

# 23 05 93 – Testing, Adjusting, and Balancing for HVAC

## DIVISION 23 – HVAC



- Revision history of section:
  - 01/14/21

### OUTLINE SPECIFICATION

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. General Requirements:

1. Saint Paul Public Schools (SPPS) implements a digital platform for reporting of Testing, Adjusting, and Balancing (TAB) readings. This applies to all new and existing HVAC equipment within SPPS buildings. The TAB Contractor shall enter TAB data into the SPPS database which is running on the Building Start platform. Costs for this platform are borne by SPPS. The TAB Contractor shall provide their own field device which may include Android devices (tablet/phone), iOS devices (iPad, iPhone), or Windows PC devices (laptop/Surface Pro/netbook). All HVAC equipment tested shall be recorded on the device/platform. The TAB contractor is required to “sync” their device daily to the SPPS Building Start database.
  - a. SPPS uses the Building Start digital platform. Training will be provided to the TAB contractor personnel at no additional cost to the TAB contractor, either via online web training and/or in person. SPPS will set up the project on the Building Start platform and the TAB Contractor will record all testing performed on the Building Start platform.
  - b. TAB Contractor will be required to communicate a written, electronic Issues Log to be shared with the all of the following: Architect, Engineer, Commissioning Firm, Owner, and General Contractor. It is the TAB Contractor’s responsibility to communicate an Issues Log to the Architect, Engineer, Commissioning Firm, Owner, and General Contractor at a minimum of once a week.
2. TAB Contractor shall schedule balancing dates with Engineer, SPPS, and the Commissioning Agent to coordinate their participation. TAB kick-off meeting shall be at the same time as the Commissioning kick-off meeting. TAB contractor shall bring a TAB plan to this meeting for approval. Confirmation of balancing by the commissioning team will occur.

###### B. Section Includes:

1. Testing, adjustment, and balancing of air systems.
2. Testing, adjustment, and balancing of hydronic systems.
3. Measurement of final operating condition of HVAC systems.

##### 1.02 SUBMITTALS

- A. **General:** Provide submittals in accordance with Section 01 33 00. The Owner will select the

TAB contractor and will notify the Commissioning Agent of the selection as soon as practical after the selection is made.

- B. **Test Reports:** TAB reports shall include data from Building Start, company info, issues log items, instrument calibration, and executive type summary to include notes on all items which are not within design tolerance. Provide SPPS reports in Building Start format or PDF format, complete with index page and with cover identification to Architect/Engineer.

### 1.03 QUALITY ASSURANCE

- A. **General:** Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance; NEBB Procedural Standards for Testing, Balancing, and Adjusting of Environmental Systems; or TABB Testing Adjusting Balancing Bureau Standards.

### 1.04 QUALIFICATIONS

- A. **Agency Qualifications:** Company specializing in the testing, adjusting, and balancing of systems specified in this Section with technicians having a minimum of (3) year's documented experience certified by AABC, NEBB, or TABB. Perform work under supervision of AABC Certified Test and Balance Engineer; NEBB Certified Testing, Balancing, and Adjusting Supervisor; or TABB Certified Testing, Balancing, and Adjusting Supervisor.

### 1.05 SCHEDULING

- A. **Commencement:** Schedule work to commence after HVAC and associated controls are installed and operational. Schedule completion of TAB work 30 days after Substantial Completion of Project. If scheduling requires the Contractor to work in building after or before regularly scheduled school hours, the Contractor shall make arrangements with the School. If overtime is required, it will be provided at no additional cost to the Owner.

## PART 2 - NOT USED

## PART 3 - EXECUTION

### 3.01 INSTALLATION TOLERANCES

- A. **Air Handling Systems:** Adjust to within plus or minus 10 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. **Air Outlets and Inlets:** Adjust total to within plus 10 percent and minus 10 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. **Hydronic Systems:** Adjust to within plus or minus 10 percent of design.

### 3.02 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. **General:** Perform testing and balancing procedures on each system in accordance with the procedures contained in the AABC, "National Standards for Testing and Balancing of Heating, Ventilating, and Air Conditioning Systems"; SMACNA, "HVAC Systems Testing, Adjusting & Balancing"; or NEBB "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", and this Section.

1. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish in accordance with Insulation Specifications for this Project.
2. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper control positions, valve position indicators, fan-speed-control levers, and similar controls and devices to show final settings.
3. Take and report testing and balancing measurements in inch-pound (IP) units.

### **3.03 GENERAL PROCEDURES FOR MULTIPLE FAN AIR SYSTEMS**

#### **A. General:**

1. In systems where fans are acting in series (supply and direct ducted return fans) check air flows in each mode of operation (full return, full economizer, and minimum air flow) to determine fan tracking for each mode of operation listed of each fan. Adjust fan tracking to maintain mixing box pressure between the supply and return fans.
2. Where supply fans and relief fans are in series, measure and adjust fan flows and pressure to provide the same negative static pressure by each fan.
3. Where balance dampers are not present, assist the Controls Contractor in positioning the control dampers to provide correct air flow in each mode.
4. Where supply fans (direct drive type) are in parallel (fan wall configuration), measure and adjust fan speed to meet required air flow at each fan.

### **3.04 GENERAL PROCEDURES FOR POOL SPACES**

- #### **A. General:**
- Pool spaces shall be balanced to be negative compared to adjacent spaces. Compensate air flows to adjust for seasonal volumetric changes in outdoor airflows to avoid positive pressures in pool space.

### **3.05 PROCEDURES FOR COMMERCIAL KITCHEN HOODS**

#### **A. General:**

1. Coordinate hood balancing with kitchen hood supplier.
2. Measure, adjust, and record the airflow of each kitchen hood. For kitchen hoods designed with integral make-up air, measure and adjust the exhaust and make-up airflow. Measure airflow by duct Pitot-tube traverse. If a duct Pitot-tube traverse is not possible, provide an explanation in the report of the reason(s) why and also the reason why the method used was chosen.
  - a. Install welded test ports in the sides of the exhaust duct for the duct Pitot-tube traverse. Install each test port with a threaded cap that is liquid tight.
  - b. Air balance for kitchen spaces shall be adjusted to provide a slight negative compared to adjacent spaces.

**END OF SECTION**