AHU SUMMARY

Project Name	Radient Technology - Office AHUs	Current Patch Number	R8		
Location	Canada	Database Version	20160215		
Report Date	1/5/2019	Pricing Version	20160107	Currency	USD

TAG NO.	MODEL	LOCATION	QTY	NET
1) AHU-7	SCS3H-50mm TB-AH120-PF	,	1	
2) AHU-8	SCS3H-50mm TB-AH100-PF	,	1	
3) AHU-9	SCS3H-50mm TB-AH120-PF	,	1	

TAG # 1 AHU CODE : SCS3H-50mm TB-AH120-PF

Description		
TAG NO. :	AHU-7	
General		
Less Joint Section		
Roofing		
Air Hood		
Access Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Return Fan Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Blower		
Drive Package (575V/3Ph/60Hz, NEMA PREMIUM)		
VFD (Standard)		
Airflow Switch		
Disconnect		
Economizer		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) ,c/w AL Damper		
Flat & Box Filter Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Flat Filter (Disposable 2"), 25%-30% DS (G4)		
Rigid Filter (4"), 60-65% DS (F6)		
Water Coil Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) (Short Coil Section)		
Coil Assy		
Copper Header		
SS Drain Pan		
Coil Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) (Short Coil Section)		
Coil Assy		
Copper Header		
SS Drain Pan		
Access Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Supply Plug Fan Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Blower		
Drive Package (575V/3Ph/60Hz, NEMA PREMIUM)		
VFD (Standard)		

Prepared By : Checked By : Approved By :

Airflow Switch		
Disconnect		

TAG # 2 AHU CODE : SCS3H-50mm TB-AH100-PF

Description		
TAG NO. :	AHU-8	
General		
Less Joint Section		
Roofing		
Air Hood		
Access Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Return Fan Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Blower		
Drive Package (575V/3Ph/60Hz, NEMA PREMIUM)		
VFD (Standard)		
Airflow Switch		
Disconnect		
Economizer		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) ,c/w AL Damper		
Flat & Box Filter Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Flat Filter (Disposable 2"), 25%-30% DS (G4)		
Rigid Filter (4"), 60-65% DS (F6)		
Water Coil Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) (Short Coil Section)		
Coil Assy		
Copper Header		
SS Drain Pan		
Coil Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) (Short Coil Section)		
Coil Assy		
Copper Header		
SS Drain Pan		
Access Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Supply Plug Fan Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Blower		
Drive Package (575V/3Ph/60Hz, NEMA PREMIUM)		
VFD (Standard)		
Airflow Switch		
Disconnect		

TAG # 3 AHU CODE : SCS3H-50mm TB-AH120-PF

Description		
TAG NO. :	AHU-9	
General		
Less Joint Section		
Roofing		
Air Hood		
Access Section		

Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Return Fan Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Blower		
Drive Package (575V/3Ph/60Hz, NEMA PREMIUM)		
VFD (Standard)		
Airflow Switch		
Disconnect		
Economizer		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) ,c/w AL Damper		
Flat & Box Filter Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Flat Filter (Disposable 2"), 25%-30% DS (G4)		
Rigid Filter (4"), 60-65% DS (F6)		
Water Coil Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) (Short Coil Section)		
Coil Assy		
Copper Header		
SS Drain Pan		
Coil Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5) (Short Coil Section)		
Coil Assy		
Copper Header		
SS Drain Pan		
Access Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Supply Plug Fan Section		
Enclosure (Ext / Inner) (GI Solid(Painted)-0.5 / GI Solid-0.5)		
Blower		
Drive Package (575V/3Ph/60Hz, NEMA PREMIUM)		
VFD (Standard)		
Airflow Switch		
Disconnect		

Prepared By : Checked By : Approved By :

TECHNICAL REPORT

Project Name	Radient Technology - Office AHUs	Patch Number	R8
Tag	AHU-7	Database Version	20160215
Model	SCS3H-50mm TB-AH120-PF	Pricing Version	20160107
Location	Canada	Report Date	1/5/2019

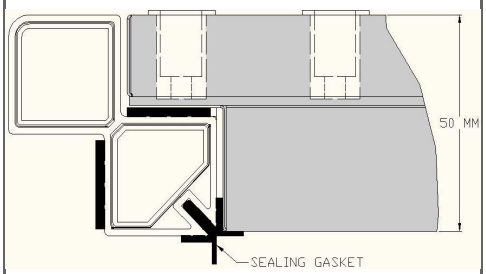
GENERAL SPECIFICATIONS

Unit is outside of the scopes of AHRI Standards 430/431

GENERAL SPECIFICATIONS

AHU Type	:	50mm TB	Total Height	:	68.9	in
PU Thickness	:	50 mm	Total Width	:	80.71	in
Installation Type	:	Outdoor	Total Length	:	312.99	in
Quantity	:	1	Roof Selection	:	Yes	
Season	:	Summer	Altitude	:	0.00	ft

STRUCTURAL PROFILE



AIR SIDE CRITERIA

Supply Air Volume	:	12700	CFM
Fresh Air Volume	:	2640	CFM
Return Air Volume	:	10060	CFM
Exhaust Air Volume	:	2640	CFM
Coil Face Velocity	:	528	ft/min

PANEL / FRAME

Inner Material	:	GI Solid	
Inner Skin	:	0.5	mm
Outer Material	:	GI Solid(Painted)	
Outer Skin	:	0.5	mm
Insulation	:	Polyurethane-40kg/m³	
Base Type	:	Bolted Base	

Remark :

Prepared By : Checked By : Approved By :

1 EMPTY SECTION

GENERAL SPECIFICATIONS

Section Name	:	Access Section
Opening Location	:	None

Prepared By : Checked By : Approved By :

2 EXHAUST FAN

FAN SPECIFICATIONS

Fan Code	:		
Fan Type	:	Backward	
Fan Quantity	:	2	
Fan Shaft Power	:		hp
Blower Speed	:		rpm
Maximum Fan Speed	:		rpm
Discharge Opening	:		
Discharge Direction	:		
Air Flow	:	12700	CFM

MOTOR SPECIFICATIONS

Installed Power	:	2 @ 5 hp	
Power Supply	:	575V/3Ph/60Hz	
Motor Efficiency	:	%	
Efficiency Type	:	NEMA	
Motor Frame	:	PREMIUM 215T	
Motor Pole	:	4	
Mounting Position	:	Rear	
Motor Type	:	AC	
Shaft Speed	:	2106	rpm
Class H Motor	:	No	
2 Speed Motor	:	No	

PERFORMANCE

ISP	:	0.31	in.wg
ESP	:	0.75	in.wg
TSP	:	1.06	in.wg

VFD

VFD Type	:	Standard
VFD Installation	:	Factory Installed

FAN SOUND LEVEL

	Inlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	91.6	95.2	97.9	100.0	100.3	99.1	91.0	81.0	106.1
Lw(A)	66.6	80.2	89.9	97.0	100.3	100.1	92.0	80.0	104.6
Lp(A)	58.8	72.4	82.1	89.2	92.5	92.2	84.2	72.2	96.8

	Outlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	93.8	101.5	103.5	104.1	104.0	101.7	93.2	82.2	110.3
Lw(A)	67.6	85.4	94.9	100.9	104.0	102.9	94.2	81.1	108.0
Lp(A)	59.6	77.4	86.9	92.9	96.0	94.9	86.2	73.1	100.0

	Sound Pressure Level @ 1 meter of AHU External (dBA)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lp(A)	56.6	56.4	67.8	73.6	79.9	75.7	59.1	46.4	82.2

ACCESSORIES

Airflow switch	:	1
Disconnect	:	1

Prepared By : Checked By : Approved By :

3 BYPASS DAMPER (EXHAUST AIR SECTION)

REAR OPENING

Air Flow	:	10060	CFM	Dimension (LxW)	:	20.08*62.99	Blade Type	: Opposed
Air Velocity	:	1145	ft/min	Damper Material	:	AL	Operating Method	: Handle Arm

RIGHT OPENING

Air Flow	:	2640	CFM	Dimension (LxW)	:	20.08*47.24	Blade Type	: Opposed
Air Velocity	:	401	ft/min	Damper Material	:	AL	Operating Method	: Handle Arm

4 PRIMARY FILTER

FILTER SPECIFICATIONS

Filter Type	:	Flat Filter (Disposable 2")		Air Flow	:	12700	CFM	24" x 24"	:	6
Filter Grade	:	25%-30% DS (G4)		Initial PD.	:	0.31	in.wg	24" x 12"	:	0
Mounting Type	:	Side Loading		Final PD.	:	1.00	in.wg	24" x 20"	:	0
Filter Area	:	24.000	ft²	Design PD.	:	0.31	in.wg	20" x 20"	:	0
Filter Velocity	:	530	ft/min							

Prepared By : Checked By : Approved By :

SECONDARY FILTER

Filter Type	:	Rigid Filter (4")		Air Flow	:	12700	CFM	24" x 24"	: 6
Filter Grade	:	60-65% DS (F6)		Initial PD.	:	0.38	in.wg	24" x 12"	: 0
Mounting Type	:	Side Loading		Final PD.	:	1.51	in.wg	24" x 20"	: 0
Filter Area	:	24.000	ft²	Design PD.	:	0.38	in.wg	20" x 20"	: 0
Filter Velocity	:	530	ft/min						

Prepared By : Checked By : Approved By :

Prepared By : Checked By : Approved By :

to be 1 ton per 400CFM total cooling or greater.

383MBH total **Type 5 Cooling Water Coil**

Total capacity (MBH)	218.9	Sensible capacity (MBH)	218.9

Air Properties

Air flow (ft³/min)	12,700	Entering air dry bulb (°F)	82.0
		Entering air wet bulb (°F)	68.0
Face velocity (ft/min)	511	Leaving air dry bulb (°F)	65.9
Air pressure drop (in w.g.)	0.47	Leaving air wet bulb (°F)	62.8
Barometric pressure (in Hg)	29.92	Air properties measured at	Altitude

Fluid Properties

Fluid	40% Propylene Glycol	Entering fluid temperature (°F)	44.0
Fluid flow rate (gal/min)	47.8	Leaving fluid temperature (°F)	54.0
Fluid velocity (ft/s)	1.6	Fluid pressure drop (ft w.g.)	1.7

Construction

Type	5	Rows deep	4
Tubes in face	33	Fin spacing (fins/in)	12
Finned height (in)	52.6	Circuiting	Full
Finned length (in)	68.0	Number of feeds	33

6 WATER HEATING COIL

AHRI CERTIFIED® www.ahridirectory.org
Air-Cooling and Air-Heating Coils AHRI Standard 410

COIL SPECIFICATIONS

Coil Code	:	5WH1Y-33Tx66 LH	Coil Layer	:	1			
Coil Tube Size	:	5/8" (Type 5)	Medium	:	40% PG	Header Material	:	Copper
Coil Row	:	1	Circuiting Method	:	H (2T/C)	Has Drain Pan	:	Yes
Coil FPI	:	6	Tube / Fin Material	:	Copper / Aluminium	Drain Pan Material	:	SS 304
Tube Face	:	33	Tube Spacing (in)	:	1.594	Moisture Eliminator	:	No
Fin Height	:	52.60 in	Coil Frame Material	:	GI	Coil Spacer	:	No
Fin Length	:	66.00 in	Coating Material	:	None	Coil Length Type	:	Short Coil Section

AIR SIDE

ENTERING AIR			
Dry Bulb Temp.	:	60.0	°F
Wet Bulb Temp.	:	60.0	°F
Relative Humidity	:	100.00	%
LEAVING AIR			
Dry Bulb Temp.	:	85.3	°F
Wet Bulb Temp.	:	63.6	°F
Relative Humidity	:	29.49	%

WATER SIDE

Entering Temp.	:	160.0	°F
Leaving Temp.	:	140.0	°F
Flow Rate	:	20.8	gpm
Water Velocity	:	51	ft/min
Pressure Drop	:	1.1	ft.wg
Header Connection	:	1.5	In
Connection Type	:	MNPT	
Fouling Factor	:	0.001	h.ft².°F/Btu
Glycol Type	:	Propylene Glycol	
Glycol Percentage	:	40	%

PERFORMANCE 205MBH

Total Capacity	:	139721	Btu/h
Sensible Capacity	:	139721	Btu/h
Air Flow	:	12700	CFM
Air Velocity	:	528	ft/min
Air Pressure Drop	:	0.13	in.wg

Notes

Certified in accordance with the AHRI Forced-Circulation Air-Conditioning and Air-Heating Coils.

Certified Program, which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the

Standard Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Tube internal construction : Smooth

Fin Configuration : Corrugated, Waffle with Rippled Edge.

Prepared By : Checked By : Approved By :

7 EMPTY SECTION

GENERAL SPECIFICATIONS

Section Name	:	Access Section
Opening Location	:	None

Prepared By : Checked By : Approved By :

8 SUPPLY FAN

FAN SPECIFICATIONS

Fan Code	:		
Fan Type	:	Backward	
Fan Quantity	:	2	
Fan Shaft Power	:		hp
Blower Speed	:		rpm
Maximum Fan Speed	:		rpm
Discharge Opening	:		
Discharge Direction	:		
Air Flow	:	12700	CFM

MOTOR SPECIFICATIONS

Installed Power	:	2 @ 10 hp	
Power Supply	:	575V/3Ph/60Hz	
Motor Efficiency	:	92.4	%
Efficiency Type	:	NEMA PREMIUM	
Motor Frame	:		
Motor Pole	:		
Mounting Position	:	Rear	
Motor Type	:	AC	
Shaft Speed	:		rpm
Class H Motor	:	No	
2 Speed Motor	:	No	

PERFORMANCE

Total Efficiency	:		%
Discharge Velocity	:		ft/min
ISP	:	2.23	in.wg
ESP	:	1.00	in.wg
TSP	:	3.23	in.wg

ESP to be 2.25 or Greater

VFD

VFD Type	:	Standard
VFD Installation	:	Factory Installed

FAN SOUND LEVEL

	Inlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	85.5	86.2	91.6	93.2	92.6	93.0	87.1	78.6	99.4
Lw(A)	60.5	71.2	83.6	90.2	92.6	94.0	88.1	77.6	98.0
Lp(A)	52.7	63.4	75.8	82.4	84.8	86.2	80.3	69.8	90.2

	Outlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	87.5	90.2	91.3	96.2	95.1	95.0	89.1	80.6	101.6
Lw(A)	61.3	74.1	82.7	93.0	95.1	96.2	90.1	79.5	100.3
Lp(A)	53.3	66.1	74.7	85.0	87.1	88.2	82.1	71.5	92.3

	Sound Pressure Level @ 1 meter of AHU External (dBA)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lp(A)	50.5	47.4	61.5	66.8	72.2	69.7	55.2	44.0	75.1

ACCESSORIES

Airflow switch	:	1
Disconnect	:	1

Prepared By : Checked By : Approved By :

AHU SUMMARY

Project Name	Radient Technology - Office AHUs	Patch Number	R8
Location	Canada	Database Version	20160215
Report Date	1/5/2019	Pricing Version	20160107

Show maximums with these motors

No.	Tag	Model	Qty.	Supply Fan		Exhaust Fan		Cooling Cap.	Heating Cap.	HSHP	Electric Heater	Cooling Coil Revise if required			Heating Coil		
				Air Flow	TSP	Air Flow	TSP					Leaving	Header	Rows* FPI* Circuiting	Leaving	Header	Rows* FPI* Circuiting
				ft³/min	in.wg	ft³/min	in.wg	btu/h	btu/h	btu/h	kW	DB/WB	Inch		DB/WB	Inch	
1	AHU-7	SCS3H-50mm TB-AH120-PF	1	12700	3.23	2640	1.06	250953 383MBH	139721 205MBH	-	-	62.2/61.	2	4*12	85.3/63.6	1.5	1*6
2	AHU-8	SCS3H-50mm TB-AH100-PF	1	11000	3.44	2200	1.09	209477 284MBH	147515 172MBH	-	-	63.6/62.1	2	4*12	95.6/64.4	1.5	1*10
~~3~~	~~AHU-9~~	~~SCS3H-50mm TB-AH120-PF~~	~~1~~	~~12000~~	~~3.11~~	~~2400~~	~~1.05~~	~~276090~~	~~176513~~	-	-	~~62.2/60.8~~	~~1.5~~	~~4*12~~	~~97.7/64.8~~	~~1.5~~	~~1*10~~

No.	Blower								Filter Type	Humidifier		Heat Recovery		Fresh Air Damper		Return Air Damper	
	Type	Fan Model	Disch. Direction	Speed	Disch. Opening	Mtr Loc.	Mtr Power	Volt.		Humid.	Type	Type	Cap.	Loc.	Opening Size	Loc.	Opening Size
				RPM	W*L (in)		hp			kg/h			hp		H*W (in)		H*W (in)
1	Exhaust Plug Fan Supply Plug Fan	630-R-PF (Alt) 710-R-PF (Alt)	FrontFront	1723 1403	27.56*27.56 33.46*33.46	Rear Rear	10.00	575V/3Ph 575V/3Ph	25%-30% DS (G4),60-65% DS (F6)	-	-	-	-	-	-	-	-
2	Exhaust Plug Fan Supply Plug Fan	630-R-PF (Alt) 630-RH-PF (Alt)	FrontFront	1548 1813	27.56*27.56 27.56*27.56	Rear Rear	10.00	575V/3Ph 575V/3Ph	25%-30% DS (G4),60-65% DS (F6)	-	-	-	-	-	-	-	-
~~3~~	~~Exhaust Plug Fan Supply Plug Fan~~	~~630-R-PF (Alt) 710-R-PF (Alt)~~	~~FrontFront~~	~~1662 1350~~	~~27.56*27.56 33.46*33.46~~	~~Rear Rear~~	~~10.00~~	~~575V/3Ph 575V/3Ph~~	~~25%-30% DS (G4),60-65% DS (F6)~~	-	-	-	-	-	-	-	-

Remark :

Legends : MTR. = Motor HSHP = Hot-Shoe Heat Pipe, PC/RH = Pre-Cool / Re-Heat, TC/SC = Heat Wheel or Heat Plate's Enthalpy/Sensible Capacities, when shown in bracket (), refer to Summer (Winter) performance

WEIGHT SUMMARY

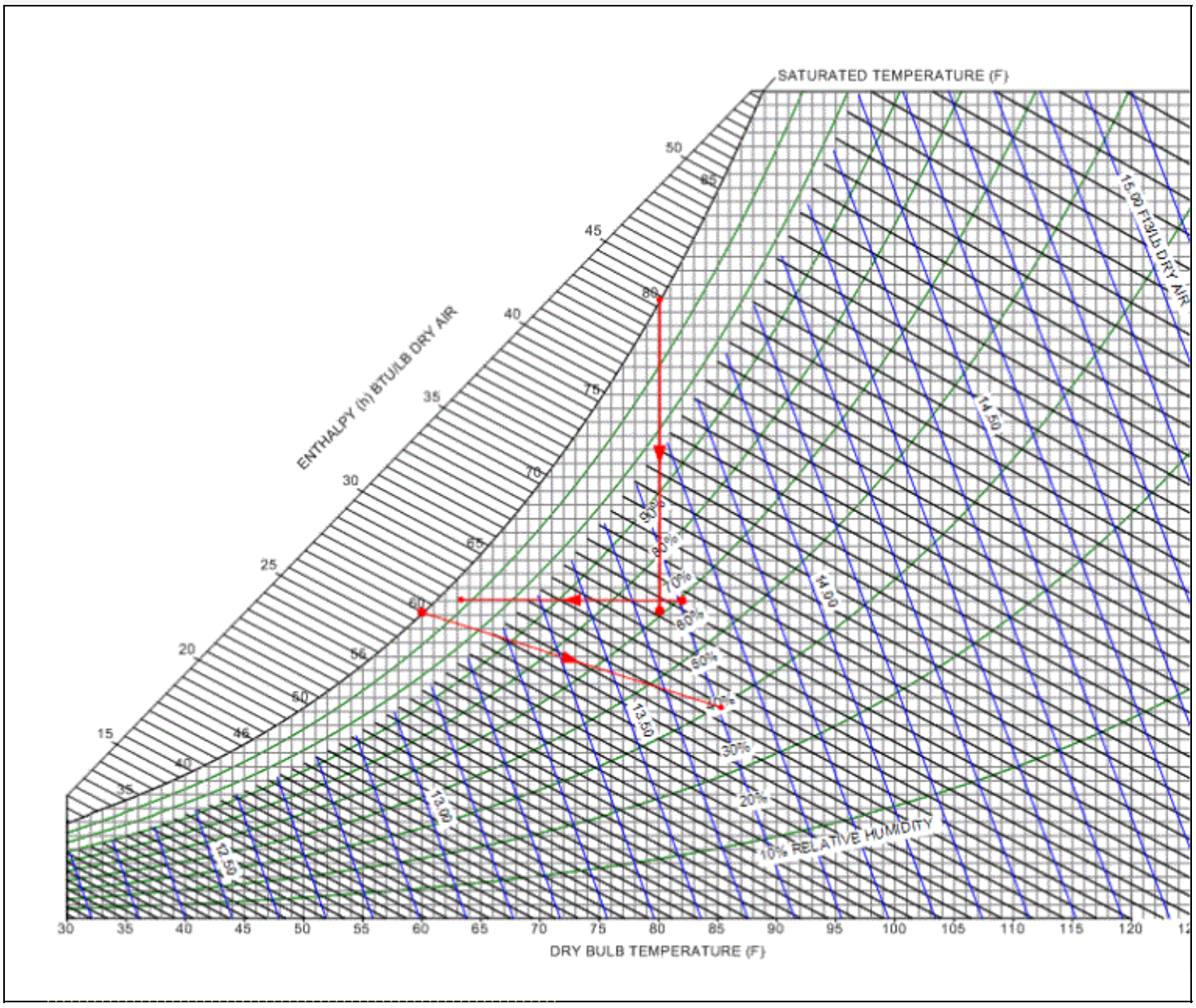
Project Name :	Radient Technology - Office AHUs	Patch Number :	R8
Location :	Canada	Database Version :	20160215
Report Date :	1/5/2019	Unit Measurement :	lb

NO.	TAG	MODEL	SECTION WEIGHT											QTY	UNIT WEIGHT	TOTAL WEIGHT	Remark For Casing
			1	2	3	4	5	6	7	8	9	10	11	12				
1	AHU-7	SCS3H-50mm TB-AH120-PF	1478.8	1353.4	2122.6										1	4954.8	4954.8	
2	AHU-8	SCS3H-50mm TB-AH100-PF	1432.8	1239.6	1961.8										1	4634.2	4634.2	
~~3~~	~~AHU-9~~	~~SCS3H-50mm TB-AH120-PF~~	~~1478.8~~	~~1353.4~~	~~2099.7~~										~~1~~	~~4931.9~~	~~4931.9~~	

PHSYCHROMETRIC REPORT

Project Name	Radient Technology - Office AHUs	Patch Number	R8
Tag	AHU-7	Database Version	20160215
Model	SCS3H-50mm TB-AH120-PF	Pricing Versin	20160107
Location	Canada	Report Date	1/5/2019

Chart Display



Entering/ Leaving Air Condition

Guideline : E = Entering Air Condition, L = Leaving Air Condition, (F) = Fresh Air, (R) = Return Air

Comp. No.	Unit	1		2		3		4		5		6		7		8	
Component		Mixing Box(F)		Mixing Box(R)		Coil		Heat									
Air Direction		E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L
DB Temp.	°F	80.1	80.1	80.1	80.1	82.0	63.3	60.0	85.3								
WB Temp.	°F	66.9	80.1	66.9	80.1	68.0	61.9	60.0	63.6								
RH	%	50.76	100.00	50.76	100.00	49.11	92.22	100.00	29.49								

KRUGER

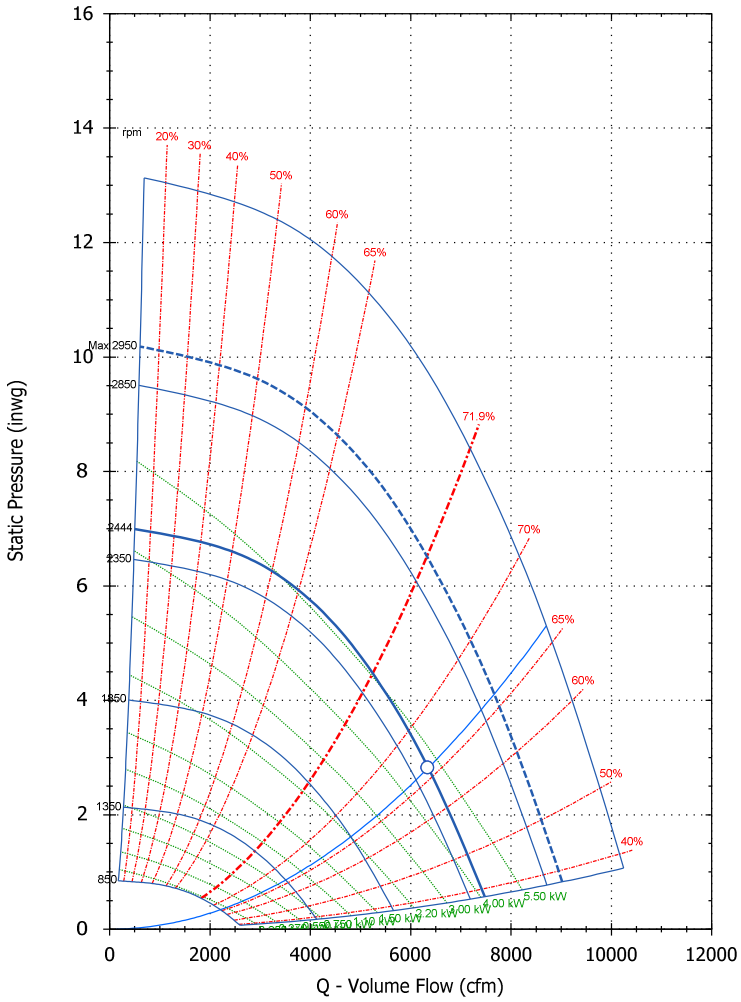
Date 9/5/2019

Project Radient Technology
Reference BNB-P450 (Supply)

Kruger Ventilation Industries Pte Ltd
No. 17 Tuas Avenue 10
Singapore 639141

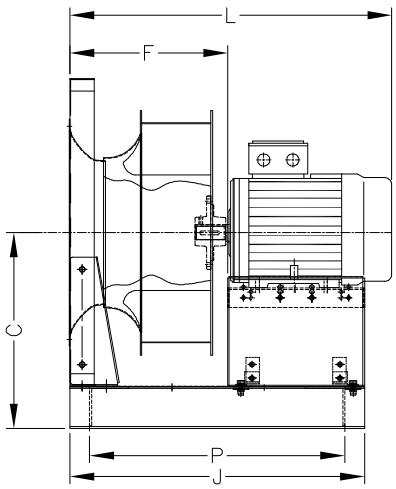
Tel: +65 6861 1577 **Fax:** +65 6861 3577
Email: mktg@krugerasia.com

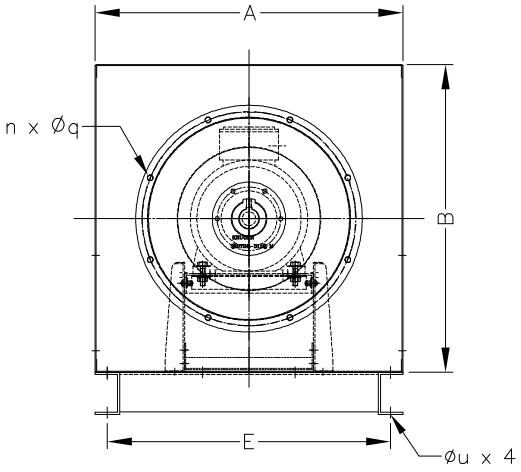
Fan Selection	
Fan Type	
Unit	BNB-P450/BIIM (II)
Operating Conditions	Ducted
Air Volume	6,350 cfm
Static Pressure	2.82 inwg
Velocity Pressure Total	0.543 inwg
Pressure	3.36 inwg
Outlet Velocity	2951 ft/min
Fan Total Efficiency	66.2 %
Fan Static Efficiency	55.5 %
Fan Speed	2444 rpm
Air Temperature	68 °F
Fan Absorbed Power	5.09 kW
Motor Selection	
Recommended Motor	D132S (7.50 kW)
Motor Speed	3480 rpm
Service Factor **Plenum**	40 %
Selection Plenum Size	
Outlet Size	-
Operating Limits Max.	
Absorbed Power Max.	7.40 kW
Fan Speed	2950 rpm
Temperature (Min-Max)	-20° to 100°C



Hz	63	125	250	500	1k	2k	4k	8k	Overall
Lwi(Lin)	89	95	98	93	91	88	86	83	102 dB
Lwi(A)	63	79	89	89	91	90	87	82	97 dB(A)
Lpi(A)	39	55	65	65	67	66	63	58	73 dB(A)

* Sound data is for the inlet side * Sound Pressure Level 7m, Room Conditions





KRUGER

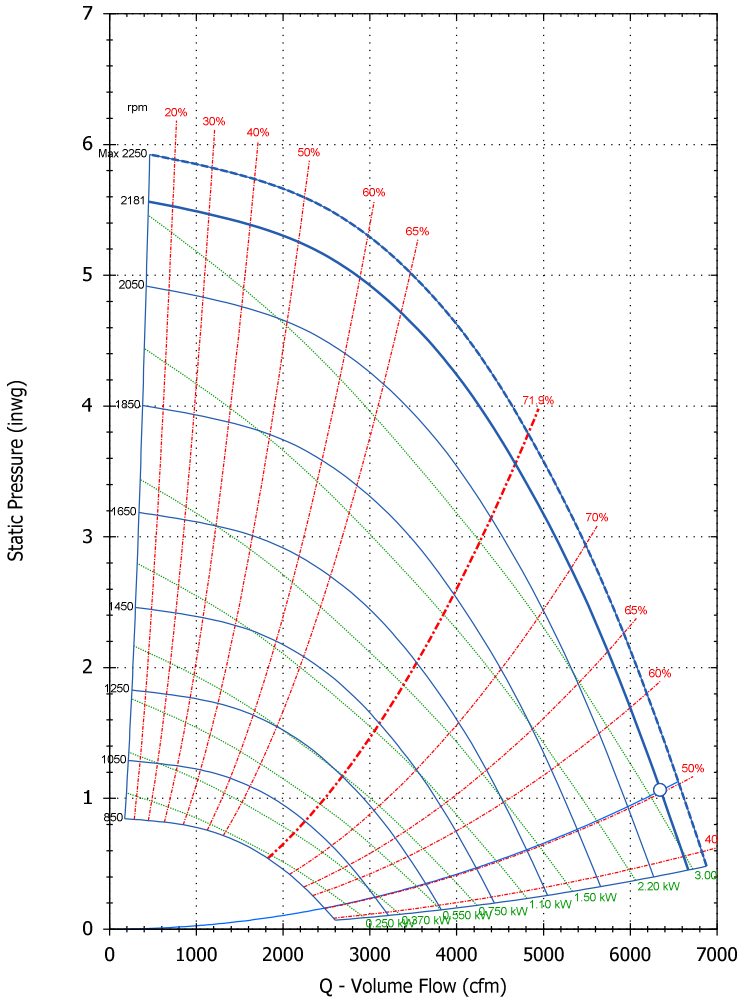
Date 9/5/2019

Project Radient Technology
Reference BNB-P450 (Return)

Kruger Ventilation Industries Pte Ltd
No. 17 Tuas Avenue 10
Singapore 639141

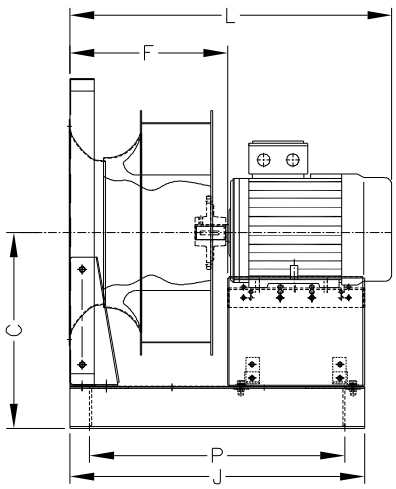
Tel: +65 6861 1577 **Fax:** +65 6861 3577
Email: mktg@krugerasia.com

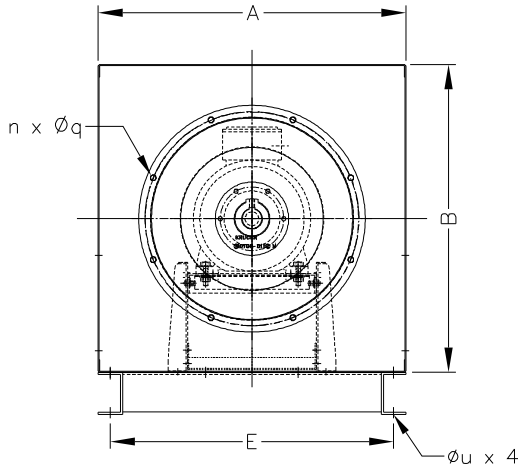
Fan Selection	
Fan Type	
Unit	BNB-P450/BIM (I)
Operating Conditions	Ducted
Air Volume	6,350 cfm
Static Pressure	1.06 inwg
Velocity Pressure	0.543 inwg
Total Pressure	1.60 inwg
Outlet Velocity	2951 ft/min
Fan Total Efficiency	50.5 %
Fan Static Efficiency	33.4 %
Fan Speed	2181 rpm
Air Temperature	68 °F
Fan Absorbed Power	3.18 kW
Motor Selection	
Recommended Motor	D132S (5.50 kW)
Motor Speed	3480 rpm
Service Factor **Plenum**	60 %
Selection Plenum Size	-
Outlet Size	-
Operating Limits Max.	
Absorbed Power Max.	3.30 kW
Fan Speed	2250 rpm
Temperature (Min-Max)	-20° to 100°C



Hz	63	125	250	500	1k	2k	4k	8k	Overall
Lwi(Lin)	85	91	96	89	88	86	84	83	99 dB
Lwi(A)	59	75	87	86	88	87	85	82	94 dB(A)
Lpi(A)	35	51	63	62	64	63	61	58	70 dB(A)

* Sound data is for the inlet side * Sound Pressure Level 7m, Room Conditions





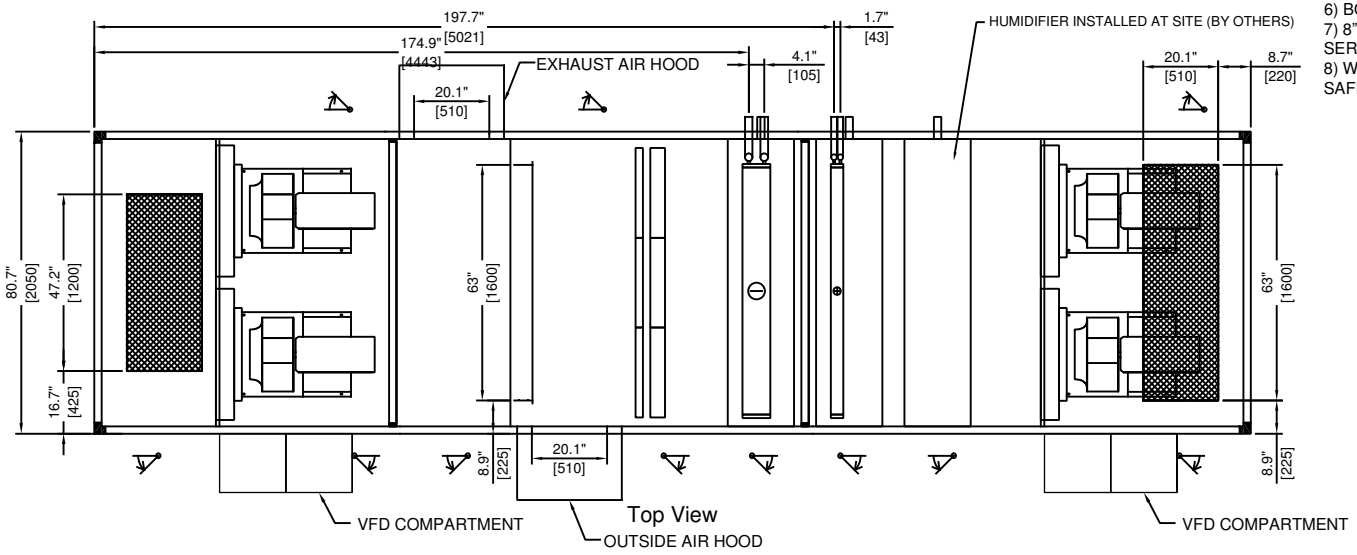
PRELIMINARY DRAWING

Confirm curbing requirements with General Contractor.

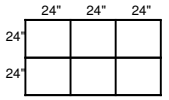
APPROVED	
DATE	

NOTES:
1) HUMIDIFIER BY OTHERS.
2) CONVENIENT OUTLET IN CONTROL PANEL.
3) EXHAUST & OUTSIDE AIR DAMPERS BY OTHERS.
4) VFD COMPARTMENT AND AIR HOODS TO BE SHIPPED LOOSE.
5) UNIT TO BE SHIPPED IN SINGLE BASE.
6) BOTTOM RETURN & DOWNFLOW DISCHARGE OPENING
7) 8" BASE WELDED TYPE AS PER ROOF TOP MODEL(RT SERIES BASE)
8) WIRE MESH ON RETURN AND SUPPLY OPENING FOR SAFETY PRECAUTION

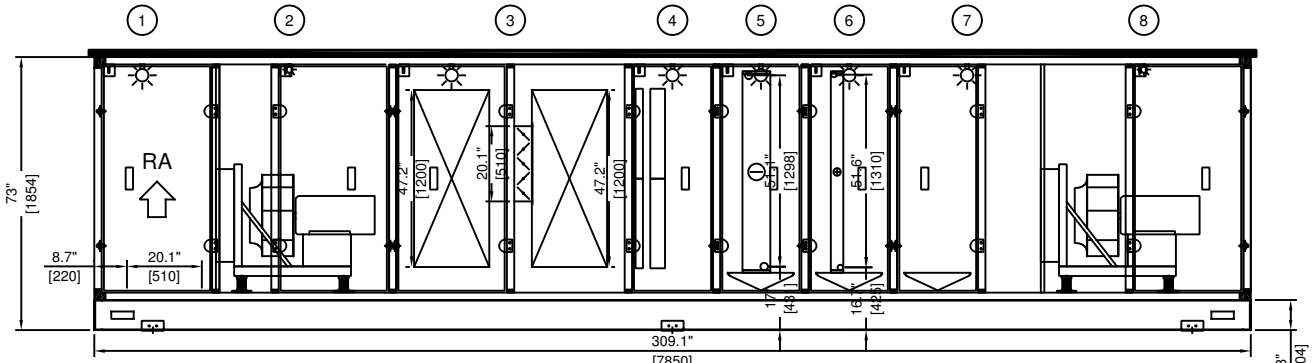
Specification	Value	Unit
Unit Info		
AHU Installation Type	Outdoor	
AHU Construction Type	50mm TB	
PU Thickness	50	mm
Casing (Ext / Inner)	GI Solid(Painted)/GI Solid	
1 Access Section		
2 Exhaust Plugfan		
Blower Code	450-P-PF x 2 Nos	
Disch. Direction	Front	
Motor		
Installed Motor Power	7.5	hp
Power Supply	575V/3Ph/60Hz	
Pole	2	
Location	Rear	
Isolator	Standard (Spring)	
Other		
Remark :		
Overall dimension will be altered with VFD installed.		
3 Economizer		
Mixing Box #1		
Opening Position		
Blade Type		
Opening Type (Left)	AL Damper (By others)	
Size 1 (Left)	510 x 1200	in
Mixing Box #2		
Opening Position		
Blade Type		
Opening Type (Front)	AL Damper	
Size 1 (Front)	1600 x 510	in
Opening Type (Right)	AL Damper (By others)	
Size 1 (Right)	510 x 1200	
4 Combined Filter		
Grade (Prim)	25%-30% DS (G4)	
Grade (Sec)	60-65% DS (F6)	
Mounting Type (Sec)	Side Loading	
5 Water Cooling		
Coil Code	5WF4C-33Tx68 LH	
Coil Tube Size	5/8" (Type 5)	
Coil Header Connection	2"MNPT@1 Qty	
Coil Row/FPI	4 / 12	
Coil Circuit	F (4T/C)	
Coil Connection	Left Side	
Coil Header Material	Copper	
Fin Material	Aluminium	
Coil Coating	None	
Drain Pan Connection	Left Side	
Drain Pan Material	SS 304	
6 Water Heating		
Coil Code	5WH1Y-33Tx66 LH	
Coil Tube Size	5/8" (Type 5)	
Coil Header Connection	1.5"MNPT@1 Qty	
Coil Row/FPI	1 / 6	
Coil Circuit	H (2T/C)	
Coil Connection	Left Side	
Coil Header Material	Copper	
Fin Material	Aluminium	
Coil Coating	None	
Drain Pan Connection	Left Side	
Drain Pan Material	SS 304	
7 Access Section		
8 Supply Plugfan		
Blower Code	450-P-PF x 2 Nos	
Disch. Direction	Front	
Motor		
Installed Motor Power	10	hp
Power Supply	575V/3Ph/60Hz	
Pole	2	
Location	Rear	
Isolator	Standard (Spring)	
Other		
Remark :		
Overall dimension will be altered with VFD installed.		



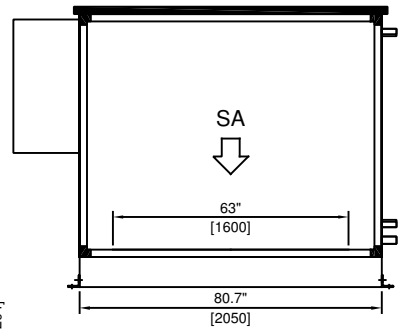
Filter Arrangement



Filter Size - 24" x 24" - (6)



Right View



Front View

ALL DIMENSION ARE IN MM
STANDARD ENGINEERING
TOLERANCES MUST OBSERVE

DUNHAM–BUSH INDUSTRIES SDN. BHD (6302-K)

FOR INTERNAL USE

DRAWN BY	HELMY	DESIGNED BY	MAN
CHECKED BY	MAN	APP'D BY	

DESCRIPTION

PROJECT NAME :Radient Technology - Office AHUs
UNIT NAME : AHU-7
MODEL : SCS3H-50mm TB-AH120-PF
QTY : 1

DRAWING NO : 87509F-252 Rev 2 (13.05.19)	SCALE N.T.S.	REV R8	SHEET 1 OF 1

TECHNICAL REPORT

Project Name	Radient Technology - Office AHUs	Patch Number	R8
Tag	AHU-8	Database Version	20160215
Model	SCS3H-50mm TB-AH100-PF	Pricing Version	20160107
Location	Canada	Report Date	1/5/2019

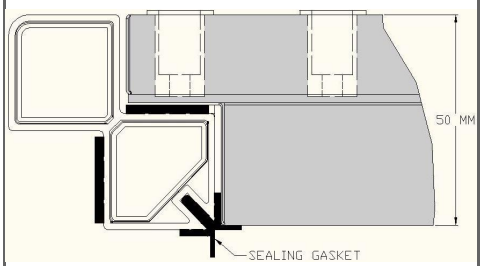
GENERAL SPECIFICATIONS

Unit is outside of the scopes of AHRI Standards 430/431

GENERAL SPECIFICATIONS

AHU Type	:	50mm TB	Total Height	:	61.03	in
PU Thickness	:	50 mm	Total Width	:	80.71	in
Installation Type	:	Outdoor	Total Length	:	312.99	in
Quantity	:	1	Roof Selection	:	Yes	
Season	:	Summer	Altitude	:	0.00	ft

STRUCTURAL PROFILE



AIR SIDE CRITERIA

Supply Air Volume	:	11000	CFM
Fresh Air Volume	:	2200	CFM
Return Air Volume	:	8800	CFM
Exhaust Air Volume	:	2200	CFM
Coil Face Velocity	:	533	ft/min

PANEL / FRAME

Inner Material	:	GI Solid	
Inner Skin	:	0.5	mm
Outer Material	:	GI Solid(Painted)	
Outer Skin	:	0.5	mm
Insulation	:	Polyurethane-40kg/m³	
Base Type	:	Bolted Base	

Remark :

Prepared By : Checked By : Approved By :

1 EMPTY SECTION

GENERAL SPECIFICATIONS

Section Name	:	Access Section
Opening Location	:	None

Prepared By : Checked By : Approved By :

2 EXHAUST FAN

FAN SPECIFICATIONS

Fan Code	:		
Fan Type	:	Backward	
Fan Quantity	:	2	
Fan Shaft Power	:		hp
Blower Speed	:		rpm
Maximum Fan Speed	:		rpm
Discharge Opening	:		
Discharge Direction	:		
Air Flow	:	11000	CFM

MOTOR SPECIFICATIONS

Installed Power	:	2 @ 5 hp
Power Supply	:	575V/3Ph/60Hz
Motor Efficiency	:	%N
Efficiency Type	:	NEMA PREMIUM
Motor Frame	:	
Motor Pole	:	4
Mounting Position	:	Rear
Motor Type	:	AC
Shaft Speed	:	rpm
Class H Motor	:	No
2 Speed Motor	:	No

PERFORMANCE

ISP	:	0.34	in.wg
ESP	:	0.75	in.wg
TSP	:	1.09	in.wg

VFD

VFD Type	:	Standard
VFD Installation	:	Factory Installed

FAN SOUND LEVEL

	Inlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	87.4	92.3	94.7	96.9	97.5	96.0	87.9	77.9	103.1
Lw(A)	62.4	77.3	86.7	93.9	97.5	97.0	88.9	76.9	101.6
Lp(A)	54.5	69.5	78.9	86.1	89.6	89.2	81.1	69.1	93.8

	Outlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	89.5	98.3	99.3	100.8	100.9	98.5	90.0	79.2	106.9
Lw(A)	63.3	82.2	90.7	97.6	100.9	99.7	91.0	78.1	104.8
Lp(A)	55.3	74.2	82.7	89.6	92.9	91.7	83.0	70.1	96.8

	Sound Pressure Level @ 1 meter of AHU External (dBA)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lp(A)	52.3	53.5	64.6	70.5	77.0	72.7	56.0	43.3	79.2

ACCESSORIES

Airflow switch	:	1
Disconnect	:	1

Prepared By : Checked By : Approved By :

3 BYPASS DAMPER (EXHAUST AIR SECTION)

REAR OPENING

Air Flow	:	8800	CFM	Dimension (LxW)	:	16.14*55.12	Blade Type	: Opposed
Air Velocity	:	1424	ft/min	Damper Material	:	AL	Operating Method	: Handle Arm

RIGHT OPENING

Air Flow	:	2200	CFM	Dimension (LxW)	:	16.14*39.37	Blade Type	: Opposed
Air Velocity	:	499	ft/min	Damper Material	:	AL	Operating Method	: Handle Arm

4 PRIMARY FILTER

FILTER SPECIFICATIONS

Filter Type	:	Flat Filter (Disposable 2")		Air Flow	:	11000	CFM	24" x 24"	:	0
Filter Grade	:	25%-30% DS (G4)		Initial PD.	:	0.34	in.wg	24" x 12"	:	0
Mounting Type	:	Side Loading		Final PD.	:	1.00	in.wg	24" x 20"	:	6
Filter Area	:	20.000	ft²	Design PD.	:	0.34	in.wg	20" x 20"	:	0
Filter Velocity	:	549	ft/min							

Prepared By : Checked By : Approved By :

SECONDARY FILTER

Filter Type	:	Rigid Filter (4")		Air Flow	:	11000	CFM	24" x 24"	:	0
Filter Grade	:	60-65% DS (F6)		Initial PD.	:	0.40	in.wg	24" x 12"	:	0
Mounting Type	:	Side Loading		Final PD.	:	1.51	in.wg	24" x 20"	:	6
Filter Area	:	20.000	ft²	Design PD.	:	0.40	in.wg	20" x 20"	:	0
Filter Velocity	:	549	ft/min							

Prepared By : Checked By : Approved By :

Prepared By : Checked By : Approved By :

to be 1 ton per 400CFM total cooling or greater.

Type 5 Cooling Water Coil

284MBH

Total capacity (MBH)	187.4	Sensible capacity (MBH)	187.4

Air Properties

Air flow (ft³/min)	11,000	Entering air dry bulb (°F)	82.0
		Entering air wet bulb (°F)	68.0
Face velocity (ft/min)	522	Leaving air dry bulb (°F)	66.1
Air pressure drop (in w.g.)	0.49	Leaving air wet bulb (°F)	62.8
Barometric pressure (in Hg)	29.92	Air properties measured at	Altitude

Fluid Properties

Fluid	40% Propylene Glycol	Entering fluid temperature (°F)	44.0
Fluid flow rate (gal/min)	40.9	Leaving fluid temperature (°F)	54.0
Fluid velocity (ft/s)	1.6	Fluid pressure drop (ft w.g.)	1.8

Construction

Type	5	Rows deep	4
Tubes in face	28	Fin spacing (fins/in)	12
Finned height (in)	44.6	Circuiting	Full
Finned length (in)	68.0	Number of feeds	28

6 WATER HEATING COIL

COIL SPECIFICATIONS

Coil Code	:	5WH1B-28Tx66 LH	Coil Layer	:	1			
Coil Tube Size	:	5/8" (Type 5)	Medium	:	40% PG	Header Material	:	Copper
Coil Row	:	1	Circuiting Method	:	H (2T/C)	Has Drain Pan	:	Yes
Coil FPI	:	10	Tube / Fin Material	:	Copper / Aluminium	Drain Pan Material	:	SS 304
Tube Face	:	28	Tube Spacing (in)	:	1.594	Moisture Eliminator	:	No
Fin Height	:	44.63 in	Coil Frame Material	:	GI	Coil Spacer	:	No
Fin Length	:	66.00 in	Coating Material	:	None	Coil Length Type	:	Short Coil Section

AIR SIDE

ENTERING AIR			
Dry Bulb Temp.	:	60.0	°F
Wet Bulb Temp.	:	60.0	°F
Relative Humidity	:	100.00	%
LEAVING AIR			
Dry Bulb Temp.	:	95.6	°F
Wet Bulb Temp.	:	64.4	°F
Relative Humidity	:	16.36	%

WATER SIDE

Entering Temp.	:	160.0	°F
Leaving Temp.	:	140.0	°F
Flow Rate	:	22.0	gpm
Water Velocity	:	62	ft/min
Pressure Drop	:	1.2	ft.wg
Header Connection	:	1.5	In
Connection Type	:	MNPT	
Fouling Factor	:	0.001	h.ft².°F/Btu
Glycol Type	:	Propylene Glycol	
Glycol Percentage	:	40	%

PERFORMANCE

172MBH

Total Capacity	:	147515	Btu/h
Sensible Capacity	:	147515	Btu/h
Air Flow	:	11000	CFM
Air Velocity	:	533	ft/min
Air Pressure Drop	:	0.17	in.wg

Notes

Certified in accordance with the AHRI Forced-Circulation Air-Conditioning and Air-Heating Coils.

Certified Program, which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard

Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Tube internal construction : Smooth

Fin Configuration : Corrugated, Waffle with Rippled Edge.

Prepared By : Checked By : Approved By :

7 EMPTY SECTION

GENERAL SPECIFICATIONS

Section Name	:	Access Section
Opening Location	:	None

Prepared By : Checked By : Approved By :

8 SUPPLY FAN

FAN SPECIFICATIONS

Fan Code	:	
Fan Type	:	
Fan Quantity	:	
Fan Shaft Power	:	
Blower Speed	:	
Maximum Fan Speed	:	
Discharge Opening	:	
Discharge Direction	:	
Air Flow	:	

MOTOR SPECIFICATIONS

Installed Power	:	2 @ 7.5 hp
Power Supply	:	575V/3Ph/60Hz
Motor Efficiency	:	92.4 %
Efficiency Type	:	NEMA
Motor Frame	:	PREMIUM 254T
Motor Pole	:	4
Mounting Position	:	Rear
Motor Type	:	AC
Shaft Speed	:	rpm
Class H Motor	:	No
2 Speed Motor	:	No

PERFORMANCE

Show Max. Values at this fan and motor size. ESP to be 2.25" or greater.

ISP	:	2.44	in.wg
ESP	:	1.00	in.wg
TSP	:	3.44	in.wg

VFD

VFD Type	:	Standard
VFD Installation	:	Factory Installed

FAN SOUND LEVEL

	Inlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	89.3	94.7	97.0	97.8	98.3	96.2	88.9	79.6	104.3
Lw(A)	64.3	79.7	89.0	94.8	98.3	97.2	89.9	78.6	102.3
Lp(A)	56.5	71.9	81.2	87.0	90.5	89.4	82.0	70.7	94.5

	Outlet Sound (dB)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lw	91.4	98.7	98.0	101.0	101.1	98.4	90.9	81.4	106.9
Lw(A)	65.2	82.6	89.4	97.8	101.1	99.6	91.9	80.3	104.9
Lp(A)	57.2	74.6	81.4	89.8	93.1	91.6	83.9	72.3	96.9

	Sound Pressure Level @ 1 meter of AHU External (dBA)								
Band Frequency, Hz	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Overall**
Lp(A)	54.3	55.9	66.9	71.4	77.9	72.9	56.9	44.9	80.0

ACCESSORIES

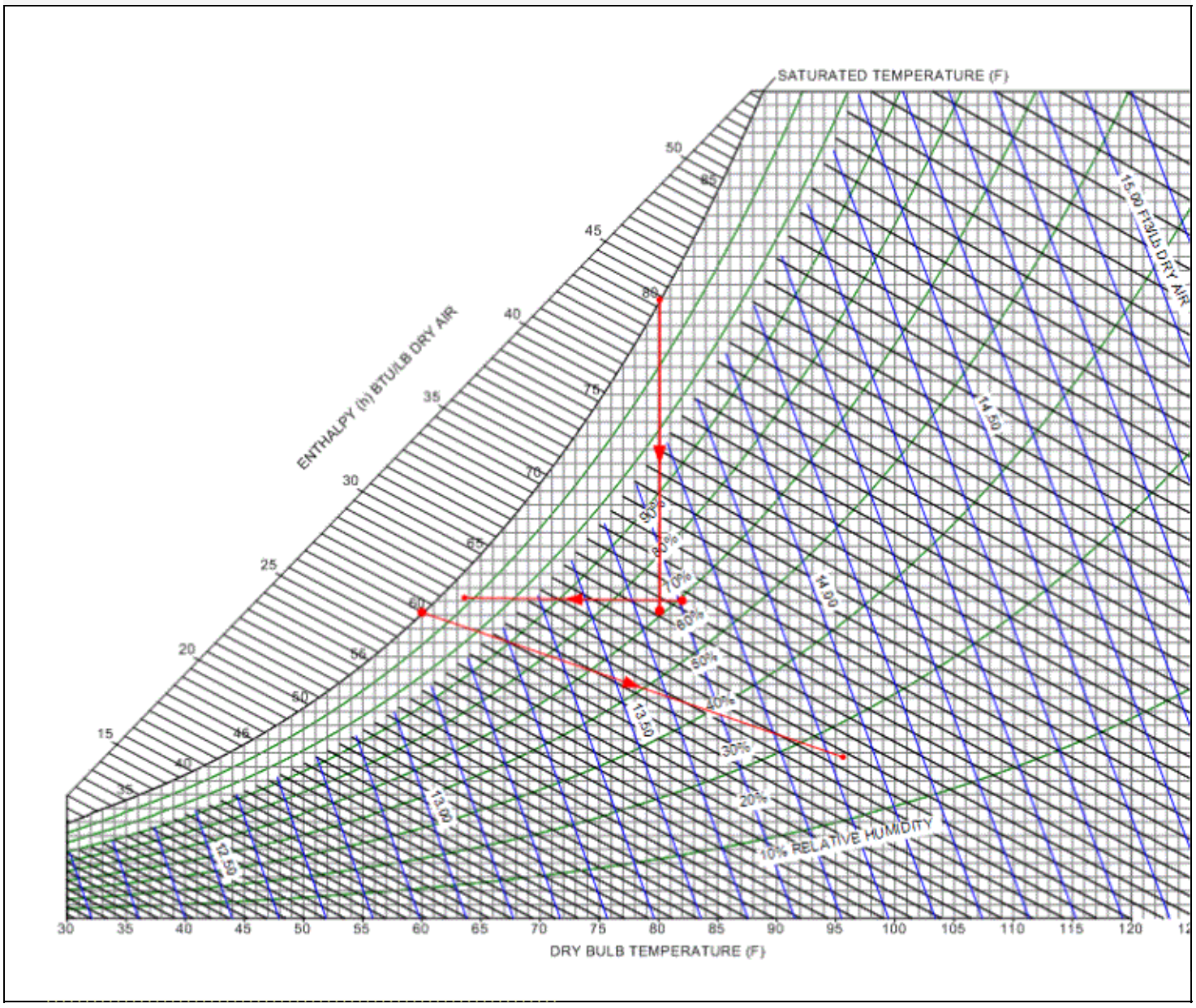
Airflow switch	:	1
Disconnect	:	1

Prepared By : Checked By : Approved By :

PHSYCHROMETRIC REPORT

Project Name	Radient Technology - Office AHUs	Patch Number	R8
Tag	AHU-8	Database Version	20160215
Model	SCS3H-50mm TB-AH100-PF	Pricing Versin	20160107
Location	Canada	Report Date	1/5/2019

Chart Display



Entering/ Leaving Air Condition

Guideline : E = Entering Air Condition, L = Leaving Air Condition, (F) = Fresh Air, (R) = Return Air

Comp. No.	Unit	1		2		3		4		5		6		7		8	
Component		Mixing Box(F)		Mixing Box(R)		Coil		Heat									
Air Direction		E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L
DB Temp.	°F	80.1	80.1	80.1	80.1	82.0	63.6	60.0	95.6								
WB Temp.	°F	66.9	80.1	66.9	80.1	68.0	62.1	60.0	64.4								
RH	%	50.76	100.00	50.76	100.00	49.11	92.06	100.00	16.36								

KRUGER

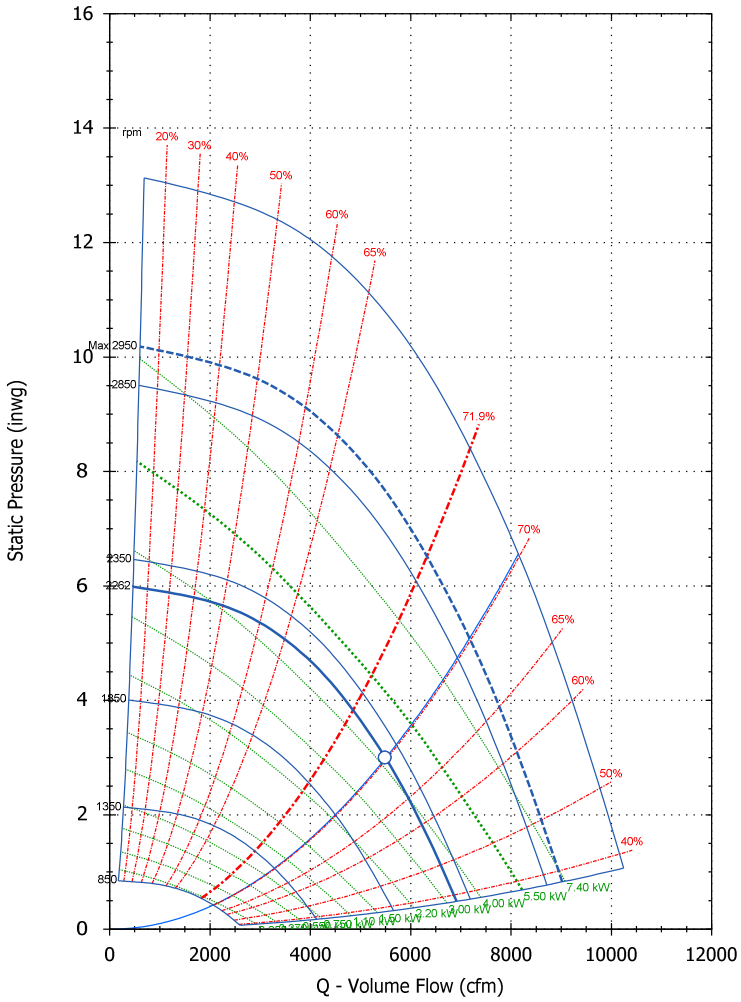
Date 9/5/2019

Project Radient Technology
Reference BNB-P450 (Supply)

Kruger Ventilation Industries Pte Ltd
No. 17 Tuas Avenue 10
Singapore 639141

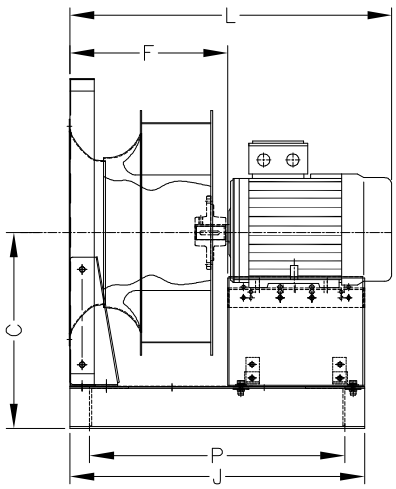
Tel: +65 6861 1577 **Fax:** +65 6861 3577
Email: mktg@krugerasia.com

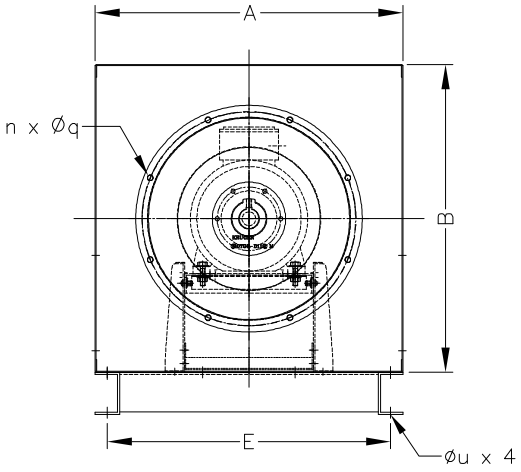
Fan Selection	
Fan Type	
Unit	BNB-P450/BIIM (II)
Operating Conditions	Ducted
Air Volume	5,500 cfm
Static Pressure	2.99 inwg
Velocity Pressure	0.407 inwg
Total Pressure	3.40 inwg
Outlet Velocity	2556 ft/min
Fan Total Efficiency	70.1 %
Fan Static Efficiency	61.7 %
Fan Speed	2262 rpm
Air Temperature	68 °F
Fan Absorbed Power	4.20 kW
Motor Selection	
Recommended Motor	D132S (5.50 kW)
Motor Speed	3480 rpm
Service Factor **Plenum**	20 %
Selection Plenum Size	
Outlet Size	--
Operating Limits Max.	
Absorbed Power Max.	7.40 kW
Fan Speed	2950 rpm
Temperature (Min-Max)	-20° to 100°C



Hz	63	125	250	500	1k	2k	4k	8k	Overall
Lwi(Lin)	89	94	96	91	90	86	83	80	100 dB
Lwi(A)	63	78	88	88	90	87	84	79	95 dB(A)
Lpi(A)	39	54	64	64	66	64	60	55	71 dB(A)

* Sound data is for the inlet side * Sound Pressure Level 7m, Room Conditions





KRUGER

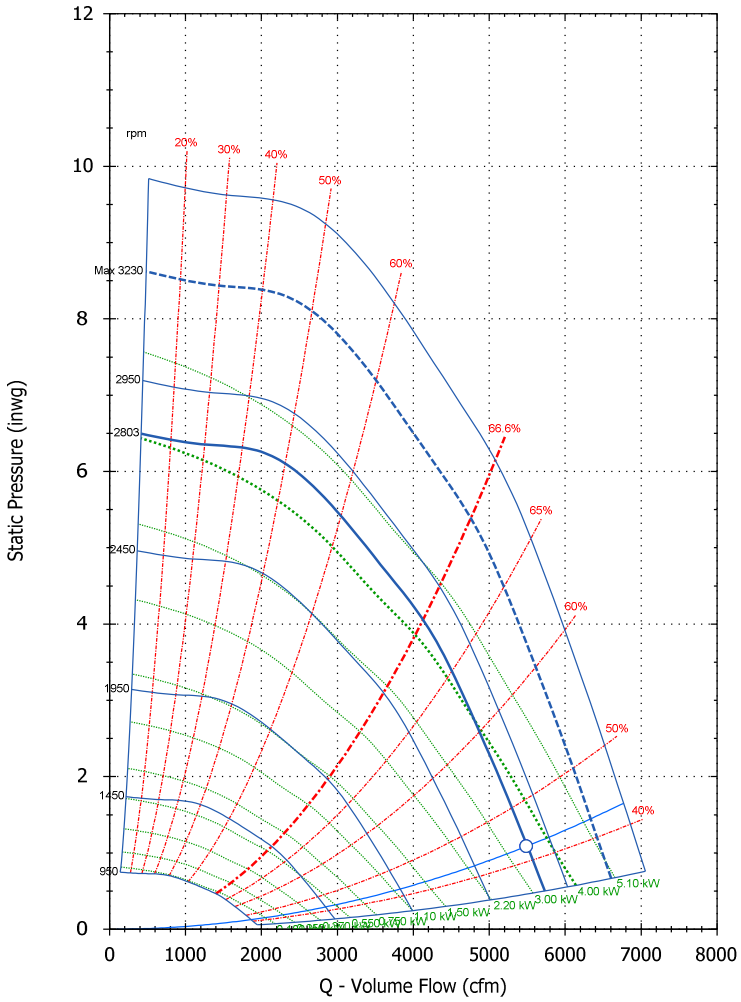
Date 9/5/2019

Project Radient Technology
Reference BNB-P400 (Return)

Kruger Ventilation Industries Pte Ltd
No. 17 Tuas Avenue 10
Singapore 639141

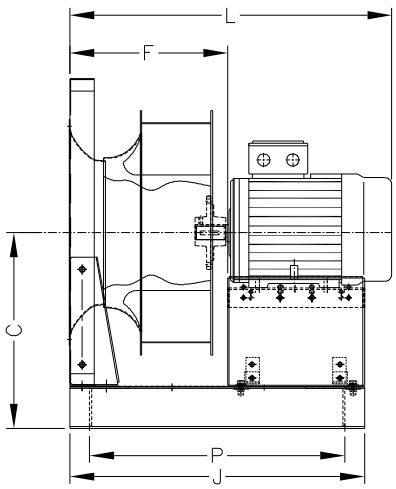
Tel: +65 6861 1577 **Fax:** +65 6861 3577
Email: mktg@krugerasia.com

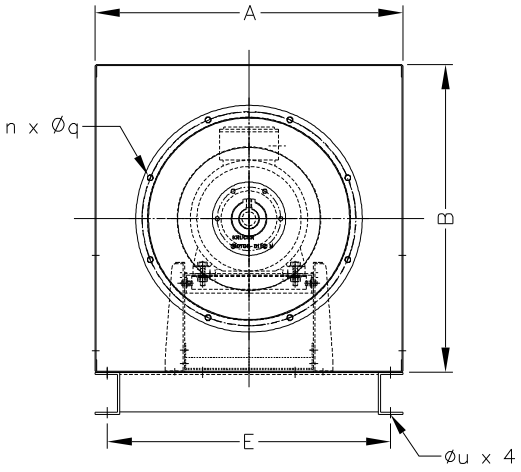
Fan Selection	
Fan Type	
Unit	BNB-P400/BIIM (II)
Operating Conditions	Ducted
Air Volume	5,500 cfm
Static Pressure	1.09 inwg
Velocity Pressure	0.636 inwg
Total Pressure	1.73 inwg
Outlet Velocity	3195 ft/min
Fan Total Efficiency	43 %
Fan Static Efficiency	27.1 %
Fan Speed	2803 rpm
Air Temperature	68 °F
Fan Absorbed Power	3.48 kW
Motor Selection	
Recommended Motor	D112M (4.00 kW)
Motor Speed	3480 rpm
Service Factor **Plenum**	40 %
Selection Plenum Size	
Outlet Size	--
Operating Limits Max.	
Absorbed Power Max.	5.10 kW
Fan Speed	3230 rpm
Temperature (Min-Max)	-20° to 100°C



Hz	63	125	250	500	1k	2k	4k	8k	Overall
Lwi(Lin)	86	94	97	92	91	88	86	85	101 dB
Lwi(A)	60	78	88	89	91	89	87	84	96 dB(A)
Lpi(A)	36	54	64	65	67	66	63	60	73 dB(A)

* Sound data is for the inlet side * Sound Pressure Level 7m, Room Conditions





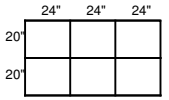
PRELIMINARY DRAWING

Confirm Curbing Requirements with General Contractor.

APPROVED	
DATE	

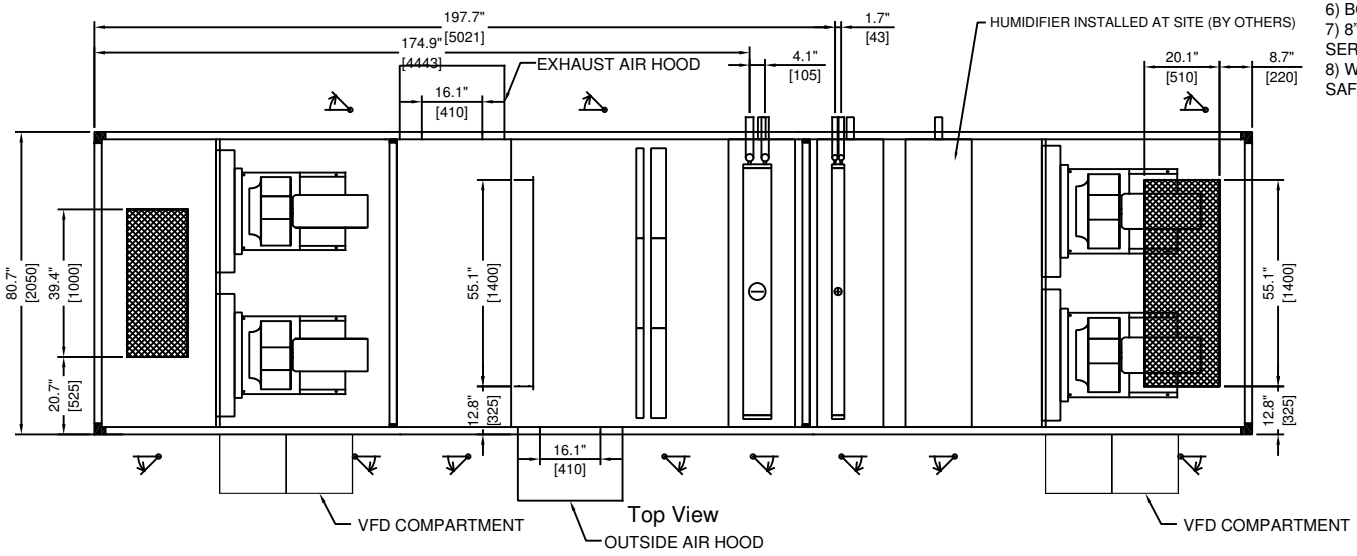
NOTES:
1) HUMIDIFIER BY OTHERS.
2) CONVENIENT OUTLET IN CONTROL PANEL.
3) EXHAUST & OUTSIDE AIR DAMPERS BY OTHERS.
4) VFD COMPARTMENT AND AIR HOODS TO BE SHIPPED LOOSE.
5) UNIT TO BE SHIPPED IN SINGLE BASE.
6) BOTTOM RETURN & DOWNFLOW DISCHARGE OPENING
7) 8" BASE WELDED TYPE AS PER ROOF TOP MODEL(RT SERIES BASE)
8) WIRE MESH ON RETURN AND SUPPLY OPENING FOR SAFETY PRECAUTION

Filter Arrangement

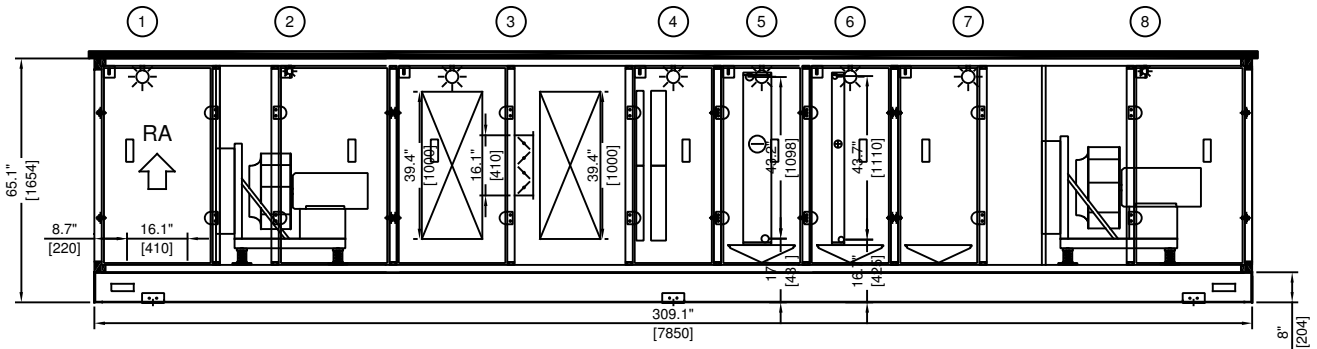


Filter Size - 20" x 24" - (6)

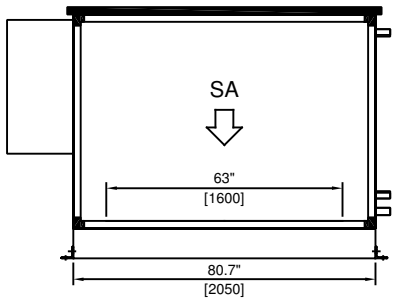
Specification	Value	Unit
Unit Info		
AHU Installation Type	Outdoor	
AHU Construction Type	50mm TB	
PU Thickness	50	mm
Casing (Ext / Inner)	GI Solid(Painted)/GI Solid	
1 Access Section		
2 Exhaust Plugfan		
Blower Code	400-P-PF x 2 Nos	
Disch. Direction	Front	
Motor		
Installed Motor Power	5	hp
Power Supply	575V/3Ph/60Hz	
Pole	2	
Location	Rear	
Isolator	Standard (Spring)	
Other		
Remark :		
Overall dimension will be altered with VFD installed.		
3 Economizer		
Mixing Box #1		
Opening Position		
Blade Type		
Opening Type (Left)	AL Damper (By others)	
Size 1 (Left)	410 x 1000	in
Mixing Box #2		
Opening Position		
Blade Type		
Opening Type (Front)	AL Damper	
Size 1 (Front)	1400 x 410	in
Opening Type (Right)	AL Damper (By others)	
Size 1 (Right)	410 x 1000	
4 Combined Filter		
Grade (Prim)	25%-30% DS (G4)	
Grade (Sec)	60-65% DS (F6)	
Mounting Type (Sec)	Side Loading	
5 Water Cooling		
Coil Code	5WF4C-28Tx68 LH	
Coil Tube Size	5/8" (Type 5)	
Coil Header Connection	2"MNPT@1 Qty	
Coil Row/FPI	4 / 12	
Coil Circuit	F (4T/C)	
Coil Connection	Left Side	
Coil Header Material	Copper	
Fin Material	Aluminium	
Coil Coating	None	
Drain Pan Connection	Left Side	
Drain Pan Material	SS 304	
6 Water Heating		
Coil Code	5WH1B-28Tx66 LH	
Coil Tube Size	5/8" (Type 5)	
Coil Header Connection	1.5"MNPT@1 Qty	
Coil Row/FPI	1 / 10	
Coil Circuit	H (2T/C)	
Coil Connection	Left Side	
Coil Header Material	Copper	
Fin Material	Aluminium	
Coil Coating	None	
Drain Pan Connection	Left Side	
Drain Pan Material	SS 304	
7 Access Section		
8 Supply Plugfan		
Blower Code	450-P-PF x 2 Nos	
Disch. Direction	Front	
Motor		
Installed Motor Power	7.5	hp
Power Supply	575V/3Ph/60Hz	
Pole	2	
Location	Rear	
Isolator	Standard (Spring)	
Other		
Remark :		
Overall dimension will be altered with VFD installed.		



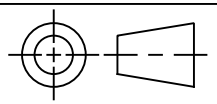
Top View



Right View



Front View



ALL DIMENSION ARE IN MM
STANDARD ENGINEERING
TOLERANCES MUST OBSERVE

DUNHAM–BUSH INDUSTRIES SDN. BHD (6302-K)

FOR INTERNAL USE

DRAWN BY	HELMY	DESIGNED BY	MAN
CHECKED BY	MAN	APP'D BY	

DESCRIPTION

PROJECT NAME :Radient Technology - Office AHUs
UNIT NAME : AHU-8
MODEL : SCS3H-50mm TB-AH100-PF
QTY : 1

DRAWING NO : 87509F-253 Rev 2 (13.05.19)	SCALE N.T.S.	REV R8	SHEET 1 OF 1

KRUGER

BNB

PLENUM FAN

with Backward Curved Wheels

KRUGER

BNB Series

PLENUM FAN with Backward Curved Wheels

BNB Series

Plenum Fans – Backward curved wheels

Kruger Plenum Fans are designed for air handling application where the fan wheel operates without housing, inside a plenum. This results in saving of space normally occupied by the fan housing, transition and diffusers. The fan wheel pressurizes the entire plenum in which the fan is installed. This allows air ducts to be directly connected from any direction to the plenum. The compact size of the plenum fan makes it an excellent selection for retrofit and replacement application and for variable air volume systems.

There are three types of BNB Series, i.e. BNB-R (regular type), BNB-P (high pressure ratio type), BNB-Q (high volume ratio type).

NOMENCLATURE

MODEL: BNB-R 450 / D I

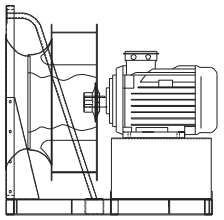
- Fan operation class — I & II
- Drive mode — 'D' - Direct Driven; 'B' - Belt Driven
- Fan model
- Fan type — R, P, Q

TYPE / OPERATING LIMIT

Each fan type has its maximum operating speed and power due to its mechanical design.

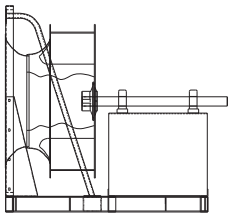
The operating limit of BNB series is set according with the requirement of class I and II limit as defined in AMCA standard 99-2408-69.

The BNB series is available in Direct Driven and Belt Driven as follow:



Direct Driven 'D'
This type is supplied with no belts nor pulley and therefore minimal maintenance is required. It is a compact, space saving design with motor directly connected to wheel. This construction is mainly for cleanroom, with or without VFD, since there is an absence of belt residue which may contaminate the airstreams.

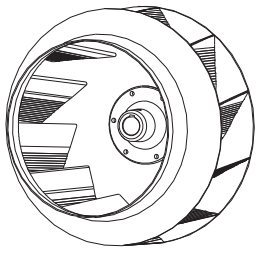
Fan Size : 315 to 1400
Volume : 1000 to 150,000 m^3/h
Total Pressure : up to 2500 Pa



Belt Driven 'B'
No bearings in the fan inlet to affect performance. Separate base for motor mounting is required.

Fan Size : 315 to 1400
Volume : 1000 to 150,000 m^3/h
Total Pressure : up to 2500 Pa

Drawings and dimension data of belt driven are available upon request.



TECHNICAL SPECIFICATION

Wheel

The wheels of BNB series have backward curved blades manufactured in mild steel with polyester powder coating finish.

Shaft

Shafts are manufactured from C45 carbon steel using an automatic process for positioning and cutting of the keyways. All dimensional tolerances of the shaft are fully checked to ensure a precision fit. All shafts are then coated with an anti-corrosion varnish after assembly.

Bearing

Bearings used are either deep groove ball bearings with an adapter sleeve, or spherical roller bearings sealed at both sides for different duty application.

The bearings are lubricated for life and maintenance-free. If re-lubrication is necessary, it is recommended to use lithium base grease suitable for all temperatures within the operational limits.

Balancing Quality

All wheels are statically and dynamically balanced to ISO1940 and AMCA 204 – G2.5 standard.

All fans after assembly are trim-balanced to ISO1940 and AMCA 204 - G2.5 standard.

Other standard rather than G2.5 is available upon request.

ACCESSORIES

Inlet Guard

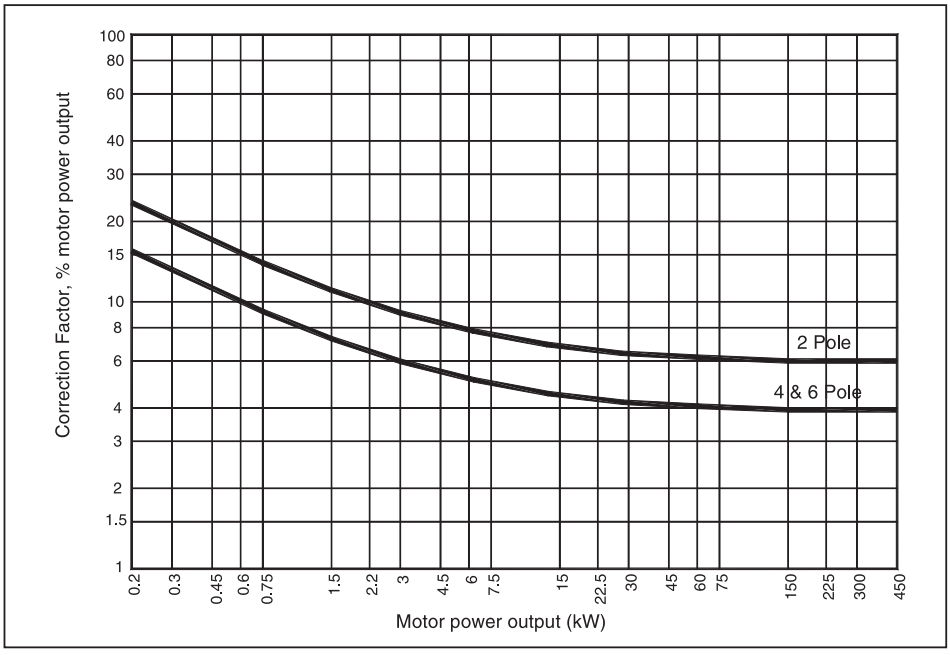
Inlet guards may be a requirement in some industrial safety regulations. These are available upon request.

Motor Selection

The power curves shown on each performance graph represents the absorbed power at the shaft of the fan measured in kW.

To determine the power of the motor to be installed, a correction factor should be applied to compensate for the transmission loss.

For conversion to horsepower (HP), use multiplying factor 1.34.



PERFORMANCE

The performance data shown on each diagram is derived from tests conducted in accordance with AMCA Standard 210- Fig 15- Installation type A (free inlet and free outlet condition).

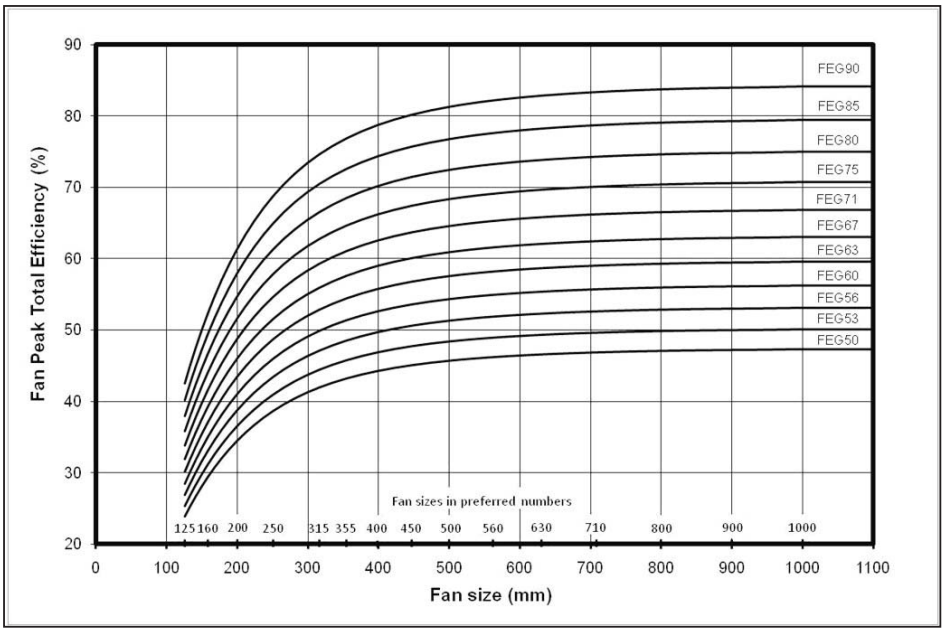
Ratings refer to standard air density with the total pressure as a function of the air volume, using logarithmic scale.

It is essential that, the same installation type and test standards are used at all times, when comparing fan performance.

According to ISO 12759/AMCA 205, BNB series can be classify as FEG 85 based on fan peak efficiency. The following is the explanation of FEG classification:

1. Fan size is the impeller diameter in mm.
2. The fan peak efficiency shall be calculated from the fan (total) pressure.
3. If this method is used for a direct driven fan, the fan efficiency is the impeller efficiency.
4. The FEG label for a given fan size is assigned when the fan peak efficiency is equal or lower than the efficiency at the grade upper limit and higher than efficiency at the grade upper limit of the next lower grade for the fan size.
5. For any fan sizes larger than 1016 mm, the values of the grade upper limits are the same as for a size of 1016 mm.
6. No labels are considered for the fans with the fan peak total efficiency below FEG50.
7. The values of efficiencies are calculated for fan sizes in the preferred R40 Series.
8. Not all fan sizes in preferred numbers shown.

Fan Efficiency Grades (FEG) for Fans without Drives (SI) – ISO 12759/ AMCA 205



NOISE

The noise levels shown on each diagram refer to the sound power, "A-weighted" values and the data are obtained at the outlet side from tests conducted in accordance to AMCA Standard 300. The noise levels are determined as follow:

- Sound power level - ("A" scale): Lw (A) as catalogue
- Octave band spectrum: Lw = Lw(A) + Lw rel. dB [refer to Kruger for more details]
- Sound pressure level:

a) free field
$Lp(A) = Lw(A) - (20\log_{10}d) - 11$

b) room conditions
$Lp(A) = Lw(A) - (20\log_{10}d) - 8$

where d = distance of fan (m)

SELECTION GUIDELINES

To obtain optimum performance, the following guidelines should be adhered to in the plenum fan selection.

MINIMUM DISTANCE

Recommended minimum distance values for correct plenum fan installation are as follow.

D = Impeller Diameter