

**PART 1 - GENERAL****1.1 RELATED SECTIONS**

- .1 Division 23 - Mechanical.
- .2 Division 26 - Electrical.

**1.2 SUMMARY**

- .1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting, and balancing for air systems and hydronics systems.
- .2 TAB means to test, adjust, and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

**1.3 QUALIFICATIONS OF TAB PERSONNEL**

- .1 Submit names of personnel to perform TAB to Departmental Representative within 90 days of award of Contract.
- .2 Provide documentation confirming qualifications, successful experience.
- .3 TAB: Performed in accordance with the requirements of Standard under which TAB Firm's qualifications are approved:
  - .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-2002.
  - .2 National Environmental Balancing Bureau (NEBB) TABES, 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 Recommendations and suggested practices contained in the TAB Standard: Mandatory.
- .5 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.
- .6 Use TAB Standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.
- .7 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.

- .8 TAB Standard quality assurance provisions such as performance guarantees form part of this Contract.
  - .1 For systems or system components not covered in TAB Standard, use TAB procedures developed by TAB Specialist.
  - .2 Where new procedures and requirements are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC, NEBB, or TABB), requirements, and recommendations contained in these procedures and requirements are mandatory.

#### **1.4 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.

#### **1.5 EXCEPTIONS**

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

#### **1.6 CO-ORDINATION**

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

#### **1.7 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.
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- .3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports, and fittings.

## **1.8 START-UP**

- .1 Follow start-up procedures as recommended by equipment manufacturer, unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in contractual documents.

## **1.9 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.

## **1.10 START OF TAB**

- .1 Notify Departmental Representative 7 days prior to start of TAB.
- .2 Start TAB when building is essentially completed, including:
  - .1 Installation of ceilings, doors, windows, and other construction affecting TAB.
  - .2 Application of weatherstripping, sealing, and caulking.
  - .3 Pressure, leakage, and other tests specified elsewhere in Specifications.
  - .4 Provisions for TAB installed and operational.
  - .5 Start-up, verification for proper, normal, and safe operation of mechanical and associated electrical and control systems affecting TAB including, but not limited to:
    - .1 Proper thermal overload protection in place for electrical equipment.
    - .2 Hydronics systems:
      - .1 Liquid systems flushed, filled, and 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.

**1.11 APPLICATION TOLERANCES**

- .1 Do TAB to following tolerances of design values:
  - .1 Hydronic systems: Plus or minus 5%.

**1.12 ACCURACY TOLERANCES**

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

**1.13 INSTRUMENTS**

- .1 Prior to TAB, submit to Departmental Representative list of instruments used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced Standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Departmental Representative.

**1.14 SUBMITTALS**

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

**1.15 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 Calculation procedures.
  - .4 Summaries.

**1.16 TAB REPORT**

- .1 Format in accordance with referenced standard.

- .2 TAB report to show results in SI units and to include:
  - .1 Project record drawings.
  - .2 System schematics.
- .3 Submit 6 copies of TAB Report to Departmental Representative for verification and approval, in both official languages, in "D-ring" binders, complete with index tabs.

### **1.17 VERIFICATION**

- .1 Reported results subject to verification by Departmental Representative.
- .2 Provide personnel and instrumentation to verify up to 30% of reported results.
- .3 Number and location of verified results as directed by Departmental Representative.
- .4 Pay costs to repeat TAB as required to satisfaction of Departmental Representative.

### **1.18 SETTINGS**

- .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions, and 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.

### **1.19 COMPLETION OF TAB**

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

### **1.20 HYDRONICS SYSTEMS**

- .1 For the needs for this section, the systems hydronic include the system using the following fluid: Diesel.
- .2 The operations of TAB must be carried out in accordance with the most strict requirements stated in the present section or the Standards and the relevant reference documents of the AABC of the SMACNA or the ASHRAE.
- .3 Carry out the test, the adjustment, and the balancing of systems, apparatuses, elements, and regulation and control devices.

- .4 The persons charged to carry out the operations of TAB must be members in good standing and be entitled to provide the services prescribed, according to standards of the AABC.
- .5 The TAB operations of the systems must be carried out under the direction of a recognized supervisor entitled to provide the services prescribed according to standards of the AABC.
- .6 The readings to be done will carry in particular on followings, according to systems, apparatuses, elements, or control devices and regulation concerned: Static pressure, flow rate, pressure drop, temperature, density, number of revolutions, power, voltage, and levels of noise and vibration.
- .7 The points of measurement, in the case of the apparatuses, will be located at the following places, according to the case:
  - .1 At the entry and the exit side of the heat exchangers (primary and secondary sides), cooling coils, condensers, pumps, pressure regulators, control valves and regulation, and any other apparatus causing conditions changings;
  - .2 At regulators and regulation control devices.
- .8 The points of measurement, in the case of the systems, will be located at the following places, according to the case: On supply and return of primary and secondary loops (principal drains, principal and secondary drain connections, supply lines of final elements of hydronic systems).

**PART 2 - PRODUCTS**

- .1 Not Used.

**PART 3 - EXECUTION**

- .1 Not Used.

**END OF SECTION**