

## **PART 1 - GENERAL**

These standards and procedures apply to the testing adjusting and balancing of all equipment and components to assure the optimum performance of mechanical systems.

### **1.01 REFERENCES**

- Associated Air Balancing Council (AABC).
- Air Movement and Control Association (AMCA).
- American Society of Heating and Air-Conditioning Engineers, Inc (ASHRAE).
- National Environmental Balancing Bureau (NEBB).
- Industrial Ventilation, American Conference of Governmental Industrial Hygienists (ACGIH).

### **1.02 DESIGN CRITERIA**

#### **A. Drawings, Specifications and Report:**

1. Entire Project HVAC systems will be balanced. Balance work to be completed after final completion of all mechanical work including all Siemens DDC connections and programming. Balancing effort shall be in accordance with industry standards.
2. Indicate design minimum and maximum (cfm, gpm, etc.) parameters on drawings. Drawings should reflect as built conditions and copies of drawings indicating testing locations must be included in final report.
3. A copy of all balance reports must be submitted to AV F&I in PDF format.
4. Air and water flow rates shall be measured and adjusted to deliver final flow rate within 10% of the design parameters.
5. Show a unique (POS) number for each piece of equipment or terminal.
6. Air quantities and temperatures in air handling/energy transfer equipment schedules.
7. Water quantities and temperatures in thermal energy transfer shall be indicated in equipment schedules.
8. Water quantities and heads shall be indicated in pump schedules.

B. All work shall proceed under the general direction of these standards.

C. For projects with Commissioning requirements, Coordinate with Division 1.

D. Existing Projects:

1. Each project shall have a budget line item to pay for the services of a testing and balancing agency to determine and report existing conditions.
2. In the event the project intends to change existing systems, those systems shall be measured by the testing agency at the 30 percent design stage so that existing system (worst case) capacity may be determined. Report to be included at the 30 percent submittal.

**PART 2 – QUALITY ASSURANCE**

A. Testing and Balancing Agencies:

The following Testing and Balancing agencies have been previously qualified:

1. Neudorfer Inc. (Seattle) (206) 621-1810.
2. Coffman Engineers, (Seattle) (206) 623-0717.

B. Qualification Requirements for Agencies:

1. Contractor shall submit references demonstrating a record of balance work on air systems of 100,000 cfm or greater and with 100 or more zones, and on hydronic systems of 4,500 gpm or greater with primary-secondary-tertiary variable flow pumping systems.
2. Contractor shall submit certification that employees engaged in SeaTac work shall have successfully completed the Siemens 4-day training course in Field Level Network Device Operations.
3. Contractor shall attend a 1/2-day plant wide tour, a review of all mechanical drawings and recent balance documents to gain an understanding of the SeaTac mechanical systems prior to bidding.
4. Contractor shall agree to submit a current NEBB Conformance Certificate covering the balancing work for each project.
5. Contractor shall perform a quality check witnessed and approved by the Resident Engineer on at least 10% of all readings.
6. Failure of 25% of quality check readings shall initiate a formal complaint (resolution) to the NEBB firm.

**C. Pre-Design Balance Procedure**

1. Engineer shall cause a predesign balance procedure as defined below, to be performed before existing system is changed or demolished in part or in whole.

<b>PRE DESIGN AIR BALANCE REPORT:</b>			
<b>CFM, SP, HP, VFD%</b>			
<b>AHU</b>			
	<b>TRAVERSE</b>		
<b>TRAVERSE</b>	<b>UPSTREAM MAIN</b>	<b>TRAVERSE</b>	<b>DOWNSTREAM MAIN</b>
	<b>CFM, SP</b>		<b>CFM, SP</b>
	<b>"MAIN DUCT"</b>	<b>"MAIN DUCT"</b>	
	<b>"TARGET SPACE"</b>		
	<b>CFM (TOTAL)</b>		
<b>SUMMARY:</b>			
AHU CFM XXX, SP XX, HP XX, RPM XX, VFD XX%			
"TARGET SPACE" CFM,			
UPSTREAM MAIN CFM, SP			
DOWNSTREAM MAIN CFM, SP			
<b>INCLUDE ABOVE SUMMARY OF THE THREE TRAVERSES AT 70% and 100% AS FOLLOWS:</b>			
1. AHU FAN CURVE - DESIGN CFM & SP, HP, V, PH & 70% and 100% READINGS OF CFM & SP.			
2. "EXISTING" DUCT MAIN(S) DRAWING SHOWING UPSTREAM & DOWNSTREAM TRAVERSE LOCATIONS			
3. EXISTING "UPSTREAM" & "DOWNSTREAM" CFM & SP AT 70% and 100% WIDE OPEN			
4. "TARGET SPACE" TOTAL CFM			
5. DDC GRAPHIC SCREEN SHOTS (8-1/2" X 11") AT ABOVE READINGS			

END OF SECTION