 1-3 Total cooling capacity of the unit shall be -----  
---- Kw, or greater at conditions of ----- l/s  
evaporator air entering unit at ----- oC wet  
bulb temperature.  
Total sensible capacity shall be ----- Kw or  
greater with ----- oC dry-bulb temperature at  
above conditions.
- 1-4 Water cooled condenser shall maintain -----  
- saturated condensing temperature when  
supplied with ----- l/min of ----- oC water at a  
----- water fouling factor.  
Maximum water pressure drop for the  
condenser at these conditions shall be -----  
Kpa.
- 1-5 Power input to the compressor motor (s) shall  
not exceed ----- Kw at the conditions  
specified.

## Cabinet

- 2-1 Panels shall be factory painted with durable  
oven cured polyester based powder paint,  
which can withstand 500 hours of salt spray  
test and in accordance with ASTM B117.
- 2-2 Unit fan section shall be insulated with 10 mm  
thick & 70 m3/Kg rubber insulation and  
compressor section shall be insulated with 12  
mm thick & 48 m3/Kg foam insulation to muffle  
sound.
- 2-3 The unit dimensions shall be ----- mm wide, ---  
----- mm deep and ----- mm high.
- 2-4 A self-contained filter frame for use with  
standard filters of ----- mm x ----- mm x ----  
--- mm shall be located at the back of the  
cabinet. Filters shall be factory supplied.

## Fan

- 3-1 Air fan shall be capable of delivery ----- l/s of  
air with an external static pressure of -----  
pa or greater.
- 3-2 Motor shall be factory supplied with ---- speed  
direct driven motor
- 3-3 Air fan shall be centrifugal forward curved and  
direct driven with external rotor motor of  
nominal ----- Kw. When operating at -----  
rpm.

## Refrigerant circuit

Units shall have a sealed refrigerant circuit including a high efficient scroll, rotary or reciprocating compressor, and an expansion device for refrigerant metering an enhanced aluminum lanced fin and rifled copper tube refrigerant to air heat exchanger. a reversing valve and accumulator (heat pump units) a coaxial (tube-in-tube) refrigerant to-water heat exchanger and safety controls including a high-pressure switch. a low-pressure switch. . Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a lockout device. The lockout shall be reset at the thermostat or at the contractor supplied disconnect switch. Units which may be reset only at the disconnect switch only SHALL NOT be acceptable.

Hermetic reciprocating compressors shall be internally sprung. The compressor will be mounted on external isolating springs. The external springs will be secured to rails that are isolated from the cabinet base. Compressor shall have thermal overload protection and be located in an insulated compartment away from air stream to minimize sound transmission. Refrigerant-to-air heat exchangers shall utilize enhanced lanced aluminum fins and rifled copper tube construction rated to withstand 400 psig refrigerant working pressure. Refrigerant-to-water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design. rated to withstand 450 psig working refrigerant pressure and 450 psig working water pressure. Plate-to-plate heat exchangers ARE NOT acceptable.

Option: The unit will be supplied with cupro nickel coaxial water-to-refrigerant heat exchangers.

## **Guide Specifications (Continue)**

### **Drain pan**

The drain pan shall be constructed to inhibit corrosion and fully insulated. Drain outlet shall be located on pan as to allow complete and unobstructed drainage of condensate.

### **Electrical**

Factory assembled, tested and installed control box. A control box shall be located within the unit compressor compartment and shall contain terminal block for thermostat wiring, low water temperature sensor connection and water flow switch connection.



# **AIR CONDITIONING**

50 PH - PD1/July 2004