

DIVISION 15 - MECHANICAL

Section 15990 - Testing, Adjusting And Balancing

Introduction

Achieving an acceptable final air and water balance is one of the most critical elements of project completion. It is therefore extremely important that the balancing and the associated report be accomplished and submitted before or at the time of substantial completion. Similarly, timely reviews by the Consultant/UofA will insure that the final balance is acceptable prior to occupancy.

Part 1 – General

- Vibration Testing
 - Vibration testing to be performed on all rotating equipment 3 horsepower and above in accordance with AABC Standards.
 - Equipment shall have a maximum vibration velocity reading no greater than 0.04in/sec.
- Fume Hood Testing *Discuss With UA Facilities Design & Construction*
 - Each fume hood shall be identified with a plaque indicating the location and number of exhaust fan serving the hood.
 - Each exhaust fan shall be identified with a weather-proof plaque indicating the location(s) of the fume hood(s), by room number, that the fan serves.
- Air Systems
 - All work shall be in accordance with latest edition AABC, NEEB Standards and applicable sections of ASHRAE and SMACNA HVAC systems testing, adjusting and balancing procedures.
 - The entire system shall be tested for noise, tightness of joints and proper functioning of the system. Noise tests shall be made under minimum system pressure drop conditions (highest air velocities and clean filter conditions).
 - Air volumes measured shall be within $\pm 10\%$ of those shown on drawings unless otherwise specified for diffusers, grilles, registers where applicable and fans.
 - Ensure all temperature sensors and controls are calibrated prior to conducting test and balance procedures.
 - At the time of final inspection, recheck in the presence of the U of A/Architect, random selections of air quantities and fan data recorded in the certified report. Points or areas for recheck shall be selected by the UofA/Architect and be approximately 10% of the report data.
 - At the time of verification measure space temperature and humidity in a representative number of rooms to verify performance. Tabulate these results and bind into certified report as an appendix.
 - Testing to be conducted on a hierachial principal, i.e. each piece of equipment for proper operation, followed by each sub-system followed by entire system, followed by inter-ties to other major systems.
 - Following final acceptance of the certified reports by the Architect, permanently mark the settings of all valves, dampers, splitters and other adjustable devices so that balance set position can be restored if disturbed at any time. Do not mark such devices until after final acceptance.

- VFD controlled fan systems to be tested in bypass mode to verify satisfactory operation of static pressure high limit sensor.
- Piping Systems
 - Test all plumbing systems in accordance with all applicable plumbing codes.
 - Test all fire protection systems in accordance with all applicable NFPA Codes.
 - Compressed air system shall be tested to a minimum of 125% and a maximum of 150% of pressure setting of relief valve, using nitrogen, for 24 hours and pressure drop shall not exceed 10% of the minimum pressure.
 - Balance the entire water system to ensure all coils, heat exchangers, etc., are operating to design conditions. Adjust the circuits by means of the balancing valves and record balance position.
 - Each pump shall be checked for design, working and shut-off head conditions and any pump that varies by more than 10% from the design conditions shall have the impeller trimmed or changed until design conditions have been met.
 - Flow through all heat exchangers, chillers, boilers and other such equipment shall be balanced to ensure that the pressure drop through the equipment is within 10% of the manufacturer's design conditions.
 - If the design conditions cannot be met by adjusting the balancing valves throughout the system, then pump impellers shall be either changed or trimmed as required.
 - Initial balancing of coils shall be to ensure that the pressure drops are within 10% of the manufacturer's design conditions. When both the air and water systems are fully operational, entering air and water and leaving air and water readings shall be taken as close as possible to the peak design conditions to ensure the coil performance meets the design conditions. Coil water working conditions shall only be taken in conjunction with the air flow working conditions for the coil.
 - Coordinate with the Contractor to ensure that all necessary valves for control and balancing are installed in all locations required. Notify the U of A/Architect in writing that this coordination has taken place. Include in this letter any recommendations made regarding valves, locations, installation, etc.
 - Testing to be conducted on a hierarchical principal, i.e. each piece of equipment for proper operation, followed by each sub-system followed by entire system, followed by inter-ties to other major systems.
 - Following final acceptance of the certified reports by the Owner/Architect, permanently mark the setting of all valves and other adjustable devices so that balance set position can be restored if disturbed at any time. Do not mark such devices until after final acceptance.
- **Part 2 - Products**
- No Discussion.
- **Part 3 - Execution**
- All required balancing shall be completed and the final report submitted as a condition of substantial completion.

End of Section 15990