

## **1 General**

### **1.1 RELATED SECTIONS**

- .1 Section 21 05 01 – Common Work Results - Mechanical.

### **1.2 QUALIFICATIONS OF TAB PERSONNEL**

- .1 Submit names of TAB Sub-Contractor to the Departmental Representative within thirty (30) days of award of contract.
- .2 Provide documentation confirming qualifications.
- .3 TAB Contractor shall submit list of projects completed within the last five (5) years.
- .4 TAB: performed in accordance with the requirements of industry standards, such as:
  - .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-2002.
  - .2 National Environmental Balancing Bureau (NEBB), TABB Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.
  - .3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing.
  - .4 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) – HVAC Applications: Testing, Adjusting and Balancing.
- .5 Recommendations and suggested practices contained in the TAB Standard: mandatory.
- .6 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.
- .7 Acceptable Contractors: Scotia Air Balance 1996 Ltd., Griffin Air Balance Ltd., Systems Balance (2006) Limited, Barrington Air Balance Services, Source Management Ltd., Scan Air Balance 1998 Ltd.

### **1.3 PURPOSE OF TAB**

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads
- .2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

#### **1.4 EXCEPTIONS**

- .1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction.

#### **1.5 CO-ORDINATION**

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.
- .2 Do TAB of each system independently, where interlocked with other systems, in unison with those systems.

#### **1.6 PRE-TAB REVIEW**

- .1 Review contract documents before project construction is started and confirm in writing to Departmental Representative adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.
- .2 Review specified standards and report to Departmental Representative in writing proposed procedures which vary from standard.
- .3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

#### **1.7 START-UP**

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in Division 23.

#### **1.8 OPERATION OF SYSTEMS DURING TAB**

- .1 Operate systems for length of time required for TAB and as required by Departmental Representative for verification of TAB reports.

#### **1.9 START OF TAB**

- .1 Notify Departmental Representative seven (7) days prior to start of TAB.
- .2 Start TAB when system is essentially completed including:
  - .1 Pressure, leakage, other tests specified elsewhere Division 23.
  - .2 Provisions for TAB installed and operational.
  - .3 Start-up, verification for proper, normal / safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:
    - .1 Liquid systems:
      - .1 Flushed, filled, vented.
      - .2 Correct pump rotation.
      - .3 Strainers in place, baskets clean.

- .4 Isolating and balancing valves installed, open.
- .5 Calibrated balancing valves installed, at factory settings.

#### **1.10 APPLICATION TOLERANCES**

- .1 Do TAB to following tolerances of design values plus or minus 5%.

#### **1.11 ACCURACY TOLERANCES**

- .1 Measured values accurate to within plus or minus 2% of actual values.

#### **1.12 INSTRUMENTS**

- .1 Prior to TAB, submit to the Departmental Representative list of instruments to be used together with make, model and serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within three (3) months of TAB. Provide certificate of calibration to the Departmental Representative.

#### **1.13 SUBMITTALS**

- .1 Submit to the Departmental Representative, prior to commencement of TAB:
  - .1 Proposed methodology and procedures for performing TAB if different from referenced standard.

#### **1.14 Preliminary TAB Report**

- .1 Submit for checking and approval of Departmental Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
  - .1 Details of instruments used.
  - .2 Details of TAB procedures employed.
  - .3 Calculations procedures.
  - .4 Summaries.

#### **1.15 TAB Report**

- .1 Format in accordance with AABC and/or NEBB.
- .2 TAB report to show results in SI units and include:
  - .1 Project record drawings.
  - .2 System schematics.
- .3 Submit three (3) copies of TAB Report to Departmental Representative for verification and approval, in \*.pdf format, in English, and be indexed.

#### **1.16 VERIFICATION**

- .1 Reported results subject to verification by the Departmental Representative.

- .2 Provide manpower and instrumentation to verify 100% of the reported results.
- .3 Number and location of verified results to be at discretion of the Departmental Representative.
- .4 Bear costs to repeat TAB as required to satisfaction of the Departmental Representative.

#### **1.17 SETTINGS**

- .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.
- .2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

#### **1.18 COMPLETION OF TAB**

- .1 TAB considered complete when final TAB Report received and approved by the Departmental Representative.

#### **1.19 DOMESTIC COLD WATER (DCW) SYSTEMS**

- .1 Standard: TAB to be to most stringent of TAB standards of AABC, NEBB, SMACNA or ASHRAE.
- .2 TAB of all systems, equipment, components and controls specified.
- .3 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: Flow rate, static pressure, pressure drop (or loss), temperature, specific gravity, density, RPM, amps, electrical power and voltage.
- .4 Locations of equipment measurement: To include, but not be limited to, following as appropriate:
  - .1 Inlet and outlet of each pump.
  - .2 At each circuit balancing valve (CBV).
- .5 Voltage and current measurements for motors to be reported for each phase for three (3) phase systems.
- .6 Permanently mark the settings of all balancing valves with a permanent ink marker.

## **2 Products**

### **2.1 NOT USED**

## **3 Execution**

### **3.1 NOT USED**

**END OF SECTION**