Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 23 05 00 - Common Work Results for HVAC

1.2 SUMMARY

.1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.

.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 Engineer within 90 days of award of contract.

.2 Provide documentation confirming qualifications, successful experience (certifications, years of experience).

.3 TAB: performed in accordance with the requirements of standard under which TAB Firm's qualifications are approved:

.1 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems-[1998].

.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, standards to satisfaction of authority having jurisdiction.

1.6 COORDINATION

.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 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 confirm in writing to Engineer adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.

.2 Review specified standards and report to Engineer 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.

1.8 START-UP

.1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.

.2 Follow special start-up procedures specified elsewhere.

1.9 OPERATION OF SYSTEMS DURING TAB

.1 Operate systems for length of time required for TAB and as required by the Engineer for verification of TAB reports.

1.10 START OF TAB

.1 Notify Engineer 14 days prior to start of TAB.

.2 Start TAB when building is essentially completed, including:

.1 Installation of ceilings, doors, windows, other construction affecting TAB.

.2 Application of weatherstripping, sealing, and caulking.

.3 Pressure, leakage, other tests specified elsewhere Division 23.

.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 Air systems:

.1 Filters in place, clean.

.2 Duct systems clean.

.3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.

.4 Correct fan rotation.

.5 Fire, smoke, volume control dampers installed and open.

.6 Coil fins combed, clean.

.7 Access doors, installed, closed.

.8 Outlets installed, volume control dampers open.

.3 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.

.6 Chemical treatment systems complete, operational.

1.11 APPLICATION TOLERANCES

.1 Do TAB to following tolerances of design values:

.1 HVAC systems: plus 10 %, minus 0 %.

.2 Hydronic systems: plus or minus 10 %.

.3 Recirculated hot water: 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 Engineer a 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 Engineer.

1.14 PRELIMINARY TAB REPORT

.1 Submit for checking and approval of the Engineer, 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 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 the Engineer for verification and approval, in French in D-ring binders, complete with index tabs.

1.16 VERIFICATION

.1 Reported results subject to verification by the Engineer.

.2 Provide personnel and instrumentation to verify up to 5 % of reported results.

.3 Number and location of verified results as directed by the Engineer.

.4 Pay costs to repeat TAB as required to satisfaction of the Engineer.

1.17 SETTINGS

.1 After TAB is completed to satisfaction of the Engineer, 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 Engineer.

1.19 DOMESTIC HOT WATER PRODUCTION SYSTEMS

.1 TAB operations must be carried out in accordance with the most strict requirements stated herein or in the relevant AABC, SMACNA or ASHRAE reference standards and documents.

.2 Carry out testing, adjusting and balancing of systems, equipment and control devices and elements.

.3 TAB operations must be carried out by members in good standing entitled to provide the services prescribed, in accordance with AABC standards.

.4 TAB operations for systems must be carried out under the direction of a recognized supervisor entitled to provide the services prescribed, in accordance with AABC standards.

.5 Reported results must include the following, depending on systems, equipment and control devices and elements: static pressure, flow rate, capacity loss (or pressure drop), temperature, density, rotational speed, power demand set up, voltage and noise and vibration levels.

.6 Measurement points must include the following locations in regards to equipment: inlet and outlet of water heaters, tanks, pumps, circulation pumps, control valves and devices .

.7 Measurement points must include the following locations in regards to systems: main pipe lines or ducts, main and secondary branches, supply lines or ducts of terminal units.

1.20 OTHER MECHANICAL SYSTEMS

.1 Flush Valves: adjust according to prevailing pressure conditions.

.2 Pumped sanitary and storm drainage systems: carry out tests required to verify that systems function as specified in drawings and specifications.

.3 Backflow preventers: perform tests and obtain certificates, in accordance with CAN/CSA-B64.10 standard.

.4 Domestic hot water recirculation system: carry out tests required to verify that systems function as specified in drawings and specifications.

.5 Natural gas meters: carry out tests required to verify that systems function as specified in drawings and specifications.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION