

Synergy Test and Balance

2611 Waterfront Parkway, Ste. 340 | Indianapolis, IN 46214 | Tel. (317) 222-1828

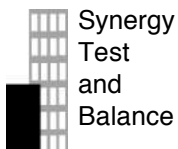
Company Information and Qualifications

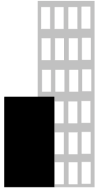


2611 Waterfront Parkway, Suite 340
Indianapolis, IN 46214
www.synergytab.com

Synergy Test and Balance Company Information and Qualifications

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Synergy Test and Balance

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Introduction

Synergy Test and Balance was formed in 2011 to provide independent, third party Test and Balance services. From then until 2012 we balanced 14 projects and established a portfolio of work allowing us to apply for certification through the Associated Air Balance Council (AABC), which we successfully completed in 2013. To date we have balanced over 125 projects.

The TAB experience of our personnel goes much deeper than Synergy's corporate history. Cheryl Yates' association with the Test and Balance field goes back many years. More recently she has focused on finance and business development, and has now combined that experience with her engineering background to become president of Synergy Test and Balance. As can be seen in our staff resumes and Glenn Miller Jr. and Todd Yates have combined TAB experience of nearly 40 years prior to the founding of Synergy Test and Balance. They have balanced some of the most complex facilities in the region, as well as many smaller projects. With this background we can provide a full range of Test and Balance services including:

- Test and Balance for Air systems
- Test and Balance for Hydronic systems
- Duct leakage testing
- Sound testing
- Vibration testing

We provide TAB services in Indiana, Kentucky, Tennessee, West Virginia and the surrounding areas.

Contact Information

Our office is located at 2611 Waterfront Parkway, Suite 340 in Indianapolis, IN.

Contact:

Cheryl Yates, President
Cheryl@synergycab.com
Office: 317 222-1828
Fax: 317 451-8079
www.synergycab.com



Associated Air Balance Council

Annual Membership Certificate

Awarded to

Synergy Test and Balance, Inc.

as a member in good standing of the Associated Air Balance Council for the year

2018

This member has met all requirements for membership and is entitled to all rights and privileges of AABC certification. This certificate is renewable on an annual basis and expires December 31, 2018.



Michael Delcamp

Michael Delcamp, *President*

Kenneth M. Sufka

Kenneth M. Sufka, *Executive Director*



Associated Air Balance Council

Annual Certificate

Awarded to

Glenn M. Miller

Synergy Test and Balance, Inc.

In recognition of his qualifications as a

Certified Test and Balance Engineer

under the rules, regulations, and requirements of the Associated Air Balance Council. The above named is fully authorized to perform total system balance in accordance with the standards as established by the AABC and as a member of the Associated Air Balance Council for the year

2018

This registration number 13-04-38 is fully recognized by the bylaws and charter of this professional association. Certification is renewable on an annual basis after examination of the agency's record for the preceding year. This certificate expires December 31, 2018.



Michael Delcamp

Michael Delcamp, President

Kenneth M. Sufka

Kenneth M. Sufka, Executive Director



Associated Air Balance Council

Annual Certificate

Awarded to

V. Todd Yates, P.E.

Synergy Test and Balance, Inc.

In recognition of his qualifications as a

Certified Test and Balance Engineer

under the rules, regulations, and requirements of the Associated Air Balance Council. The above named is fully authorized to perform total system balance in accordance with the standards as established by the AABC and as a member of the Associated Air Balance Council for the year

2018

This registration number 97-06-34 is fully recognized by the bylaws and charter of this professional association. Certification is renewable on an annual basis after examination of the agency's record for the preceding year. This certificate expires December 31, 2018.



Michael Delcamp

Michael Delcamp, President

Kenneth M. Sufka

Kenneth M. Sufka, Executive Director



Cheryl Yates, President

EDUCATION

BSME, University of Kentucky
Masters in Math Education, University of Kentucky

INDUSTRY EXPERIENCE BEGINNING 1992

CERTIFICATIONS

Engineer in Training (EIT)

AFFILIATIONS

Associated Air Balance Council (AABC)
AABC Commissioning Group (ACG)
American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
United States Green Building Council (USGBC)

EXPERIENCE

Facility Commissioning Group, Inc. (2008 – Present)
Synergy Test and Balance, Inc. Indianapolis, IN (2011-Present)

Hardin County School District – North Middle School
Defense Supply Center Columbus – Building #20
Floro Torrence Elementary School #83
Kentucky Community and Technical College System
Franklin County Public School – Franklin County Alternative School
VAMC Louisville Robley Rex – Construct Chilled Water Distribution
Thomas A. Edison Key Learning Community School #47
Charles Warren Fairbanks Elementary School #105
Arlington Woods Elementary School #99
Ralph Waldo Emerson Elementary School #58
Ernie Pyle Elementary School #90
Margaret McFarland Middle School #112
Ameresco – Kentucky Horse Park Visitor Center & Museum Assessments



Glenn Miller, Jr.

EDUCATION AAS, Paducah Community College, Studies at MSU

INDUSTRY EXPERIENCE BEGINNING 1991

CERTIFICATIONS/TRAINING

AABC Test and Balance Technician (TBT) #12-06-03 (2003-2011)

AABC Test and Balance Engineer (TBE) #13-04-38

ACG Commissioning Technician (CxT) #079-711

OSHA 10 Hour and 30 Hour Occupational Safety and Health

USEC/HAZMAT Training (24 Hours)

NES/Operator Training (Scissor Lift and Boom Lift)

AFFILIATIONS

Associated Air Balance Council (AABC)

AABC Commissioning Group (ACG)

United States Green Building Council (USGBC)

EXPERIENCE

Thermal Balance, Inc. Lexington, KY (1991-2011)

Facility Commissioning Group, Inc. Lexington, KY (2011-Present)

Synergy Test and Balance, Inc. Indianapolis, IN (2011-Present)

Hardin County School District – North Middle School

Defense Supply Center Columbus – Building #20

Floro Torrence Elementary School #83

Kentucky Community and Technical College System

Franklin County Public School – Franklin County Alternative School

VAMC Louisville Robley Rex – Construct Chilled Water Distribution

Thomas A. Edison Key Learning Community School #47

Charles Warren Fairbanks Elementary School #105

Arlington Woods Elementary School #99

Ralph Waldo Emerson Elementary School #58

Ernie Pyle Elementary School #90

Margaret McFarland Middle School #112

Ameresco – Kentucky Horse Park Visitor Center & Museum Assessments



V. Todd Yates

EDUCATION BSME, University of Kentucky

INDUSTRY EXPERIENCE BEGINNING 1991

CERTIFICATIONS

PE in the Commonwealth of Kentucky #20447
PE in the State of Tennessee #001906392
PE in the State of Indiana #PE10001131
PE in the State of Alabama #27716-E
PE in the State of West Virginia #021877
AABC Test and Balance Engineer (TBE) #97-06-34
ACG Commissioning Authority (CxA) #1004-042
USGBC LEED Accredited Professional, LEED AP BD+C

AFFILIATIONS

Associated Air Balance Council (AABC)
AABC Commissioning Group (ACG)
American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
United States Green Building Council (USGBC)

EXPERIENCE

Thermal Balance, Inc. Lexington, KY (1992-2008)
Facility Commissioning Group, Inc. Lexington, KY (1999-Present)
Synergy Test and Balance, Inc. Indianapolis, IN (2011-Present)

Floro Torrence Elementary School #83
Thomas A. Edison Key Learning Community School #47
Arlington Woods Elementary School #99
Ralph Waldo Emerson Elementary School #58
Ernie Pyle Elementary School #90
Margaret McFarland Middle School #112
Bartholomew Consolidated School Corporation – Columbus East and North High Schools
Purdue University – Lilly Hall Phases V, VI and VII
Purdue University – Marriott Hall
Purdue University – Roger B. Gatewood Mechanical Engineering Building
Jonathan Jennings Elementary School #109
Lexmark Buildings 32 and 35 TAB
UK Anderson Tower Lab
IUPUI – Neuroscience Research Building
IU Health – Neuroscience Center of Excellence
IUB – Jacobs School of Music East Studio Building



Todd Miller

EDUCATION Associate Degree in Arts, West Kentucky Community & Technical College
Graduate, Universal Technical Institute

INDUSTRY EXPERIENCE BEGINNING 2016

CERTIFICATIONS/TRAINING

OSHA 10 Hour Occupational Safety and Health

EXPERIENCE

Facility Commissioning Group, Inc. Lexington, KY (2016-Present)
Synergy Test and Balance, Inc. Indianapolis, IN (2016-Present)

Bullitt County Public Schools – Maryville Elementary School
Bullitt County Public Schools – Mt. Washington Elementary School
Danville Public Library - Additions and Renovations
Hyatt Place – Bowling Green
Indian University Bloomington – Assembly Hall Mark Cuban Center
Jefferson County Public Schools – YPAS HVAC Renovation & Elevator Addition
Toyota of Bowling Green
United Healthcare – Tenant Improvements
VAMC Lexington – 5th Floor Main Addition
Warrick County School Corporation – Tecumseh Middle and High School



Shane Catron

EDUCATION

BS Telecommunications, University of Kentucky
AA, Bluegrass Community & Technical College

INDUSTRY EXPERIENCE BEGINNING 2011

CERTIFICATIONS/TRAINING

Kentucky Electrical License #EE64580
OSHA 10 Hour Occupational Safety and Health

EXPERIENCE

Facility Commissioning Group, Inc. Lexington, KY (2016-Present)
Synergy Test and Balance, Inc. Indianapolis, IN (2016-Present)

Bullitt County Public Schools – Maryville Elementary School
Bullitt County Public Schools – Mt. Washington Elementary School
Greenwood Community School Corporation – Greenwood Middle School
Jefferson County Public Schools – YPAS HVAC Renovation & Elevator Addition
Oldham County Detention Center
University of Kentucky – Neonatal Intensive Care Unit
University of Kentucky – Pavilion A 11th Floor
VAMC Lexington – 5th Floor Main Addition



Abram Epley

EDUCATION

HVAC-R Certification, Fortis College

INDUSTRY EXPERIENCE BEGINNING 2017

EXPERIENCE

Facility Commissioning Group, Inc. Lexington, KY (2017-Present)

Synergy Test and Balance, Inc. Indianapolis, IN (2017-Present)

United Healthcare – Tenant Improvements, Indianapolis, IN

Indiana University Bloomington – Forest Quadrangle Residence Hall Renovation, Bloomington, IN

Indiana University Bloomington – Informatics & Computing Building – Luddy Hall, Bloomington, IN

The Heritage Group – The Center, Indianapolis, IN

Greenwood Community School Corporation – Greenwood Middle School, Greenwood, IN



Corey Thomasson

EDUCATION

Redland High School, Paducah, KY

INDUSTRY EXPERIENCE BEGINNING 2017

EXPERIENCE

Facility Commissioning Group, Inc. Lexington, KY (2017-Present)

Synergy Test and Balance, Inc. Indianapolis, IN (2017-Present)

United Healthcare – Tenant Improvements, Indianapolis, IN

Blanchfield Army Community Hospital Repair/Renewal OR/SPD/SDS, Fort Campbell, KY

Crane Buiding 2540 Renovation, Crane, IN

Crane Building 41, Crane, IN

CFSB – Southside Banking Center, Paducah, KY

Humana Conference Center – Second Floor Renovation, Louisville, KY

Jefferson County Public Schools- Medora Elementary School HVAC Renovations, Louisville, KY

Powell County Detention Center, Stanton, KY

Greenwood Community School Corporation – Greenwood Middle School, Greenwood, IN

Synergy Test and Balance Overall Projects List



2611 Waterfront Parkway, Suite 340
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 Phone (317) 222-1828
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	Project Name	Location
1	Hardin County School District - North Middle School	Radcliff, KY
2	Defense Supply Center Columbus - Building #20	Columbus, OH
3	Floro Torrence Elementary School #83	Indianapolis, IN
4	Kentucky Community and Technical College System	Versailles, KY
5	Franklin County Public School - Franklin County Alternative School	Frankfort, KY
6	VAMC Louisville Robley Rex - Construct Chilled Water Distribution	Louisville, KY
7	Thomas A. Edison Key Learning Community School #47	Indianapolis, IN
8	Charles Warren Fairbanks Elementary School #105	Indianapolis, IN
9	Arlington Woods Elementary School #99	Indianapolis, IN
10	Ralph Waldo Emerson Elementary School #58	Indianapolis, IN
11	Ernie Pyle Elementary School #90	Indianapolis, IN
12	Margaret McFarland Middle School #112	Indianapolis, IN
13	Ameresco - Kentucky Horse Park Visitor Center & Museum Assessments	Lexington, KY
14	Lew Wallace Elementary School #107	Indianapolis, IN
15	Theodore Potter Elementary School #74	Indianapolis, IN
16	Ashland Community and Technical College - Goodpaster Building TAB Work	Ashland, KY
17	Washington Irving Elementary School #14	Indianapolis, IN
18	Lexmark Buildings 32 & 35 TAB	Lexington, KY
19	University of Kentucky - Anderson Tower Lab 012	Lexington, KY
20	Lexmark Building 32 - Room 8-E-2-3	Lexington, KY
21	Elizabethtown Community & Technical College AHU TAB	Elizabethtown, KY
22	Carlisle County Middle School - 2014 Gym Reno	Bardwell, KY
23	BCSC - Columbus North High School Unit Ventilators	Columbus, IN
24	LCBE - Livingston County Middle School	Burna, KY
25	Park Plaza - Mariah's Restaurant	Bowling Green, KY
26	Park Plaza - Pagoda Asian Café	Bowling Green, KY
27	Park Plaza - Tres Molinos Mexican Grille	Bowling Green, KY
28	Park Plaza - 6-4-3 Sports Bar	Bowling Green, KY
29	Park Plaza - Brick & Basil Pizzeria	Bowling Green, KY
30	Crane Building 3173	Crane, IN
31	Crane Building 3168 Option 1a	Crane, IN
32	Crane Building 3168 Option 1b	Crane, IN
33	Crane Building 3168 Option 1c	Crane, IN
34	AJ Properties	Bowling Green, KY
35	VAMC - Memphis Building 1A	Memphis, TN
36	Indian Hills Christian Church	Danville, KY
37	Lexmark Fumehoods Project #14440	Lexington, KY
38	MCBE - South Marshall Middle School	Benton, KY
39	VAMC - 5th Floor Main Addition	Lexington, KY
40	Henderson Community College - Welding Lab Relocation	Henderson, KY
41	PETSENSE #363	Hopkinsville, KY
42	Marshall County High School - Freshman Wing Air Handler Replacement	Benton, KY
43	WKU-USDA Food Animal Environmental System Offices/Labs	Bowling Green, KY
44	Western Baptist Hospital - Doctors Office Building #3	Paducah, KY
45	BKD -Office Finish Out	Bowling Green, KY
46	ITCC - Lawrenceburg Campus Addition/Renovation	Lawrenceburg, IN
47	LFUCG - Community Action Center Reroof	Lexington, KY
48	LFUCG - Coroner Office Reroof	Lexington, KY
49	Fort Campbell - Blanchfield Army Community Hospital Repair/Renewal OR/SPD/SDS	Fort Campbell, KY
50	GE Aviation	Lafayette, IN
51	Store-It-All	Owensboro, KY
52	VAMC - Renovate Research Building 19	Louisville, KY
53	Jackson Purchase Medical Center - MOB 3rd Floor	Mayfield, KY
54	UK - Patterson Hall	Lexington, KY
55	Bowling Green Metalforming - Kitchen-Cafeteria Expansion	Bowling Green, KY
56	Grissom Air Reserve Base - Renovate Fuel Vehicle Maintenance B421	Grissom ARB, IN

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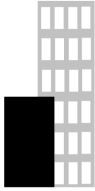
	Project Name	Location
57	Greenwood Community School Corporation - Greenwood Middle School	Greenwood, IN
58	Todd County Career Path Institute - New Facility	Elkton, KY
59	James H. Quillen VAMC Renovate Building 8	Mountain Home, TN
60	VAMC AHU Upgrades Phase 4	Louisville, KY
61	Alcoa Plant 2 AHU TAB	Laporte, IN
62	Murray Sate University - Waterfield Library	Murray, KY
63	Meijer Owensboro Store #288	Owensboro, KY
64	IMS Hulman Terrace Renovation	Indianapolis, IN
65	Jefferson County Public Schools - Greenwood Elementary School	Louisville, KY
66	Mammoth Cave National Park - Renovate and Rehabilitate Systems - Mammoth Cave Hotel	Mammoth Cave, KY
67	VAMC 7 North Halls and Walls	Louisville, KY
68	Bradie M. Shrum Lower Elementary School - HVAC Renovations	Salem, IN
69	Danville Public Library - Additions and Renovations	Danville, IN
70	Springs Valley Community Schools - Main Gym VRF HVAC	French Lick, IN
71	Community Schools of Frankfort - Frankfort High School Additions/Renovations	Frankfort, IN
72	Union County Schools - HVAC Projects	Union County (mult)
73	Fort Campbell - High School	Fort Campbell, KY
74	Bullitt County Public Schools - Mt. Washington Elementary School Additions and Renovations	Mt. Washington, KY
75	North Lawrence Community Schools - 2016 HVAC Improvements	Bedford, IN
76	Jefferson County Public Schools - YPAS HVAC Renovation & Elevator Addition	Louisville, KY
77	Oldham County Detention Center	LaGrange, KY
78	Lutheran Hospital - Lutheran Orthopedic & Spine Center - Operating Rooms	Fort Wayne, IN
79	Washington County Courts - Additions and Renovations	Salem, IN
80	Indiana University Bloomington - Informations & Computing Building Luddy Hall	Bloomington, IN
81	Walton Verona - Elementary School - Renovation	Walton, KY
82	Kroger Store #E783	Ashland, KY
83	Indiana University Bloomington - Assembly Hall Mark Cuban Center	Bloomington, IN
84	Warrick County School Corporation - Tecumseh Middle and High School	Lynnville, IN
85	Lincoln Village Youth Development Center	Elizabethtown, KY
86	Terre Haute Regional Hospital - Power Distribution Systems Upgrade	Terre Haute, IN
87	Bullitt County Public Schools - Maryville Elementary School Addition and Renovation	Louisville, KY
88	University of Kentucky - Neonatal Intensive Care Unit	Lexington, KY
89	Hyatt Place - Bowling Green	Bowling Green, KY
90	Arby's Restaurant - Benton	Benton, KY
91	Grissom Air Reserve Base - Renovate Maintenance Union and Logistics Facility B670	Grissom ARB, IN
92	University of Kentucky - Pavilion A 11th Floor	Lexington, KY
93	University of Kentucky - Anderson Tower Material Science Lab Survey	Lexington, KY
94	United Healthcare - Tenant Improvements	Indianapolis, IN
95	Toyota of Bowling Green	Bowling Green, KY
96	Crane Building 41	Crane, IN
97	Meijer Richmond Store #155	Richmond, IN
98	Jefferson County Public Schools - Medora Elementary School HVAC Renovation	Louisville, KY
99	CFSB - Southside Banking Center	Paducah, KY
100	Hopkinsville Retail - Tenant Improvements	Hopkinsville, KY
101	University of Louisville - Physicians Pediatric Ambulatory Care Center	Louisville, KY
102	Boone County Schools - Central Office Annex Building	Hebron, KY
103	Humana Conference Center - 2nd Floor Renovation	Louisville, KY

Synergy Test and Balance Overall Projects List



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	Project Name	Location
104	Crane Building 2540 Renovation	Crane, IN
105	Indiana University Bloomington - Quadrangle Residence Hall Renovation	Bloomington, IN
106	Jac-Cen-Del Community School Corporation - Jac-Cen-Del Elementary School Renovation	Osgood, IN
107	Owen County Lower Elementary School Renovation and Addition	Owenton, KY
108	The Heritage Group - The Center	Indianapolis, IN
109	MSD Lawrence Township - Harrison Hill Elementary School Renovations and Addition	Indianapolis, IN
110	West Lafayette Community School Corporation - New Elementary School	West Lafayette, IN
111	Hart County Public Library	Munfordville, KY
112	University of Kentucky - Memorial Coliseum Locker Room Renovation	Lexington, KY
113	Indiana University Bloomington - Swain East and West Renovations BP#2	Bloomington, IN
114	Western Kentucky University - Hugh Poland Hall - Air Survey	Bowling Green, KY
115	Powell County Detention Center	Stanton, KY
116	John Hardin High School - Athletic Facilities	Elizabethtown, KY
117	Indiana University Bloomington - Ernie Pyle Hall Renovation	Bloomington, IN
118	Scott County Schools - Great Crossing High School	Georgetown, KY
119	Brownsburg High School Renovation and Addition	Brownsburg, IN
120	Indiana University Bloomington - Auxiliary Library Facility Expansion #3	Bloomington, IN
121	Catalent Pharma Solutions - Suites 1010 and 1011	Winchester, KY
122	Blue Iguana Car Wash	Louisville, KY
123	Biolife Plasma Services 2017 Retrofit	Kokomo, IN
124	Asahi Bluegrass Forge - Water Distribution	Richmond, KY
125	Star Bank Carmel - Branch Remodel	Carmel, IN
126	Jefferson County Public Schools - Waggener High School Phase 1 HVAC Renovation	Louisville, KY



Synergy Test and Balance

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References

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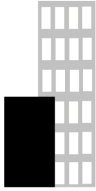
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jjjet@preferredindustries.com

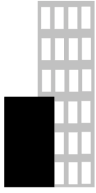


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Test and Balance Procedures for Air Systems

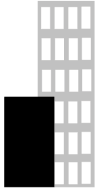
1. Obtain up-to-date specifications, drawings, and equipment submittals of the complete mechanical systems to be balanced. Compare installed equipment to design and check for completeness of installation.
2. Equipment Checks:
 - A. Check fan housings, coils, louvers and filters to ensure they are clean and free of foreign material.
 - B. Examine drives for proper belt tension and alignment.
 - C. Check fan for proper rotation.
 - D. Check automatic dampers for proper operation and position.
 - E. Check that manual dampers are in the open and locked position.
 - F. This agency will not continue the test and balance if conditions are observed that are hazardous to the air system. Such conditions will be reported before proceeding further.
3. Determine total airflow:
 - A. Airflow quantity of the fan will be determined by Pitot-tube traverse, unless impractical to do so. When the quantity cannot be obtained by Pitot-tube traverse, the sum of the outlet quantities will be used as the total CFM of the fan.
4. Adjust Outlets:
 - A. Test and adjust diffusers, registers, and grilles to distribution pattern and design requirements. Special attention will be given to avoiding drafts and noise where possible when adjustments are made.
5. Variable air volume (VAV) system:
 - A. Adjust and calibrate the VAV flow rate controllers to the required minimum and maximum CFM.
 - B. Record correction factors or flow coefficients.
6. Air Handler Unit data tested and recorded:
 - A. Manufacturer
 - B. Model Number
 - C. Serial Number
 - D. Size or Type
 - E. Fan CFM
 - F. Outlet CFM
 - G. Return CFM
 - H. Outside Air CFM
 - I. Fan RPM
 - J. Static Pressure Profile
 - K. Motor Manufacturer



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- L. Motor Horsepower
 - M. Motor RPM
 - N. Motor Volts and Phase
 - O. Motor Service Factor
 - P. Overloads
 - Q. Motor Sheave
 - R. Fan Sheave
 - S. Belts
7. Air balance procedures will be in accordance with AABC Standards.

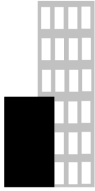


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Test and Balance Procedures for Hydronic Systems

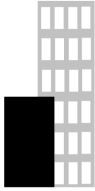
1. Obtain up-to-date specifications, drawings, and equipment submittals of the complete mechanical systems to be balanced. Compare installed equipment to design and check for completeness of installation.
2. Equipment Checks:
 - A. Strainers and piping are free from debris, cleaned and flushed.
 - B. Balancing devices are set to the full open position.
 - C. Construction strainer baskets replaced with permanent baskets.
 - D. System filled to the proper level and the pressure reducing valve set.
 - E. Automatic and manual air vents installed and air is purged from the system.
 - F. Water expansion tanks are at the proper level.
 - G. Valves, flow meters and temperature/pressure taps installed correctly, accessible and functional.
 - H. Terminal coils installed, piped correctly, and accessible.
 - I. Pumps properly aligned, grouted and anchored.
 - J. Verify correct pump rotation.
 - K. This agency will not continue the test and balance if conditions are observed that are hazardous to the water system. Such condition shall be reported before proceeding further.
3. Determine total water flow:
 - A. Using “pump shutoff head” and its operating curve verify pump impeller size where practical.
 - B. Adjust pump to design flow and record data.
4. Adjust flow measuring devices:
 - A. If flow measuring devices are used, test and set design water flow to boilers, chillers and cooling towers.
 - B. Measure and adjust main and branch flow measuring devices to the required flow.
 - C. Measure and adjust connected terminal units to design flow.
 - D. Record data from flow measuring devices.
 - E. Permanently mark or record final position of balancing valve.
5. Pump data tested and recorded:
 - A. Manufacturer
 - B. Model
 - C. Serial number
 - D. Impeller size
 - E. TDH (FT. HD.)
 - F. GPM
 - G. Discharge and Suction Pressures at full flow



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- H. Discharge and Suction Pressures at block off (where possible)
 - I. Motor Manufacturer
 - J. Motor Horsepower
 - K. Motor RPM
 - L. Motor Volts and Phase
 - M. Overloads
6. Hydronic balance procedures will be in accordance with AABC Standards.

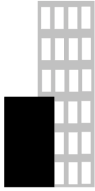


Synergy Test and Balance

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Duct Leakage Test Procedures

1. Obtain up-to-date specifications, drawings, and equipment submittals of the complete duct systems to be tested. Compare installed duct to design and check for completeness of installation. Confirm duct test requirements from project specifications.
2. Determine Maximum Allowable Leakage:
 - A. Calculations are done for either of two typical specifications: percentage of system flow, or leakage class.
 - B. Calculate total duct system surface area if leakage class is used.
3. Determine Which Orifice Plate to Use:
 - A. The proper plate is the one where the maximum allowable leakage falls between the minimum and maximum leakage at the system static pressure (refer to manufacturer orifice plate chart).
 - B. Install orifice plate (refer to operating instructions).
4. Connect Flexible Duct:
 - A. Connect flexible duct to orifice tube and confirm a sealed tight connection.
 - B. Connect flexible duct to duct system and confirm a sealed tight connection.
5. System Test Pressure Connection:
 - A. Drill a hole at least 3 feet away from the flex duct connection of the duct system.
 - B. Insert the pressure tubing from the "DUCT SYSTEM" gage so that 6 to 12 inches of tubing is inside the duct system.
6. Obtaining System Test Pressure:
 - A. Prior to starting the blower shut the inlet slide gate.
 - B. Turn the blower on and slowly open the inlet slide gate to obtain the system test pressure. Take care to avoid over-pressurization.
 - C. When system static pressure has been reached tighten the set-screw on the inlet slide gate.
7. Determining the Leakage Rate:
 - A. While system test pressure is being maintained note the pressure reading of the "ORIFICE TUBE" gage.
 - B. Refer to the calibration certificate to determine the leakage rate that corresponds to the gage reading.
 - C. Report test data on Duct Leakage report form.

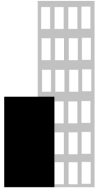


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Sound Test Procedures

1. Obtain up-to-date specifications, drawings, and equipment submittals of the complete mechanical systems to be tested. Compare installed equipment to design and check for completeness of installation.
2. The test area must be cleared of all persons except test personnel.
3. The test area will be furnished in its normal manner. Items affecting room sound absorption, such as drapes, furniture, carpeting, etc., will be in place.
4. Indoor tests will be performed when outside noise levels are near minimum.
5. Microphones will be placed in the test area at the height from the floor and distance from reflective surfaces that is specified in the manufacturer's instructions.
6. Measure the sound pressure level with the equipment running.
7. Measure the sound pressure level with the equipment off.
8. Calculate the difference between the two readings. If the level of the total noise measured is less than 2 dB higher than the background noise, the level of the background noise is too high for an accurate measurement. If the difference is between 2 dB and 10 dB a correction may be necessary. No correction will be required if the difference is greater than 10 dB.
9. Sound measurements will be performed in accordance with AABC Standards.



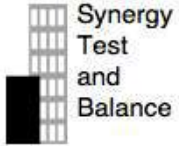
Synergy Test and Balance

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Vibration Test Procedures

1. Obtain up-to-date specifications, drawings, and equipment submittals of the complete mechanical systems to be tested. Compare installed equipment to design and check for completeness of installation.
2. Confirm that there is no construction or other activity in progress that will interfere with the test.
3. Confirm that construction equipment that might interfere with the test is turned off.
4. Confirm that building vibration sources, such as an elevator, that might interfere with the test is off.
5. Clean the equipment being tested of grease, oil, or other substance that might cause slippage or improper contact of the vibration transducer.
6. Position the vibration transducer according to the manufacturer's instructions and where it will not interfere with the operation of the equipment being tested.
7. Test equipment under actual operating conditions and record data.
8. Vibration measurements will be performed in accordance with AABC Standards.

Synergy TAB Equipment	
<u>Type</u>	<u>Model #</u>
Herman Sticht Contact Tachometer	2302
Herman Sticht Contact Tachometer	2302
Shortridge 1x4 Capture Hood	1x4
Shortridge Flow Hood	Flow Hood 8405
Shortridge Flow Hood	Flow Hood 8403
Shortridge ADM	ADM-870
Shortridge ADM	ADM-870
Shortridge ADM	ADM-870C
Shortridge ADM	ADM-870C
ALNOR Hydronic Manometer	HM 670
TSI Hydronic Manometer	HM675
Airflow Instrumentation Anemometer	LCA 6000
24" Pitot Tube	160-24
36" Pitot Tube	160-36
48" Pitot Tube	160-48
60" Pitot Tube	160-60
Clamp Meter	CAT III Fluke 30
Duct Leakage Tester	Oriflow Cobra
Evergreen Wrist Reporter w/Thumbswitch	
Evergreen Pressure/Velocity/Flow Sensing Module	
Evergreen Temperature Module	RM-T-1
Evergreen Air Insertion Temperature Probe	PR-T-1
Evergreen Water Insertion Probe	PR-T-4-6"
Evergreen Humidity/Psychrometric Sensor	S-H-3-5"
Evergreen Capture Hood 15"	CH-15D-24'
Evergreen Capture Hood 8"	CH-8D-14'
Casella Sound Level Meter	CEL-620.B2/K1
Fluke Vibration Meter	805 FC



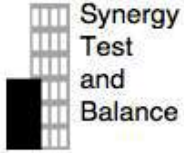
PROJECT: _____ PAGE: _____ DATE: _____
 PROJECT NAME: _____
 SYSTEM: _____
 LOCATION: _____
 TECHNICIAN: _____



AIR SYSTEM: _____
 FAN CFM (Q): _____
 ORIFICE PLATE #: _____

LEAKAGE CLASS (C_L): _____
 SPECIFIED TEST PRESSURE (P_T): _____
 DUCT CONSTRUCTION PRESSURE CLASS (P_C): _____

DESIGN DATA				FIELD TEST DATA RECORD							
SUBJECT DUCT	SURFACE AREA IN FT ²	ALLOWABLE LEAKAGE		DIAMETER		PRESSURE IN. W.C.		DATE	PERFORMED BY	WITNESSED BY	ACTUAL CFM
		FACTOR CFM/100 FT ²	CFM (TEST SECTION)	ORIFICE	TUBE	DUCT	ORIFICE				



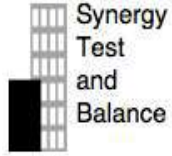
PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



AIR HANDLER DATA

	DESIGN	INSTALLED	
MANUFACTURER			
MODEL NUMBER			
SERIAL NUMBER	-----		
SIZE OR TYPE			ACTUAL
FAN CFM			
OUTLET CFM			
RETURN AIR CFM			
OUTSIDE AIR CFM			
FAN RPM			
STATIC PRESSURE (IN. W.C.)			
SUCTION S.P. (IN. W.C.)	-----	-----	
DISCHARGE S.P. (IN. W.C.)	-----		
MOTOR MANUFACTURER	-----		
MOTOR HORSEPOWER			
MOTOR RPM			
MOTOR VOLTS PHASE			
MOTOR AMPS			
MOTOR SERVICE FACTOR			
OVERLOADS	-----		
MOTOR SHEAVE	-----		
FAN SHEAVE	-----		
BELTS NO.			

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



HOT WATER BOILER DATA

UNIT NUMBER	
Location	
Service	
Rating BTU Hour	
Manufacturer	
Model Number	
Serial Number	

UNIT NUMBER	
Location	
Service	
Rating BTU Hour	
Manufacturer	
Model Number	
Serial Number	

SECONDARY HOT WATER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
Flow GPM		
Control Setting		

SECONDARY HOT WATER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
Flow GPM		
Control Setting		

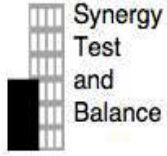
UNIT NUMBER	
Location	
Service	
Rating BTU Hour	
Manufacturer	
Model Number	
Serial Number	

UNIT NUMBER	
Location	
Service	
Rating BTU Hour	
Manufacturer	
Model Number	
Serial Number	

SECONDARY HOT WATER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
Flow GPM		
Control Setting		

SECONDARY HOT WATER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
Flow GPM		
Control Setting		

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



AIR COOLED CHILLER DATA

UNIT NUMBER	
Manufacturer	
Capacity	
Model Number	
Serial Number	

UNIT NUMBER	
Manufacturer	
Capacity	
Model Number	
Serial Number	

COOLER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
GPM		

COOLER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
GPM		

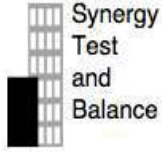
CONDENSER		
Entering Air Temp		

CONDENSER	Design	Actual
Entering Air Temp		

ELECTRICAL	
Compressor Amps	
Compressor Volts	
Fan Amps	
Fan Volts	

ELECTRICAL	Design	Actual
Compressor Amps		
Compressor Volts		
Fan Amps		
Fan Volts		

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

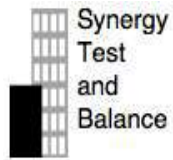


COOLING COIL DATA

System								
Location								
Service								
Manufacturer								
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL
CFM								
GPM								
Coil P.D., FT.								
E.W.T, °F								
L.W.T, °F								
E.A.T, DB °F								
E.A.T, WB °F								
L.A.T, DB °F								
L.A.T, WB °F								
Air MBH								
Water MBH								

System								
Location								
Service								
Manufacturer								
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL
CFM								
GPM								
Coil P.D., FT.								
E.W.T, °F								
L.W.T, °F								
E.A.T, DB °F								
E.A.T, WB °F								
L.A.T, DB °F								
L.A.T, WB °F								
Air MBH								
Water MBH								

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



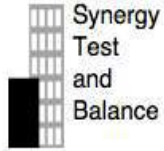
DUCT TRAVERSE DATA

ZONE	DUCT SIZE	T Y P E	AREA (ft ²)	Required Velocity FPM	Required CFM	Actual Test Velocity FPM	Actual Test CFM	Duct Static Pressure IN. W.C.	R M K S

SAMPLE

TYPE: TYPE: 1-RECTANGLE, 2-CIRCLE, 3-FLAT OVAL

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

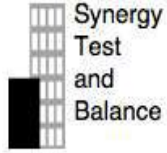


DIRECT EXPANSION COOLING COIL DATA

System								
Location								
Service								
Manufacturer								
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL
CFM								
E.A.T, DB °F								
E.A.T, WB °F								
L.A.T, DB °F								
L.A.T, WB °F								
MBH								

System								
Location								
Service								
Manufacturer								
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL
CFM								
E.A.T, DB °F								
E.A.T, WB °F								
L.A.T, DB °F								
L.A.T, WB °F								
MBH								

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

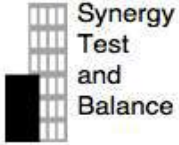


ENERGY RECOVERY UNIT DATA

Manufacturer:	
Model Number:	
Serial Number:	

	SUPPLY FAN		EXHAUST FAN	
	DESIGN	ACTUAL	DESIGN	ACTUAL
FAN CFM				
OUTLET CFM				
FAN RPM				
STATIC PRESSURE				
DISCHARGE S.P.				
SUCTION S.P.				
DELTA SP ACROSS ARC				
MOTOR MANUFACTURER				
MOTOR HORSEPOWER				
MOTOR RPM				
MOTOR VOLTS PHASE				
MOTOR AMPS				
MOTOR SERVICE FACTOR				
OVERLOADS				
MOTOR SHEAVE				
FAN SHEAVE				
BELTS NO.				

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

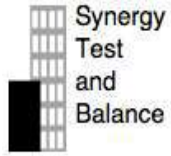


FAN TEST DATA

FAN NO.									
LOCATION									
AREA SERVED									
MANUFACTURER									
MODEL NO.									
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	
FAN CFM									
RPM									
HORSEPOWER									
VOLTS/PHASE	∅		∅		∅		∅		
AMPS									
OUTLET CFM									

FAN NO.								
LOCATION								
AREA SERVED								
MANUFACTURER								
MODEL NO.								
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL
FAN CFM								
RPM								
HORSEPOWER								
VOLTS/PHASE	∅		∅		∅		∅	
AMPS								
OUTLET CFM								

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

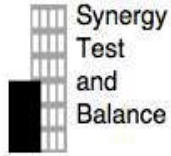


FLOW METER DATA

LOCATION	STATION DESIGNATION	SIZE	DESIGN GPM	ACTUAL GPM	NOTATION

SAMPLE

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



HEAT EXCHANGER DATA

UNIT NUMBER	
Location	
Service	
Manufacturer	
Model Number	
Serial Number	

UNIT NUMBER	
Location	
Service	
Manufacturer	
Model Number	
Serial Number	

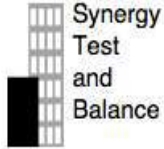
PRIMARY WATER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
Flow GPM		
MBH		
Control Setting		

PRIMARY WATER	Design	Actual
Entering Water Temp		
Leaving Water Temp		
Pressure Drop Ft.		
Flow GPM		
MBH		
Control Setting		

SECONDARY HOT WATER	
Entering Water Temp	
Leaving Water Temp	
Pressure Drop Ft.	
Flow GPM	
MBH	
Control Setting	

SECONDARY HOT WATER	
Entering Water Temp	
Leaving Water Temp	
Pressure Drop Ft.	
Flow GPM	
MBH	
Control Setting	

REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

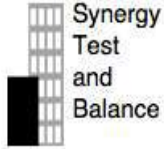


HEATING COIL DATA

System									
Location									
Service									
Manufacturer									
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	
CFM									
GPM									
Coil P.D., FT.									
E.W.T, °F									
L.W.T, °F									
E.A.T, DB °F									
L.A.T, DB °F									
Air MBH									
Water MBH									

System								
Location								
Service								
Manufacturer								
	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL	DESIGN	FINAL
CFM								
GPM								
Coil P.D., FT.								
E.W.T, °F								
L.W.T, °F								
E.A.T, DB °F								
L.A.T, DB °F								
Air MBH								
Water MBH								

REMARKS

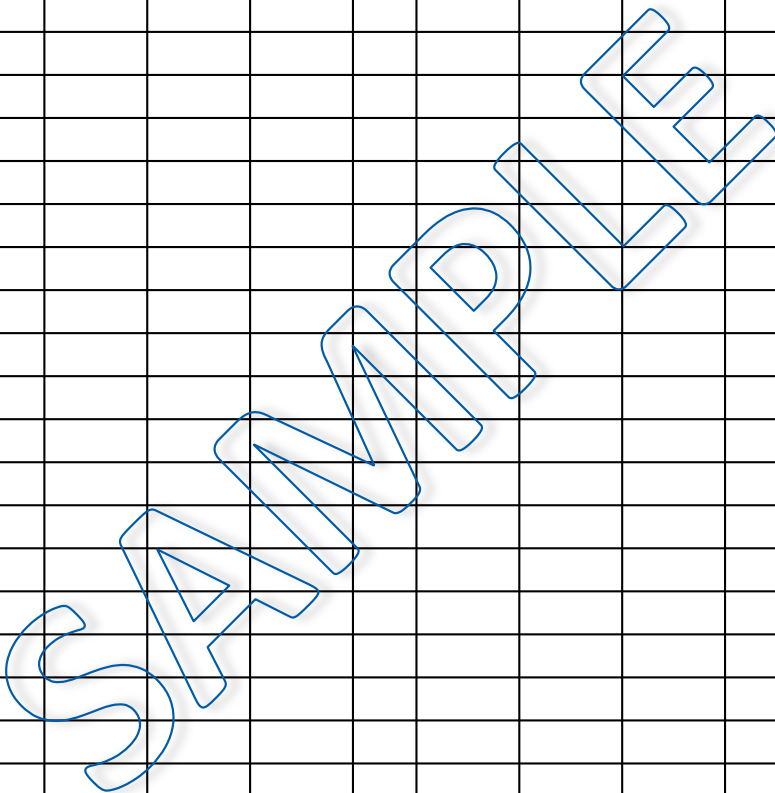


PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

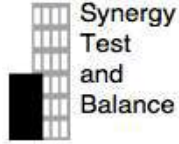


OUTLET TEST DATA

AREA SERVED	OUTLET NUMBER	ROOM NUMBER	OUTLET TYPE	OUTLET SIZE	A _k	DESIGN		TEST	FINAL		RMKS.
						FPM	CFM	CFM	FPM	CFM	



REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



PUMP DATA

PUMP NO.	
MANUFACTURER	
SIZE	
IMPELLER	
SERVICE	

PUMP NO.	
MANUFACTURER	
SIZE	
IMPELLER	
SERVICE	

TEST DATA	GPM	FT. HD.	BHP
DESIGN			
ACTUAL			
DISCHARGE			
SUCTION			
$\Delta P \times 2.307$			

TEST DATA	GPM	FT. HD.	BHP
DESIGN			
ACTUAL			
DISCHARGE			
SUCTION			
$\Delta P \times 2.307$			

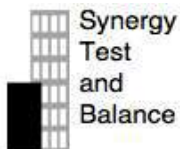
BLOCK OFF	
DISCHARGE	
SUCTION	
$\Delta P \times 2.307$	

BLOCK OFF	
DISCHARGE	
SUCTION	
$\Delta P \times 2.307$	

MOTOR MFG	
HORSEPOWER	
RPM	
VOLTS	
ACTUAL VOLTS	
AMPS	
ACTUAL AMPS	
OVERLOADS	VFD PROTECTED

MOTOR MFG	
HORSEPOWER	
RPM	
VOLTS	
ACTUAL VOLTS	
AMPS	
ACTUAL AMPS	
OVERLOADS	

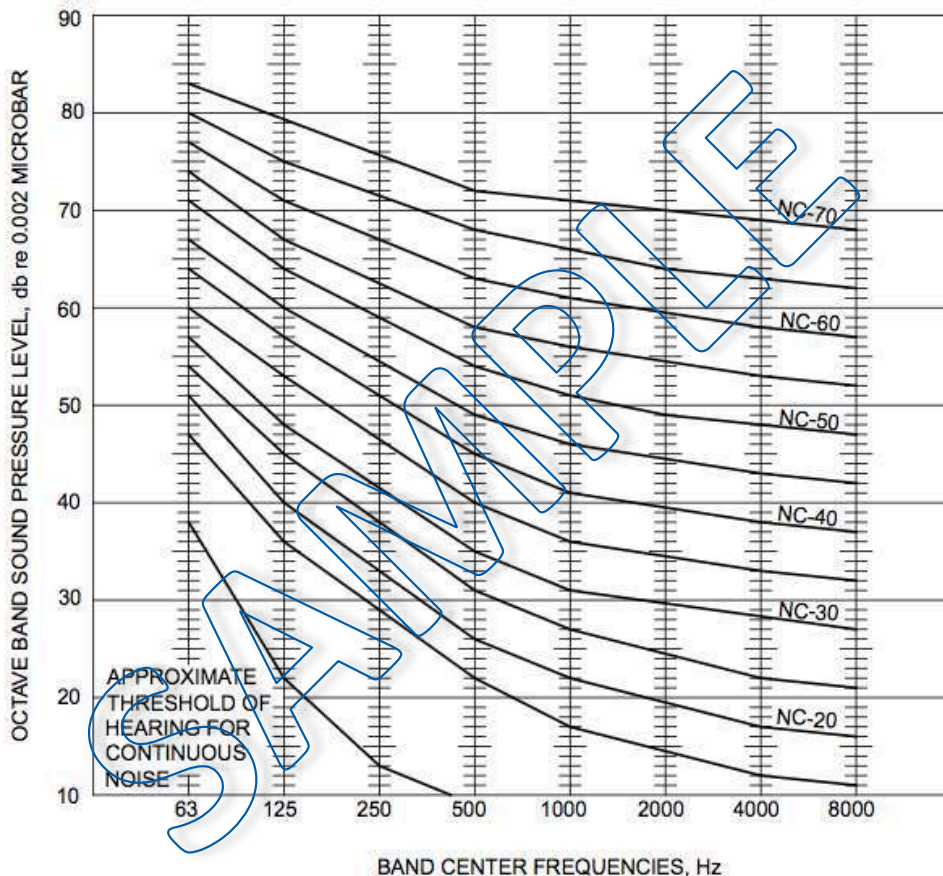
REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		

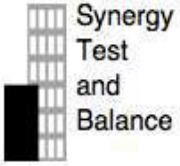


SOUND TEST DATA



LOCATION	OCTAVE BANDS - EQUIPMENT ON									
	ALL PASS	A	63	125	250	500	1000	2000	4000	8000
LOCATION	OCTAVE BANDS - EQUIPMENT OFF									
	ALL PASS	A	63	125	250	500	1000	2000	4000	8000

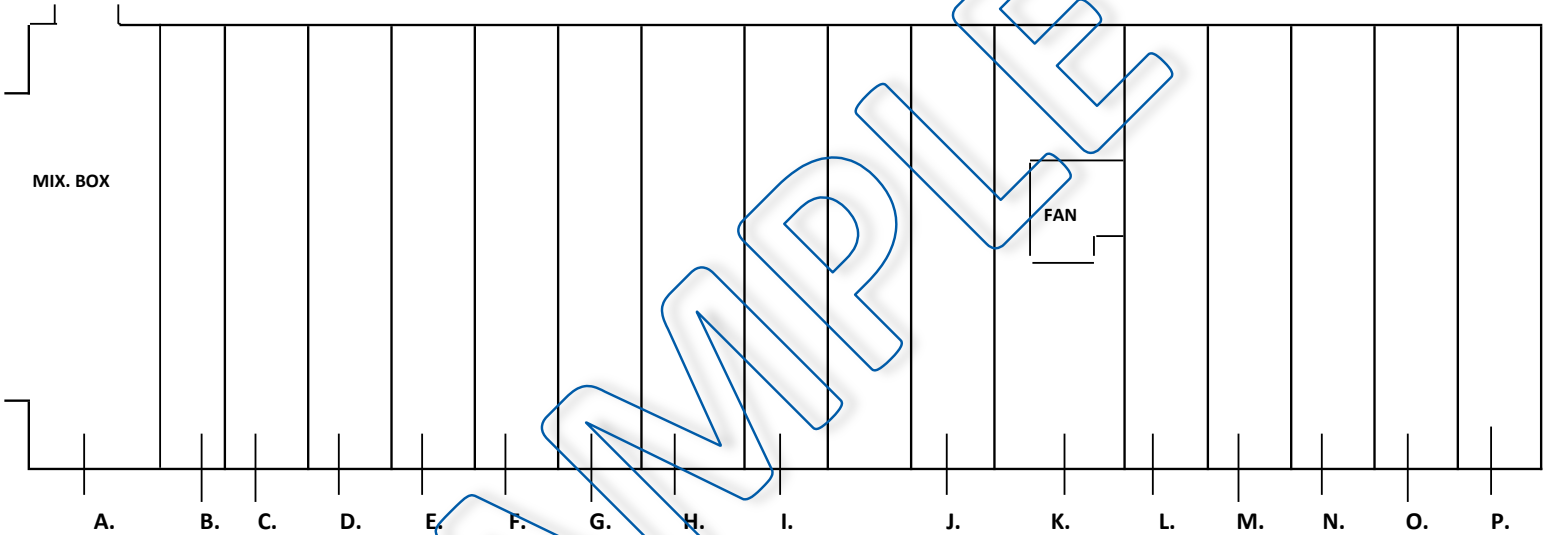
REMARKS



PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



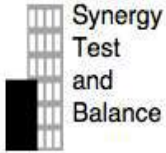
STATIC PRESSURE PROFILE DATA



INLET									
A	B	C	D	E	F	G	H	I	J

DISCHARGE					
K	L	M	N	O	P

REMARKS: _____

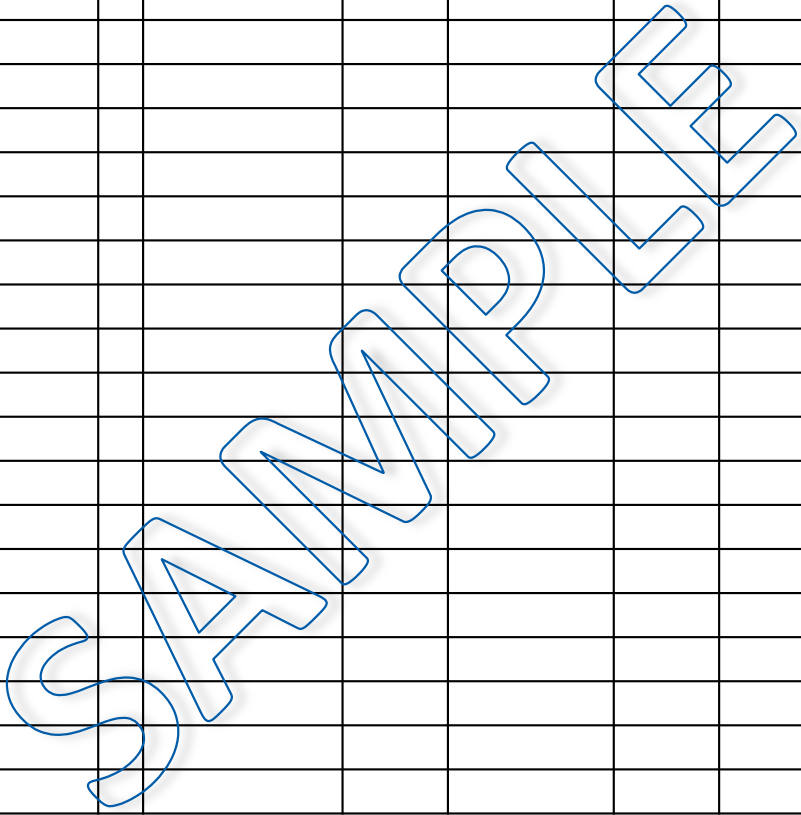


PROJECT #:	PAGE:	DATE:
PROJECT NAME:		
SYSTEM:		
LOCATION:		
TECHNICIAN:		



TERMINAL UNIT DATA

BOX #	LOCATION	T Y P E	BOX ADDRESS	INLET SIZE	CAL. FACTOR	DESIGN CFM		ACTUAL CFM	
						MIN	MAX	MIN	MAX



TYPE: 1-Constant, 2-Variable, 3-Fan Powered (Parallel), 4-Fan Powered (Series), 5-Dual Duct

REMARKS

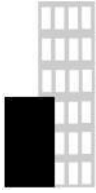


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Abbreviation and Acronyms

1. AHU Air Handling Unit
2. BD Belt Drive
3. BHP Brake Horsepower
4. CC Cooling Coil
5. CL Center Length
6. CB Circuit Breaker
7. CD Ceiling Diffuser
8. CW Chilled Water
9. DD Direct Drive
10. DTR Dual Temperature Coil
11. EAR Exhaust Air Register
12. ER Exhaust Register
13. EX Exhaust Fan
14. ERU Energy Recovery Unit
15. ESP External Static Pressure
16. FO Fully Open
17. FX Fixed
18. FH Fume Hood
19. FLA Full Load Amps
20. HC Heating Coil
21. HW Hot Water
22. INA Information Not Available
23. INACC Inaccessible
24. MAU Make-up Air Unit
25. MAX Maximum
26. MIN Minimum
27. MTR Motor
28. NA Not Applicable
29. ND No Design
30. NI Not Installed
31. NL Not Listed
32. NR Not Running
33. NS Not Specified
34. NW Not Wired
35. OD Outside Diameter
36. PD Pitch Diameter
37. RAG Return Air Grille
38. RHC Reheat Coil
39. RR Return Register
40. SF Supply Fan
41. SAG Supply Air Grille
42. SAR Supply Air Register
43. SF Safety Factor
44. SLOT Slot Diffuser



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Abbreviation and Acronyms

- 45. SR..... Supply Register
- 46. TP Thermally Protected
- 47. TSP..... Total Static Pressure
- 48. VFD Variable Frequency Drive