

SECTION 15990
START-UP REQUIREMENTS FOR HEATING,
VENTILATING & AIR CONDITIONING (HVAC) SYSTEMS

PART 1 GENERAL

- 1.1 The Contractor shall provide an independent Testing, Adjusting and Balancing (TAB) Contractor to perform TAB work for the HVAC systems. The TAB Contractor shall provide Certified Reports to the Florida Tech Representative for all TAB activities.
- 1.2 The Mechanical Contractor shall assist the TAB Contractor in performing his work as noted in PART 3 - EXECUTION and in Section 15991 - TAB of HVAC Systems.

PART 2 PRODUCTS

- 2.1 None required.

PART 3 EXECUTION

- 3.1 The Mechanical Contractor shall furnish to the TAB Contractor a complete set of specifications, architect supplement instructions, addenda, approved HVAC shop drawings, equipment performance sheets, change orders, etc. as requested by the TAB Contractor.
- 3.2 The Mechanical Contractor shall coordinate with the TAB Contractor to establish written schedules for pre-TAB inspections and for TAB work. Substantial Completion and Final Completion milestones shall be noted on the HVAC/TAB schedules. Schedule TAB work to be completed prior to Substantial Completion. HVAC/TAB schedule shall be consistent with and shown on the project's Critical Path Management schedule. Any change in construction schedules that affect the TAB work shall be coordinated with the TAB Contractor.
- 3.3 The Mechanical Contractor shall notify the TAB Contractor of hydronic system commissioning so that the TAB Contractor can monitor the cleaning, flushing, filling and chemical treatment, and observe water samples being drawn and tested. Provide chemical treatment test report to the TAB Contractor within 10 calendar days of completed tests.
- 3.4 The TAB work shall not commence until the TAB Contractor has received written notice from the Mechanical Contractor that all HVAC systems are 100% complete and are fully operational. For large projects, TAB work shall be phased on a building-by-building basis.
- 3.5 The Mechanical Contractor shall place all HVAC systems and equipment into complete operation during each working day of TAB work.
- 3.6 The Mechanical Contractor shall provide access to HVAC systems and equipment by supplying ladders and/or scaffolding, and opening access panels and equipment room doors.
- 3.7 The TAB Contractor shall provide to the Florida Tech Representative as well as the Mechanical Contractor TAB punch lists of non-complying HVAC work, as they are discovered or at least weekly. The Mechanical Contractor shall replace or repair non-complying work within two workdays of receipt of written punch list and shall provide written notification of repairs to the TAB Contractor.

- 3.8 If the TAB Contractor is prevented from completing his work in a timely and continuous manner (according to the established HVAC/TAB schedule) due to non-operable and/or incomplete HVAC systems, all additional fees for TAB work shall be the responsibility of the Mechanical Contractor.
- 3.9 Florida Tech shall not release the Mechanical Contractor's 10% retainage until notified, in a Certified Report, by the TAB Contractor that all HVAC systems have been successfully TABed in accordance with Contract Documents and Section 15991.
- 3.10 The Mechanical Contractor shall verify the following items to ensure proper start-up and preliminary adjustments of air distribution systems.
- A. Verify that air grilles (supply, return, exhaust, etc.) are installed and connected to the duct system.
 - B. Verify that duct systems are clean of debris.
 - C. Verify that ducts attached with flexible connectors are aligned (longitudinal) within ± 0.25 ", have a uniform gap within ± 0.25 ", and have a nominal gap width of 2.0". Flexible duct connectors shall not leak.
 - D. Verify that filters are clean, and filter pull strips and spacers are installed. Filter module shall NOT allow leaks around the filters.
 - E. Verify that balancing dampers are operational and fully opened. For externally insulated ductwork, verify that 2" high standoff brackets for the locking quadrants are installed.
 - F. Verify that fire and/or smoke dampers are fully opened.
 - G. Verify proper fan rotation.
 - H. Verify proper belt drive alignment.
 - I. Verify capacity of fan motor overload elements (1.25*FLA).
- 3.11 The Mechanical Contractor shall verify the following items to ensure proper start-up and preliminary adjustments of hydronic systems.
- A. Verify that the hydronic systems are properly flushed, filled, purged and chemically treated.
 - B. Verify that the strainer baskets/screens are clean.
 - C. Verify that pump/motor shaft is correctly aligned.
 - D. Verify proper pump rotation.
 - E. Verify that all balancing valves are fully opened and are equipped with adjustable memory stops.
 - F. Verify that gage cocks, pressure gages and thermometers are properly installed at coils, pumps, chillers, heat exchangers, etc. Extensions to allow for pipe insulation are required. Gage cocks and pressure gages at pumps shall utilize pump flange taps in order for head measurements to correlate with the pump performance map. Gage cocks at chillers shall utilize evaporator and condenser manifold gage taps in order for head measurements to correlate with the manufacturer's data.
 - G. Verify capacity of pump motor overload elements (1.25*FLA).
 - H. Verify that all Venturis are properly installed with the minimum upstream and downstream straight pipe lengths.
- 3.12 The Mechanical Contractor shall verify the following items to ensure the proper start-up and preliminary adjustments of variable air volume (VAV) systems.
- A. Verify that the inlet duct to the VAV box is straight for a minimum of three inlet duct diameters. Flexible duct at the box inlet is NOT acceptable.
 - B. Verify that the service access to the heater control panel is a minimum of 42".

- C. Verify that the static pressure probe is located in the main supply air duct between the last and next-to-last takeoff to the VAV boxes or is located per the drawings. Mark the location of the probe and notify the TAB Contractor of same.
- D. Verify that the actuator of the inlet guide vanes is easily accessible; if not, relocate actuator.
- E. Verify that VAV boxes with bottom access are NOT located over light fixtures and that access panels are equipped with quarter-turn quick-release fasteners.

END OF SECTION