

1. What are your requirements when you are assigned a job for the following week? [5 things min]
2. What things should be completed at the jobsite before you are scheduled to start the balancing ?
3. What should you do when you arrive at jobsite for the first time?
4. What is the best way to determine total air flow?
5. Calculate the area of a 40"x18" duct. Show the layout of traverse points where each reading is taken. including the measurements of each hole and reading.



6. The actual airflow is 2458 cfm, the design is 3000 cfm and Fan RPM is 1145. Calculate new fan RPM.

7. Motor RPM is 1740, sheave sizes 7.5 fan sheave, variable 4.0 motor sheave, what is max and min fan RPM?

8. Design cfm is 2400 what is the range to be within 10%? (max, min)

9. What is the area of 10" round duct? Where are holes drilled?

10. If a diffuser or grille cannot be read with flow hood, what is the procedure for measuring?

11. Discharge = .56" / Suction = .78" / MA reading = .48" for a RTU

Calculate each:

What is TSP?

What is ESP?

What is pressure drop across filters and coil?

12. How much horsepower is the unit using?

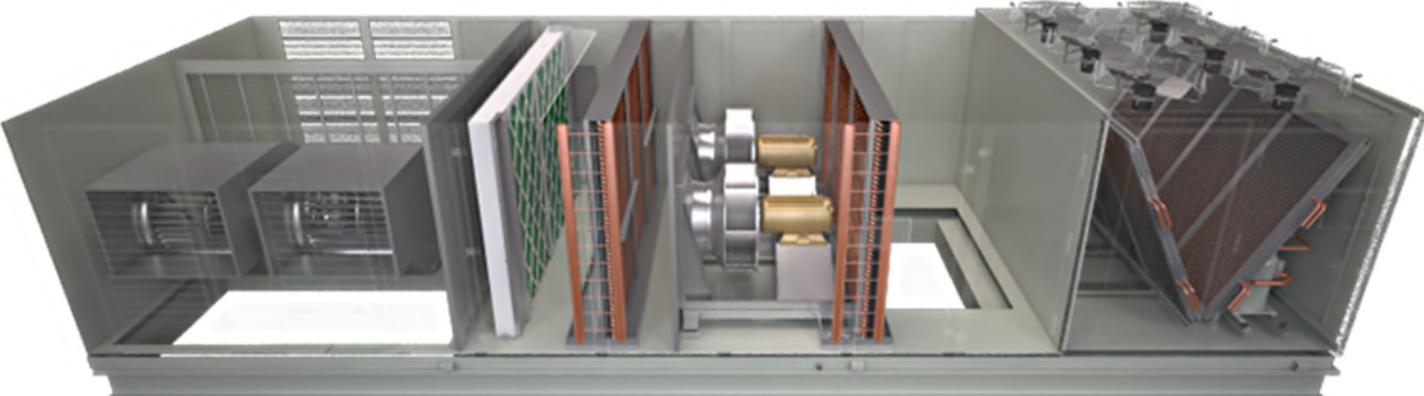
HP is 7.5 / design amps is 11.2 / actual amp average is 8.8.

13. If you are extremely low on airflow, what are some things to look for before increasing fan rpm?

14. If the unit is not running, what are some thing to check before alerting GC/EC or NTAB?

15. How do you change the rotation on a single phase motor?

16. Show where all static readings are taken and name all the sections of the unit?



17. Where is amperage and voltage measured of the following diagram?

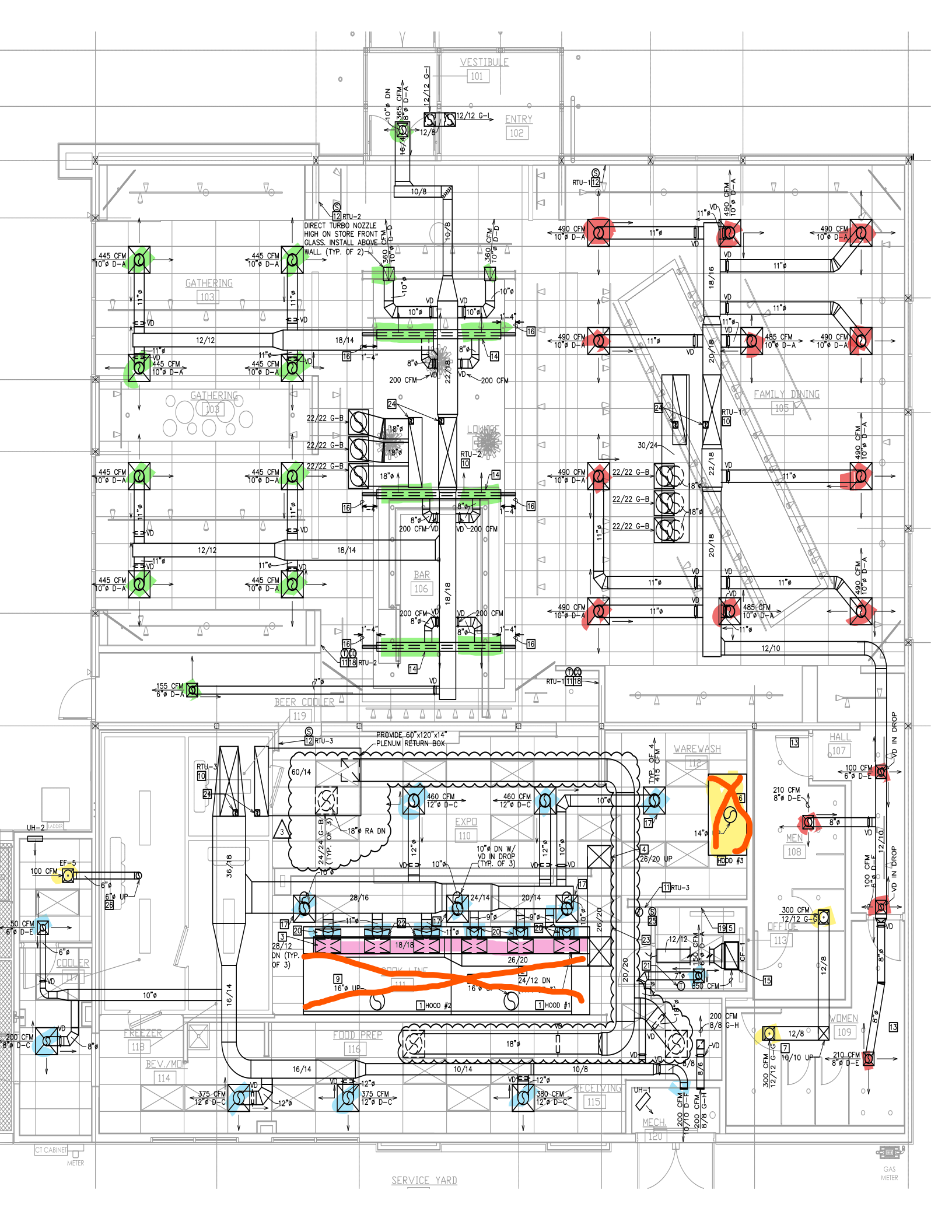


18. How do you change the rotation on a 3 phase motor?

19. How is the outside air cfm determined and calculated?

20. What are the requirements before you leave a job? [5 min]

21. Use the following documents to build a job like you would on Facilibuild including the GRD.



ROOFTOP UNIT SCHEDULE

(FURNISHED BY OWNER, INSTALLED BY MECHANICAL CONTRACTOR)

MARK RTU	MANUFACTURER	MODEL	AIR FLOW (CFM)	OA FLOW (CFM)	AMBIENT OAT (°F)	EXT. S.P. (IN.W.C.)	DX COOLING COIL			GAS HEAT			ELECTRICAL			EER	REF. TYPE	APPROX. WEIGHT (LBS)	AREA SERVED	TONNAGE OF UNIT	
							EAT (°FDB/WB)	TOTAL (BTU/HR)	SENSIBLE (BTU/HR)	INPUT (BTU/HR)	OUTPUT (BTU/HR)	VOLTS/φ/HZ	MCA (AMPS)	MOCP (AMPS)	EVAPORATOR BLOWER H.P.						
1	LENNOX	KGA180H4B	6,000	1,225	95	0.75	80.0/67.0	182,100	138,396	NATURAL GAS	260,000	208,000	208/3/60	76.0	90.0	5.0	12.0	R-410A	2,450	MAIN DINING/RESTROOMS	15.0 TONS
2	LENNOX	KGA180H4B	6,000	1,620	95	0.75	80.0/67.0	182,100	138,396	NATURAL GAS	260,000	208,000	208/3/60	76.0	90.0	5.0	12.0	R-410A	2,450	BAR/ENTRY/SIDE DINING	15.0 TONS
3	LENNOX	KGA180H4B	6,000	125	95	0.75	80.0/67.0	182,100	138,396	NATURAL GAS	260,000	208,000	208/3/60	76.0	90.0	5.0	12.0	R-410A	2,450	KITCHEN	15.0 TONS

NOTES:

EXHAUST FAN SCHEDULE (FURNISHED BY OWNER AND INSTALLED BY MECHANICAL CONTRACTOR)

MARK EF	MANUFACTURER	MODEL	TYPE	DRIVE TYPE	PERFORMANCE			ELECTRICAL		ACCESSORIES	SERVES	
					AIR FLOW (CFM)	EXT. STATIC (IN.W.C.)	FAN SPEED (RPM)	VOLTS/φ/HZ	FAN MOTOR HP (WATTS)			
1	CAPTIVE-AIRE	SEE CAPTIVEAIRE DRAWINGS									WP, RC, VC	GREASE HOOD #1
2	CAPTIVE-AIRE										WP, RC, VC	GREASE HOOD #2
3	CAPTIVE-AIRE										BS, BD, WP, RC	DISHWASHER HOOD #3
4	CAPTIVE-AIRE										BS, BD, WP, RC	RESTROOMS
5	LOREN COOK	GC 148	CEILING MOUNT	DIRECT	100	0.450	1075	115/1/60	(43)	BS, BD	EMPLOYEE RESTROOM	

AIR BALANCE SCHEDULE (FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR)

SUPPLY AIR UNIT	OUTSIDE AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	SUPPLY AIRFLOW (CFM)	OA/SA %	EXHAUST AIR UNIT	EXHAUST AIRFLOW (CFM)	REMARKS
RTU-1	1,225	4,775	6,000	20.4%	EF-1	2,750	
RTU-2	1,620	4,380	6,000	27.0%	EF-2	3,040	
RTU-3	125	5,875	6,000	2.08%	EF-3	900	
MUA-1	4,630	0	4,630	100.0%	EF-4	600	
					EF-5	100	
TOTAL	7,600	15,035	22,630	33.58%	TOTAL	7,390	
RESULTING BUILDING PRESSURIZATION						210 CFM	
PRESSURIZATION PERCENTAGE						2.84%	

HOOD INFORMATION - Job#3122409

HOOD NO.	TAG	MODEL	LENGTH	MAX. COOKING TEMP.	EXHAUST PLENUM								MUA CFM	AC CFM	HOOD CONSTRUCTION	HOOD CONFIG.		
					TOTAL EXH. CFM	RISER(S)						VEL.				S.P.	END TO END	ROW
						WIDTH	LENG.	HEIGHT	DIA.	CFM								
1	H-1L	5430 ND-2-ACPSP-F	11' 0"	600 Deg.	2750			4'	16'	2750	1970	-1.077'	2200	900	430 SS Where Exposed	LEFT	FRONT	
2	H-2R	5430 ND-2-ACPSP-F	13' 6"	600 Deg.	3038			4'	16'	3038	2176	-0.620'	2430	960	430 SS Where Exposed	RIGHT	FRONT	
3	H-3	4224 VHB-G	6' 0"	700 Deg.	900			4'	14'	900	842	-0.079'	0	0	304 SS 100%	ALONE	ALONE	

HOOD INFORMATION

HOOD NO.	TAG	FILTER(S)					LIGHT(S)				UTILITY CABINET(S)				FIRE SYSTEM PIPING	HOOD HANGING WGT	
		TYPE	QTY.	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY.	TYPE	WIRE GUARD	LOCATION	SIZE	FIRE SYSTEM		ELECTRICAL			SWITCHES
												TYPE	SIZE	MODEL #			QUANTITY
1	H-1L	Captrate Solo Filter	8	20'	16'	85% See Filter Spec.	4	L55 Series E26	NO	Left	20"x54"x30"	Ansul R102	3.0/3.0/3.0	M-DCV-E21101MS	1 Light 1 Fan	YES	1057 LBS
2	H-2R	SS Baffle with Handles	10	20'	16'	30%	4	L55 Series E26	NO							YES	950 LBS
3	H-3						2	L55 Series E26	NO							NO	184 LBS

HOOD OPTIONS

HOOD NO.	TAG	OPTION
1	H-1L	LEFT QUARTER END PANEL 23' Top Width, 0' Bottom Width, 23' High 430 SS
		INSULATION FOR TOP OF HOOD
		STRUCTURAL FRONT PANEL
2	H-2R	RIGHT QUARTER END PANEL 23' Top Width, 0' Bottom Width, 23' High 430 SS
		INSULATION FOR TOP OF HOOD
		STRUCTURAL FRONT PANEL

PERFORATED SUPPLY PLENUM(S)

HOOD NO.	TAG	POS.	LENGTH	WIDTH	HEIGHT	TYPE	RISER(S)				
							WIDTH	LENG.	DIA.	CFM	S.P.
1	H-1L	Front	152'	24'	6'	MUA	12"	28"		733	0.202'
						MUA	12"	28"		733	0.202'
						MUA	12"	28"		733	0.202'
						AC	8"	16"		300	0.099'
						AC	8"	16"		300	0.099'
						AC	8"	16"		300	0.099'
2	H-2R	Front	162'	24'	6'	MUA	12"	28"		810	0.211'
						MUA	12"	28"		810	0.211'
						MUA	12"	28"		810	0.211'
						AC	6"	28"		320	0.072'
						AC	6"	28"		320	0.072'
						AC	6"	28"		320	0.072'

EXHAUST FAN INFORMATION - Job#3122409

FAN UNIT NO.	TAG	FAN UNIT MODEL #	CFM	ESP.	RPM	H.P.	B.H.P.	Ø	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS.)	SDNES
1	EF-1	CASRE20DD	2750	1.500	1201	3.000	1.6130	3	208	9.5	1277 FPM	350	19.8
2	EF-2	DU180HFA	3038	1.000	1197	1.500	0.9050	3	208	4.4	702 FPM	163	17.1
3	EF-3 (Dish)	DR33HFA	900	0.400	1582	0.333	0.2670	1	115	5.6		57	13.7
4	EF-4 (Bath)	DR30HFA	600	0.619	1339	0.250	0.1370	1	115	3.8		56	9.3

CONDENSER DETAILS

FAN UNIT NO.	TAG	FAN UNIT MODEL #	CONDENSER NO.	TONNAGE	VOLTAGE	PHASE	FREQUENCY	MCA	RLA	MAX. FUSE SIZE	MIN. WIRE SIZE
5	MUA-1	A2-D.500-G15-MPU	1	5	208-230	3 PHASE	60 Hz	21.4 Amps	17.4 Amps	30 Amps	12 AWG
			2	5	208-230	3 PHASE	60 Hz	21.4 Amps	17.4 Amps	30 Amps	12 AWG

MUA FAN INFORMATION - Job#3122409

FAN UNIT NO.	TAG	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP.	RPM	H.P.	B.H.P.	Ø	VOLT	FLA	COOLING COIL ENTERING DB TEMP.	COOLING COIL ENTERING WB TEMP.
5	MUA-1	A2-D.500-G15-MPU	G15-PB	A2-D.500	2500	4630	0.500	1181	5.000	4.0870	3	208	15.0	95.0°F	76.0°F

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: AHU/RTU

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Configuration		
Num OA Filters 1		
OA Filter Size 1		
Num PreFilter 1		
PreFilter Size 1		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Rated Voltage		
Rated Amperage		
Frequency		
Service Factor		
Efficiency		
Power Factor		

Drive Data		
	Design	Actual
Motor Sheave Size		
Motor Bore Size		
Motor Sheave SetPt		
Fan Sheave Size		
Fan Sheave Bore		
Belt CL Distance		
Num of Belts		
Belt Size		

Completed By:

Notes:

Date:

Test Data		
	Design	Actual
SF CFM		
SF RPM		
RA CFM		
OA CFM		
RL Voltage		
RL Amperage		
VFD Max SetPt		
SF Motor Freq(HZ)		
RA Damper Position		
OA Damper Position		
Brake Horse Power		

Performance Data		
	Design	Actual
Fan Suction SP		
Fan Discharge SP		
Total ESP		
Fan Total SP		
Pre-Filter Delta SP		
DX Coil Delta SP		

National TAB

Project: SAMPLE P & S PROJECT

Diffuser Supply (GRD)

Air Devices

Asset	Area Served	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1									
SGRD2									
SGRD3									
SGRD4									
SGRD5									
SGRD6									
SGRD7									
SGRD8									
SGRD9									
SGRD10									
SGRD11									
SGRD12									
SGRD13									
SGRD14									
SGRD15									
SGRD16									
SGRD17									
SGRD18									
SGRD19									
SGRD20									
SGRD21									
SGRD22									
SGRD23									
SGRD24									
SGRD25									

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: AHU/RTU

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Configuration		
Num OA Filters 1		
OA Filter Size 1		
Num PreFilter 1		
PreFilter Size 1		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Rated Voltage		
Rated Amperage		
Frequency		
Service Factor		
Efficiency		
Power Factor		

Drive Data		
	Design	Actual
Motor Sheave Size		
Motor Bore Size		
Motor Sheave SetPt		
Fan Sheave Size		
Fan Sheave Bore		
Belt CL Distance		
Num of Belts		
Belt Size		

Completed By:

Notes:

Date:

Test Data		
	Design	Actual
SF CFM		
SF RPM		
RA CFM		
OA CFM		
RL Voltage		
RL Amperage		
VFD Max SetPt		
SF Motor Freq(HZ)		
RA Damper Position		
OA Damper Position		
Brake Horse Power		

Performance Data		
	Design	Actual
Fan Suction SP		
Fan Discharge SP		
Total ESP		
Fan Total SP		
Pre-Filter Delta SP		
DX Coil Delta SP		

National TAB

Project: SAMPLE P & S PROJECT

Diffuser Supply (GRD)

Air Devices

Asset	Area Served	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1									
SGRD2									
SGRD3									
SGRD4									
SGRD5									
SGRD6									
SGRD7									
SGRD8									
SGRD9									
SGRD10									
SGRD11									
SGRD12									
SGRD13									
SGRD14									
SGRD15									
SGRD16									
SGRD17									
SGRD18									
SGRD19									
SGRD20									
SGRD21									
SGRD22									
SGRD23									
SGRD24									
SGRD25									

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: AHU/RTU

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Configuration		
Num OA Filters 1		
OA Filter Size 1		
Num PreFilter 1		
PreFilter Size 1		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Rated Voltage		
Rated Amperage		
Frequency		
Service Factor		
Efficiency		
Power Factor		

Drive Data		
	Design	Actual
Motor Sheave Size		
Motor Bore Size		
Motor Sheave SetPt		
Fan Sheave Size		
Fan Sheave Bore		
Belt CL Distance		
Num of Belts		
Belt Size		

Completed By:

Notes:

Date:

Test Data		
	Design	Actual
SF CFM		
SF RPM		
RA CFM		
OA CFM		
RL Voltage		
RL Amperage		
VFD Max SetPt		
SF Motor Freq(HZ)		
RA Damper Position		
OA Damper Position		
Brake Horse Power		

Performance Data		
	Design	Actual
Fan Suction SP		
Fan Discharge SP		
Total ESP		
Fan Total SP		
Pre-Filter Delta SP		
DX Coil Delta SP		

National TAB

Project: SAMPLE P & S PROJECT

Diffuser Supply (GRD)

Air Devices

Asset	Area Served	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1									
SGRD2									
SGRD3									
SGRD4									
SGRD5									
SGRD6									
SGRD7									
SGRD8									
SGRD9									
SGRD10									
SGRD11									
SGRD12									
SGRD13									
SGRD14									
SGRD15									
SGRD16									
SGRD17									
SGRD18									
SGRD19									
SGRD20									
SGRD21									
SGRD22									
SGRD23									
SGRD24									
SGRD25									

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: FAN - Supply

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Type		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Voltage (rated)		
Amperage (rated)		
Service Factor		

Test Data		
	Design	Actual
CFM		
RL Voltage		
RL Amperage		
Suction ESP		
Discharge ESP		
Total ESP		
Brake Horse Power		

Completed By:

Notes:

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: FAN - Exhaust

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Type		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Voltage (rated)		
Amperage (rated)		
Service Factor		

Test Data		
	Design	Actual
CFM		
RL Voltage		
RL Amperage		
Suction ESP		
Discharge ESP		
Total ESP		
Brake Horse Power		

Completed By:

Notes:

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: FAN - Exhaust

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Type		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Voltage (rated)		
Amperage (rated)		
Service Factor		

Completed By:

Notes:

Test Data		
	Design	Actual
CFM		
RL Voltage		
RL Amperage		
Suction ESP		
Discharge ESP		
Total ESP		
Brake Horse Power		

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: FAN - Exhaust

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Type		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Voltage (rated)		
Amperage (rated)		
Service Factor		

Test Data		
	Design	Actual
CFM		
RL Voltage		
RL Amperage		
Suction ESP		
Discharge ESP		
Total ESP		
Brake Horse Power		

Completed By:

Notes:

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: FAN - Exhaust

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Type		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Voltage (rated)		
Amperage (rated)		
Service Factor		

Completed By:

Notes:

Test Data		
	Design	Actual
CFM		
RL Voltage		
RL Amperage		
Suction ESP		
Discharge ESP		
Total ESP		
Brake Horse Power		

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: FAN - Exhaust

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Type		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Voltage (rated)		
Amperage (rated)		
Service Factor		

Test Data		
	Design	Actual
CFM		
RL Voltage		
RL Amperage		
Suction ESP		
Discharge ESP		
Total ESP		
Brake Horse Power		

Completed By:

Notes:

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: FAN - Exhaust

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Serial Num		
Type		

Motor Data		
	Design	Actual
Motor MFG		
Frame		
Horsepower		
Motor Rpm		
Phase		
Voltage (rated)		
Amperage (rated)		
Service Factor		

Test Data		
	Design	Actual
CFM		
RL Voltage		
RL Amperage		
Suction ESP		
Discharge ESP		
Total ESP		
Brake Horse Power		

Completed By:

Notes:

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: Kitchen Hood Type I

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Job / Serial Num		
Type		
Hood length		
Hood Width		
Supply Plenum Type		
Supply Plenum Width		
Supply Plenum Length		

Test Data Exhaust		
	Design	Actual
Filter Type		
Filter Size 1		
Filter Qty 1		
Filter AK factor size 1		
Filter Total AK Area		
Filter1 FPM		
Filter2 FPM		
Filter3 FPM		
Filter4 FPM		
Filter5 FPM		
Filter6 FPM		
Filter7 FPM		
Filter8 FPM		
Filter9 FPM		
Filter High FPM(corr)		
Filter Low FPM (corr)		
Filter Ave FPM(corr)		
CFM		

Cooking Equipment		
	Design	Actual
Item 1		
Item 2		
Item 3		
Item 4		
Item 5		

Test Data Supply		
	Design	Actual
AK factor		
Total AK Area		
Kv factor (Vel)		
Reading1 FPM		
Reading2 FPM		
Reading3 FPM		
Reading4 FPM		
Reading5 FPM		
Reading6 FPM		
Reading7 FPM		
Reading8 FPM		
Reading9 FPM		
Reading10 FPM		
Reading11 FPM		
Reading12 FPM		
Reading13 FPM		
Reading14 FPM		
High FPM(corr)		
Low FPM(corr)		
Ave FPM(corr)		
CFM		

Performance Data		
	Design	Actual
Exh-Supply Net CFM		
Smoke Generation Type		
Cooking Equip Heat On		
Hood Capture %		
Space Offset Temp Riser 1		
Space Offset Temp Riser 2		
Riser Temp F (idle) Riser 1		
Riser Temp F (idle) Riser 2		
Ambient Room Temp		
100% override functional		

General		
	Design	Actual
Third Party Witness		
Third Party Company		
Tech Witness		
Tech Company		
Code Official Witness		

Date:

National TAB

Project: SAMPLE P&S PROJECT

System/Unit: Kitchen Hood Type I

Asset:

AREA:

Unit Data		
	Design	Actual
MFG		
Model Num		
Job / Serial Num		
Type		
Hood length		
Hood Width		
Supply Plenum Type		
Supply Plenum Width		
Supply Plenum Length		

Test Data Exhaust		
	Design	Actual
Filter Type		
Filter Size 1		
Filter Qty 1		
Filter AK factor size 1		
Filter Total AK Area		
Filter1 FPM		
Filter2 FPM		
Filter3 FPM		
Filter4 FPM		
Filter5 FPM		
Filter6 FPM		
Filter7 FPM		
Filter8 FPM		
Filter9 FPM		
Filter High FPM(corr)		
Filter Low FPM (corr)		
Filter Ave FPM(corr)		
CFM		

Cooking Equipment		
	Design	Actual
Item 1		
Item 2		
Item 3		
Item 4		
Item 5		

Test Data Supply		
	Design	Actual
AK factor		
Total AK Area		
Kv factor (Vel)		
Reading1 FPM		
Reading2 FPM		
Reading3 FPM		
Reading4 FPM		
Reading5 FPM		
Reading6 FPM		
Reading7 FPM		
Reading8 FPM		
Reading9 FPM		
Reading10 FPM		
Reading11 FPM		
Reading12 FPM		
Reading13 FPM		
Reading14 FPM		
High FPM(corr)		
Low FPM(corr)		
Ave FPM(corr)		
CFM		

Performance Data		
	Design	Actual
Exh-Supply Net CFM		
Smoke Generation Type		
Cooking Equip Heat On		
Hood Capture %		
Space Offset Temp Riser 1		
Space Offset Temp Riser 2		
Riser Temp F (idle) Riser 1		
Riser Temp F (idle) Riser 2		
Ambient Room Temp		
100% override functional		

General		
	Design	Actual
Third Party Witness		
Third Party Company		
Tech Witness		
Tech Company		
Code Official Witness		

Date: