Joint Chapter Recertification Connecticut & SE New York / New England NEBB Chapters

- Quality HVAC Test/ Adjust/ Balance Presented by:
  - **John Mazza**, PE, CP President
  - Airpath Engineering, PC  johnmazza@airpath.us
  - **Jeffrey Sadoff**, CP, President
  - Thermal Thinkers, Inc.  jsadoff@thermalthinkers.com
RECOGNIZING QUALITY HVAC SYSTEMS TESTING, ADJUSTING, AND BALANCING

UNDERSTANDING THE BALANCING PROCESS & INTERPRETING THE CERTIFIED VENTILATION / BALANCE REPORT INFORMATION

For:  Engineers
      Architects
      Mechanical Contractors
The T-A-B report content


- SECTION 15990 (or 230593)
- HVAC T/A/B OF SYSTEMS
- PART 1 - GENERAL
- 1.01 DESCRIPTION OF WORK
- A. Section 15990, Basic HVAC Requirements, shall be referred to for general requirements. Section 15990 specifies requirements for the final adjusting and balancing of air and hydronic fluid distribution systems, including the equipment and devices associated with each system to produce the design objectives.
COMPETING CERTIFIED TAB AGENCIES

- **NATIONAL ENVIRONMENTAL BALANCING BUREAU**
  Procedural Standards for TAB Environmental Systems 7th Edition 2005

- **ASSOCIATED AIR BALANCE COUNCIL**
  AABC National Standards for Total System Balance 2002 Edition

- **TESTING, ADJUSTING, & BALANCING BUREAU**
  The TABB Procedural Guide Published 2003

- National Balance Council -

- **SMACNA** – Sheet Metal and Air-conditioning Contractors National Association for sheet metal duct

- **USGBC-LEED** - US Green Building Council Leadership in Energy Efficient Design for efficient design & construction

- Others
A memorandum of understanding was made in 2008 between the two organizations.

NEBB members are asked to serve on ASHRAE committee to help develop standards, guidelines, and certification programs.
TAB CERTIFIED PROCEDURAL STANDARDS

- NEBB
  7th Ed. 2005

- AABC
  2002 Ed.

- TABB
  2003 Ed.
QUALITY REPORTING REQUIREMENTS

TAB firm certification and Reporting Standards
ENGINEER’S ......Know what you are specifying!
 ......Understand your design!

CONTRACTOR’S ...Install all system components that insure a predicable final balance.
 ......Complete the system before requesting TAB (including control of systems).
Construction Specifications

- Must hire an independent certified TAB firm
- Requires a Qualified Professional (Supervisor)
- Often wants a Licensed Profession Engineer to stamp the report as accurate
- Often requires at least one certified balancing technician at the site who is performing the daily TAB activities.

Who or what is a certified technician?
LOOK FOR CERTIFIED TAB FIRM’S QUALIFICATIONS

CERTIFIED FIRM
SUPERVISOR or TAB CERTIFIED PROFESSIONAL’S STATUS CERTIFICATE

National Environmental Balancing Bureau

NEBB Certification

THIS IS TO CERTIFY THAT
John Mazza, P.E.
with Airpath in Hauppauge, NY
HAS MET ALL THE NEBB REQUIREMENTS FOR
NEBB CERTIFIED PROFESSIONAL STATUS IN
Air & Hydronic Environmental Systems

Exp. March 31, 2010
Airpath/NY
No. 2798

NEBB Cert. No.

FOR THE BOARD OF DIRECTORS:

President

President-Elect
ASK FOR CERTIFICATION OF ONSITE TAB TECHNICIAN

2 Years Balancing Experience

Pass written and practical tests

6 hr/ year training classes
NEW REPORTING REQUIREMENTS

REQUIRED: “SHALL”, “SHOULD”, AND “MAY” LANGUAGE

CONDUCTED TAB ACTIVITIES:

- **SHALL** BE WITH A CERTIFIED TAB FIRM

- **SHALL** INCLUDE AT LEAST ONE ONSITE CERTIFIED TAB TECHNICIAN

- **SHALL** BE REVIEWED BY A CERTIFIED TAB PROFESSIONAL OR CERTIFIED TAB SUPERVISOR

- **SHOULD** BE EXECUTED WITH CALIBRATED INSTRUMENTATION, EVIDENCED BY A VERIFIABLE CALIBRATION REPORT

- **MAY** ADHERE TO A “QUALITY ASSURANCE PROGRAM”
CERTIFIED REPORTS SHALL HAVE THE FOLLOWING INFORMATION IN COMMON:

- Report title page, including project name, date of report, project address, owner/owner’s rep./contractor’s name, and name and address of the TAB firm.
- Firm’s certification information, certification seal & number, supervisors name and signature.
- Table of Contents Page.
- Summary page and remaining TAB issues.
- Completed report forms.
- Instrument calibration page.
- Abbreviation page.
- Associated marked up HVAC schematic or drawing.
REPORTS

☐ LOOK FOR A VALID CERTIFICATION STAMP ON THE FINAL REPORT
## CALIBRATION REPORT

**Require Proof of Instrumentation Calibration**

**NIST Standard Within Past 12 Months**

### Instrument Calibration List Report

<table>
<thead>
<tr>
<th>Instrument / Serial Number</th>
<th>Application</th>
<th>Dates of Use: thru</th>
<th>Calibration Date</th>
<th>Expiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monarch Nova Strobe / 2190717</td>
<td>Strobe Tachometer</td>
<td>9/24/09 to 9/24/10</td>
<td></td>
<td></td>
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<tr>
<td>Monarch Palm Strobe / 8260139</td>
<td>Strobe Tachometer</td>
<td>3/1/09 to 3/1/10</td>
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<tr>
<td>Monarch Nova Strobe / 2119331</td>
<td>Strobe Tachometer</td>
<td>3/1/09 to 3/1/10</td>
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<tr>
<td>Leic DCPST</td>
<td>Volt / Ammeter</td>
<td>2/28/09 to 2/28/10</td>
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<tr>
<td>Omega HHM1 / 010000072</td>
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<td>3/12/09 to 3/12/10</td>
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<td>Digital Power Analyzer</td>
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<td>Shortridge CFM 860 / M94209</td>
<td>Micromanometer</td>
<td>1/19/08 to 1/19/09</td>
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<td>Micromanometer</td>
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<tr>
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<td>0-300 PSIG X 0-1350 WC</td>
<td>2/13/07 to 2/13/08</td>
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<td></td>
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<tr>
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<td></td>
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<tr>
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<tr>
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<td></td>
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<td>Differential Water Pressure</td>
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<tr>
<td>DSP-3 Digital Water Manometer / 300-1134</td>
<td>Differential Water Pressure</td>
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<tr>
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<td>Ultrasonic Flow Meter</td>
<td>3/4/08 to 3/4/09</td>
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<td></td>
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<td>Ultrasonic Flow Meter</td>
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<tr>
<td>DWYER Manometer 400-2 / 68-6 (I-8)</td>
<td>2&quot; Inclined Air Velocity Meter</td>
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<td>calibration not required</td>
<td></td>
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<tr>
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<td>2&quot; Inclined Air Velocity Meter</td>
<td>NOT USED</td>
<td>calibration not required</td>
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</tr>
</tbody>
</table>

**Tab Supervisor:** John Mazzu, PE

**Reg. No:** 2798

**Date of Completed Report:**

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**Airpath**

**Instruments Calibration List Report**

**10/27 2009**

**Project:**

**Address:**

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**National Environmental Balancing Bureau**

**Report Not Valid Unless It Bears The NEBB Seal**

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**Page 1**
ARE ENGINEERS RESPONSIBLE FOR TAB WHICH IS NOT TRULY CERTIFIED?

Know your own mechanical specification

- **Does the specification require** Certified (AABC, TABB, NEBB) HVAC Testing, Adjusting, & Balancing?
  - Is the owner owed a certified TAB report, or just one that has been submitted by the mechanical contractor?

- Does the report review qualify the report as meeting the minimum reporting requirements?

- Has the specification been updated to present times, or does it still reference the last century?

- Does the engineer know how to address balancing issues, which prevent the system/s from meeting the design intent?
ARE ENGINEERS RESPONSIBLE FOR TAB WHICH IS NOT TRULY CERTIFIED?

CAN THE ENGINEER BE “ON THE HOOK” FOR ACCEPTING UNQUALIFIED BALANCING?

Only the owner can answer this question.
HOW DO THE DESIGN PROFESSIONALS AVOID THE PITFALLS OF A QUESTIONAL REPORT?

START WITH A QUALIFIED (CERTIFIED) FIRM.

FINISH WITH THE TEAM.

BUT IF THE REPORT IS NOT PERFECT, THE TAB INDUSTRY HAS A SAFETY NET FOR THE OWNER, ENGINEER CONTRACTOR, AND BALANCER
QUALITY ASSURANCE

Every customer of a TAB Certified (AABC, TABB, NEBB) Contractor shall be entitled to expect:

- (1) that testing, adjusting and balancing work by the contractor and its TAB Professionals will meet the written standards;

- (2) that testing, adjusting and balancing reports provided to the customer will have been prepared by a certified Technician, and reviewed by a Certified Supervisor or Professional; and

- (3) that the report(s) will include measurements taken accurately with the date and mode of operation of the systems.
Latest equipment and system reporting
THE PROCEDURAL STANDARD

Describes the specific procedure for specific system types.

- Air systems
- Water systems
Water equipment includes:

- Pumps
- Chillers
- Hot water boilers
- Cooling towers
- Fan coil units
- AHU heating & cooling coils
- Control Valves & Balancing Valves
- Other
Air system types found in most buildings include:

- Constant air volume
- Variable air volume
- Multizone – constant volume
- Chilled Beam Induction
Air equipment found may include

- Rooftop exhaust fans
- Rooftop package air conditioners
- Indoor Air Handling Units
- Indoor fans
- VAV and CAV air terminal boxes
- Supply, return, exhaust air devices
Equipment Submittals

The equipment submittal is the base point for the accurate reporting of all installed equipment.

The submittal also provides the balancer data that may aid in identifying underlying issues with the system performance prior to balancing.
Exhaust Fan submittal:

- **Make**
- **Type**
- **Equipment TAG or Number**
- **Design CFM**
- **Design SP**
- **Fan speed**
- **Brake Horse Power (BHP)**

**Performance Curve**

**Dimensions (inches):**

<table>
<thead>
<tr>
<th>A</th>
<th>3-1/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>32-7/8</td>
</tr>
<tr>
<td>C</td>
<td>26-7/8</td>
</tr>
<tr>
<td>G</td>
<td>2</td>
</tr>
<tr>
<td>T Sq.</td>
<td>24</td>
</tr>
</tbody>
</table>

**Roof Open Sq:** 19-1/2

**Unit Wt:** 149 lbs

---

**Performance Table:**

<table>
<thead>
<tr>
<th>Package</th>
<th>Flow (CFM)</th>
<th>Fan RPM</th>
<th>Bhp (HP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>150CFM</td>
<td>1268</td>
<td>.437</td>
</tr>
</tbody>
</table>

**Sound Data 8 Octave Bands dB**:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>LWA (dBA)</th>
<th>Sones</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>78</td>
<td>80</td>
<td>70</td>
<td>64</td>
<td>64</td>
<td>54</td>
<td>59</td>
<td>75</td>
<td>63</td>
</tr>
</tbody>
</table>

**Accessories:**

- PRE-WIRED DISCONNECT BOX: NEMA 1 3PH
- 480V 15 MTR DPR 480V
- ROOF CURB: GRC 22-13 SH IN/OUT:
- EXT BAGE-22 ALUM 12" ALUMINUM BIRDSCREEN
- STAINLESS HARDWARE
- LOCKING HASP
- BELT TENSIONER (ALTO)
# PRE-BALANCING REPORT

- Write in all known data from contract drawings and equipment submittals.

- Submitted to engineer prior to TAB site activities.

---

<table>
<thead>
<tr>
<th>UNIT DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Make / Model No.</strong></td>
</tr>
<tr>
<td><strong>Supply Fan Type / Size</strong></td>
</tr>
<tr>
<td><strong>Serial No.</strong></td>
</tr>
<tr>
<td><strong>Arr. / Class</strong></td>
</tr>
<tr>
<td><strong>Draw / Blow Thru</strong></td>
</tr>
<tr>
<td><strong>Make Shave</strong></td>
</tr>
<tr>
<td><strong>Fan Shave Dia / Bore</strong></td>
</tr>
<tr>
<td><strong>No. of Belts / Make / Size</strong></td>
</tr>
<tr>
<td><strong>No. of Filters / Make / Size</strong></td>
</tr>
</tbody>
</table>

| Type of System | **Constant Volume** |

---
Fan submittal info:

- **Make**
- **Model**
- **Equipment TAG or Number**
- **Design CFM**
- **Design TSP**
- **Fan speed**
Exhaust Fan Capacity Performance Curve

Fan Static Press

Design cfm flow
TAB Responsibilities and Building System Commissioning

Must follow Cx Commission Plan as described in the written plan and specification:

The TAB firm may be required to inspect ductwork, damper positions, air devices, etc.

Involvement in Functional Testing, Performance Testing, Warranties
TAB firms may be required to perform these tests.

SMACNA Air Leakage Testing of Ductwork
Example of a balancing procedure for a supply or exhaust air system

- Illustrate report preparation
- On site execution
- Final report
Mark-up Flow Scheme or HVAC Layout

- Assign a unique air device number or letter to each grill.

- Identify a duct traverse location to measure total CFM air flow.
Marked – up drawing example
Preparation of a Pre-balance report form

<table>
<thead>
<tr>
<th>AREA SERVED</th>
<th>NO.</th>
<th>TYPE</th>
<th>SIZE</th>
<th>AIRFLOW</th>
<th>VELOCITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36</td>
<td>1 TG</td>
<td>34x24</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 TG</td>
<td>34x24</td>
<td>1500</td>
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</tr>
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<td></td>
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<td>3 TG</td>
<td>30x24</td>
<td>1500</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>4 TG</td>
<td>30x24</td>
<td>1500</td>
<td></td>
</tr>
</tbody>
</table>

Total AIRFLOW: 6000
Preliminary TAB Activities

- Coordinate with other trades: electrical, sheet metal, controls, project manager

- Receive a written confirmation from the commissioning agent that the system has been installed, is functional, and is controllable...ready for testing.
Basic Balance Procedures

- **Walk through the system and check the:**
  - Fan
  - Ductwork for completeness
  - Dampers – make sure each is wide open
  - Air devices
  - Open access doors
Reporting System Deficiencies (Issues)

- Inoperative fire smoke dampers
- No power to fan or controls
- Air leakage such as incomplete ducting or raw openings
- Air devices may be missing.

(This information is generally reported to the contractor and the engineer is usually omitted from this information loop.)
Executing the air balance

- **Energize the fan**
  - Motor current is first measured to insure the running amps are less than the full load amps.
  - Fan inlet (suction) and discharge duct pressures are measured.
  - Rotation speed is measured.

FAN INLET (SUCTION) PRESSURE MEASUREMENT
Executing the air balance

- **Fan air capacity adjustments**
  - Adjust the fan pulley to increase or decrease air flow to the design rate
  - Adjustable sheaves vary flow 20% from minimum to maximum pitch.

ADJUSTABLE PITCH MOTOR PULLEY
Executing the air balance

- **Duct traverse**
  - Prepare the main air duct to measure the actual fan air flow

Four holes or more are drilled into the air duct for a 16 point traverse - flow is measured with a Pitot tube
Executing the air balance

- **Duct Traverse**
  - Enter velocity values on duct traverse form

Width = 22in. Height = 15in. Insulation = 1in
20 * 13 / 144 = 1.8 Sqft. 1.8 * ava. vel = cfm
# Traverse Report

The highlighted portion **shall** always be completed.

The highlighted portion **should** be completed.
### Executing the Air Balance

- **Duct traverse fan**
- **Calculate the actual air flow**

The highlighted portion **SHALL** always be completed.

The highlighted portion **MAY** be completed.

#### Duct Traverse Fan

<table>
<thead>
<tr>
<th>Distance from Bottom</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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</tr>
<tr>
<td>6</td>
<td>1732</td>
<td>1906</td>
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<td>1662</td>
<td>1624</td>
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</tr>
</tbody>
</table>

#### Velocity

- Sub-Totals (FPM): 6660 7098 7025 7164 6948 6960 6968 6744 0 0 0 0

#### Average Velocity

- 1736 FPM

**Remarks:**

- Test Date: 14-May-09
- Readings by: MP

---

**Certified Firm**
40-8 Osar Avenue, Hauppauge, NY 11788

**Project:** 13th Floor Traverse
**Address:** 2 Rector Street
**Service:** 13th Floor
**Altitude:** 100
**Density:** 0.074
**Traverse Location:** Women's Bathroom
**Correlation Factor:** 0.996

**Duct:** Supply Main

<table>
<thead>
<tr>
<th>Size (In.)</th>
<th>Height</th>
<th>Width</th>
<th>Supply</th>
<th>Required</th>
<th>Actual</th>
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<td>40</td>
<td>13</td>
<td>12000</td>
<td>1736</td>
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<td>4</td>
<td>8</td>
<td></td>
<td>5.56</td>
<td>9647</td>
</tr>
</tbody>
</table>

---

**Table for Distances (Inches):**

<table>
<thead>
<tr>
<th>Distance from Edge</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>8</td>
<td>13</td>
<td>18</td>
<td>23</td>
<td>28</td>
<td>33</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

- Test Date: 14-May-09
- Readings by: MP

---

**National Environmental Balancing Bureau**
Report not valid unless it bears the NEBB seal.
The air device (outlet) flow balancing is similar for both the supply, return, and exhaust ducted systems.
Executing the air balance

- Measure air flow at each air device and record the results on the Air Outlet form
- **Enter preliminary flow cfm rates**
Executing the air balance

- Final balance air flow at each air device and record the results on the Air Outlet form
- Enter final flow cfm rates

<table>
<thead>
<tr>
<th>NO.</th>
<th>TYPE</th>
<th>COLLAR SIZE (IN.)</th>
<th>DESIGN CFM</th>
<th>PRELIM CFM</th>
<th>FINAL CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CR</td>
<td>6X6</td>
<td>75</td>
<td>79</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>CR</td>
<td>6X6</td>
<td>75</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>CR</td>
<td>6X6</td>
<td>75</td>
<td>99</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>CR</td>
<td>6X6</td>
<td>75</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>CR</td>
<td>6X6</td>
<td>75</td>
<td>87</td>
<td>80</td>
</tr>
</tbody>
</table>
Air Handler Reporting
Air Handler Submittal

- Write in all know data from contract drawings and equipment submittals
- Approved Submittal
**Air Handler Submittal**

**AIR HANDLING UNIT TECHNICAL DATA**

<table>
<thead>
<tr>
<th>JOB NAME</th>
<th>HM5002/XX,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOB DESCRIPTION</td>
<td>IS 15B</td>
</tr>
<tr>
<td>MODEL NUMBER</td>
<td>C9503SHAC</td>
</tr>
<tr>
<td>UNIT TAGGING</td>
<td>HIV-1</td>
</tr>
<tr>
<td>VERSION</td>
<td>8.00</td>
</tr>
</tbody>
</table>

**Unit configuration**
- Drive (handling) location: Right
- Supply configuration: Inline horizontal

<table>
<thead>
<tr>
<th>SUPPLY</th>
<th>RETURN / EXHAUST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air volume</td>
<td>1000 cfm</td>
</tr>
<tr>
<td>Altitude</td>
<td>s</td>
</tr>
<tr>
<td>Turning loss</td>
<td>0.00</td>
</tr>
<tr>
<td>External static</td>
<td>1.64</td>
</tr>
<tr>
<td>Total static</td>
<td>1.84</td>
</tr>
<tr>
<td>External H x W</td>
<td>29 x 36</td>
</tr>
</tbody>
</table>

**CASING DETAILS**
- Frame: 2 ins
- Base: 4" formed galv channels
- Sound baffles: None (unless noted per section)
- Tread Plate floor liner: None (unless noted per section)

**1 COMBINATION FILTER (14 ins)**

<table>
<thead>
<tr>
<th>FILTER</th>
<th>PRE-FILTER</th>
<th>FACE VELOCITY</th>
<th>FACE AREA</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Throwaway (Stratadensity)</td>
<td>70 %</td>
<td>95 %</td>
<td>318</td>
</tr>
<tr>
<td>Efficiency</td>
<td>0.19</td>
<td>0.41</td>
<td>0.95</td>
<td>1.50</td>
</tr>
<tr>
<td>Clean air press. drop</td>
<td>0.00</td>
<td>1.00</td>
<td>2.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Mean air press. drop</td>
<td>0.00</td>
<td>1.50</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>Dirty air press. drop</td>
<td>0.00</td>
<td>1.50</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>2.00</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BANK ARRANGEMENT**
- No. of Filters: 1
- Size H x W: 24.00 x 2.00 x 2.00

**DOOR DATA**
- Door location: Drive side
- Door width: 10 ins
- Door opening: Outward

**SPECIAL**
- Extra filters 2 set(s): None

**2 INTERNAL FACE AND BYPASS (12 ins)**
- Dampers: Opposed blade - low leak
- Air pressure drop (face): 0.03
- Air pressure drop (bypass): 0.13

Note: Cabinet height for bypass extended 0.00_inches above 'External cabinet height' referenced above.
All the **performance** and **capacity** features of the approved air handler are indicated on this form. Transfer pertinent information from the submittal to the AHU report form.
AHU Unit Data

- Unit data comes from several places
  - AHU name plate
  - Submittals
  - Pulley & fan belt info
  - Equipment schedule
  - Fan motor nameplate
AIR HANDLER SYSTEM TESTING

Single Duct System AHU
AHU enter all final test data on form

- Test data comes from several places
  - Fan static pressure
  - Fan & motor speed
  - Electrical measurements
  - Static pressure losses
  - Duct traverses
  - Air outlet measured flow
AHU supply fan curve

**Have pre-knowledge** of the fan curve performance data and the operating point on the curve.
Understanding Variable Air Volume System Reporting

- Illustrate report preparation
- On site execution
- Final report
Variable Air Volume AIR SYSTEM

REPORT

FIGURE 3-16 Variable Air Volume (VAV) System
VAV air handling system reporting differ from constant flow system reporting
VAV Systems

VAV air handling systems usually have the following features:

- VAV terminal boxes
- Discharge air duct static pressure control
- Fan motor speed control (VFD) or
- Fan inlet guide vanes
- Integrated DDC control over equipment
VAV System Features

- VAV terminal boxes
- VAV computer DDC controller
VFD Controls

- Fan motor speed controller aka VFD Variable Frequency Drive
- Supply duct static pressure sensor
VAV air duct distribution

- Supply duct static pressure sensor
The recent NEBB standard calls for an updated VAV report. This new report is not only a required but informative offering data that was absent from prior reporting methods. Make sure this form is present in reports under review.
New VAV Supply
Air Outlet form

Vital VAV Terminal and Controller Data

Onsite Test Reporting:
1. Area Served
2. Outlet Data
3. Min – Max Flow

Final Summary Flow Report for Terminal
Engineers must understand VAV Box Calibration Curve

- Why should engineers follow this Calibration Curve and how should they interpret it correctly?

- Air flow is calibrated and regulated by the dp velocity sensor at the box inlet.

- Flow is related to sensor velocity pressure.
The Final TAB Report should include:

- Cover page
- Contents page
- Summary page
- Evidence of Certification & Signature
- Calibrated instrument list
- Equipment report forms
- Air device report forms
- Optional traverse form
- Marked up drawings
The Final TAB Report should include:

The marked up TAB contract drawing
Reported System Deficiencies
AIR FLOW BALANCING PROBLEMS

PROBABLE CAUSES:

- **AIR DUCT LEAKAGE** – Up to 25% loss can actually be designed into the job without the engineer aware of the consequences of the design.

- POOR DUCT CONFIGURATIONS AT THE FAN INLET OR OUTLET
AIR FLOW BALANCING PROBLEMS

PROBABLE CAUSES:

FAN SYSTEM EFFECT:

POOR DUCT CONFIGURATIONS AT THE FAN INLET OR OUTLET WILL RESULT IN LOW FAN PERFORMANCE WHICH DIFFERS FROM THE FAN CURVE. LOSS OF FAN CAPACITY CAN EXCEED 20% FROM THE PUBLISHED FAN RATING.
FAN SYSTEM EFFECT

- MANY POOR EXAMPLES OBSERVED IN THE FIELD
- ENGINEERS OFTEN INSIST THEIR DESIGN IS OK
Questions