

SECTION 15900

HVAC TESTING, ADJUSTING & BALANCING

1.0 GENERAL

1.1 DESCRIPTION

1. The General Provisions and other mechanical systems are specified in other Sections of Division 15.
2. This Section covers testing, adjusting, and balancing work specified herein, and also shown on the Drawings, and is defined to include, but is not limited to, air distribution systems, hydronic distribution systems, and associated equipment and apparatus of mechanical work. The work consists of setting speed and volume (flow), adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as shown on the Drawings or specified herein.
3. Component types of testing, adjusting, and balancing specified in this Section include the following as applied to mechanical equipment:
 1. Fans.
 2. Air handling units.
 3. Ductwork systems.
 4. Grilles, registers, and diffusers.

1.2 QUALITY ASSURANCE

1. Work shall be performed by a firm certified by the National Environmental Balancing Bureau (NEBB), or the Associated Air Balance Council (AABC) in testing and balancing disciplines for this type of project. Work shall be performed under the direction of an engineer registered in the State of Alabama.
2. Comply with:
 1. NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environment Systems" or AABC's Manual MN-1 "AABC National Standards", as applicable to mechanical air and hydronic distribution systems and associated equipment and apparatus.
 2. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise specified herein.

1.3 SUBMITTALS

1. Submit 3 copies of certified test reports signed by the supervisor who performed the testing, adjusting and balancing, except as otherwise specified herein.
2. Be in hardback three ring loose leaf binders.
3. Include title page with job name, contractor's and sub-contractors' names, addresses, and telephone numbers, and index sheet.
4. Include identification and types of instruments used and their most recent calibration dates, and methods of testing and balancing each system and piece of equipment.
5. Include AABC or NEBB test forms containing installation data, design data, equipment data, and operating data for all systems and equipment.
6. Include copies of readings, with piping layouts and duct layouts showing where readings were taken.

1.4 JOB CONDITIONS

1. Do not proceed with testing, adjusting, and balancing work until:
2. All work is complete and all systems are operable.

3. All cleaning, flushing, lubrication, and start-up specified in other Sections has been accomplished.

2.0 PRODUCTS

2.1 PATCHING MATERIALS

1. Use the same products and materials for patching holes in insulation, ductwork, and housings which have been cut or drilled for test purposes, including access for test instruments, and attaching jigs, to match existing.

3.0 EXECUTION

3.1 TESTING, ADJUSTING AND BALANCING

1. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Submit a detailed report to the Engineer documenting all deficiencies of all systems and controls that prevent complete testing, adjusting and balancing. Do not proceed with testing, adjusting, and balancing work until unsatisfactory conditions have been corrected.
2. Provide materials, equipment, labor, and power to test, adjust, and balance all new heating, ventilating, refrigeration, and air conditioning systems and components on this project as shown on the Drawings, or as specified herein. Verify functioning of all operating devices and equipment. In addition, the following specific testing and balancing shall be performed.
3. Ductwork failing test shall be repaired, reworked, or rebuilt, and retested until satisfactory, before additional ductwork is installed and before ductwork is covered up.

3.2 Air systems balancing, general:

1. Test, adjust, and balance systems to achieve operation and design air quantity, temperature differential, and pressure drop through all ductwork, equipment, and components.

3.3 Hydrostatic pressure testing:

1. Test all piping systems to 1-1/2 times the operating conditions specified in Section 15100, HVAC Piping, Valves & Accessories, but do not exceed test pressure specified in ANSI/ASME B16.1-1975.
2. Test shall be held for 4 hours, minimum, with compensation made for temperature change.
3. No pressure change allowed.

3.4 Cost of tests and subsequent measures shall be borne by the Contractor if results indicate deficient performance, and by the Owner if test results meet the required performance conditions. No allowance for environmental factors will be made in evaluating test results.

3.5 Submit report of all system deficiencies, leaks, or defects that must be corrected to successfully pass all tests.

3.6 Patch holes in insulation, ductwork, and housings, which have been cut or drilled for test purposes.

3.7 Mark equipment settings, including damper control positions, valve indicators, fan speed control devices, and controls and devices, to show final settings at completion of testing, adjusting, and balancing work. Provide markings with paint or permanent identification materials.

3.8 After testing, adjusting, and balancing is complete, visit the job during the heating cycle and during the cooling cycle to make adjustments to provide uniform temperatures throughout the building. Schedule trip during the months of December through February for the heating cycle, and June through August for the cooling cycle. Obtain signed statements from the Owner acknowledging these two trips and subsequent adjustments. Submit statements to the Architect.

- 3.9 Prior to final inspection, after balancing is complete, furnish all labor and materials for the Architect's representative to verify air quantities of a 20% selection of grilles, registers or diffusers.
- 3.10 All pressure and leakage tests of the piping and ductwork systems shall be made in the presence of the Architect's representative.

END OF SECTION