TESTING, ADJUSTING, AND BALANCING

General

This design guideline describes use of U-M's Test Adjust and Balance (TAB) specification, TAB design considerations, minimum TAB data to be shown on design documents, and the contracting of TAB work.

Related Sections

U-M Design Guideline Technical Sections:
15910 Laboratory Ventilation

U-M Master Specification:
15910 Laboratory and Fume Hood Air Flow Controls
15990 Testing, Adjusting, and Balancing

U-M Standard Details:

TAB Specifications

U-M Master Specification Section 15990 Testing, Adjusting, and Balancing shall be used as the TAB specification on all projects. The A/E shall edit U-M TAB spec. 15990 to make it project specific. Turn on hidden text and read all spec. editors notes when editing the specification.

Pay special attention to the following when revising the spec. to make it project specific:

- Scope of Work Section: Remember to include systems such as domestic hot water return, RO/DI, and process cooling water systems, if TAB work is required on such systems.
- Acoustical Testing Section: Describe the requirements for any needed special accoustical testing. This section also requires sound readings be taken in 6 rooms designated by the AE. It is recommended this requirement always be left in the spec. in case any noise trouble shooting is needed after construction is complete.
- Performance Testing Section: If required, include specific details regarding the tests required.

Review and edit as appropriate, the balancing procedures included in the specification, and add any additional procedures required for unique or complex systems (e.g. BSL3 labs, clean rooms, etc.). If requested by the construction team, participate in the pre-balance

conferences described in the spec. to explain the design intent and answer questions about the appropriate TAB procedures.

Be aware that the U-M TAB spec requires submittals relative to the TAB work, including proof of TAB technician qualifications, TAB instrument type and calibration, and proposed reporting forms. The AE must approve these submittals prior to any TAB work commencing.

The U-M TAB spec. requires equipment vibration testing for all rotating equipment ½ HP and larger. If a project is limited to one or two pieces of small horsepower equipment in low risk areas such testing becomes cost prohibitive and the AE should strike it from the spec. Vibration testing should always be included on projects with large equipment or significant rotating equipment quantities.

Note that the U-M TAB spec does not cover ASHRAE 110 fume hood testing.

Note that the U-M TAB spec requires that progress TAB reports be submitted within 3 days and final TAB reports within 1 week of the completion of TAB field work.

Pre-Construction TAB Work

When appropriate, require the TAB trade to perform pre-construction and post-construction TAB work, in particular when spaces are renovated, to measure representative flows, pressures, and/or temperatures of other areas served by common systems. In some cases it may be appropriate to issue a separate contract for pre-construction TAB work.

TAB Design Documents

All required TAB data shall be clearly indicated on the design documents, including the following:

- Code minimum outside air CFM for each air handler
- Air handler supply fan/ return fan/exhaust fan CFM offset (as it relates to building pressurization)
- Dirty filter pressure drops
- Fume hood face velocity alarm point
- Room pressure offsets for rooms designed with CFM offset. Indicate the amount of offset (in CFM) with an arrow pointing in the appropriate direction, across each of the room's doors. Note that the U-M TAB spec. requires smoke-stick tests to validate the offset direction at these room types
- Room pressure offsets for rooms controlled to a setpoint (e.g., to an inches w.c. setpoint) (list on control drawings).

The scope of the TAB work shall be clearly delineated in the design documents. As appropriate, require that the entire system in a renovation project be rebalanced, in particular

to assure un-renovated areas are not adversely affected by new work. Include the TAB data for both the new and unaltered portions of the system.

Note that proper architectural patching of room penetrations will be required for any room with pressure offset. The mechanical engineer is advised to assure the project documents thoroughly cover this requirement.

TAB Contracting

The University of Michigan limits TAB work to pre-approved contractors. These contractors are listed in the U-M spec. The AE shall not add or delete from the contractors listed in the spec. unless directed otherwise by U-M.

The preferred and best practice is for the TAB trade to be under contract direct to the Owner rather than as a sub-contractor to another trade. Discuss the TAB contracting arrangement with the U-M Project Manager and prepare bid documents as directed.

Air and water balance should always be done by the same TAB contractor, and is a requirement of the U-M TAB spec. If a project is so large that multiple TAB contracts are required, the scope of work split should be by building area, with one contractor doing all air and water balance for a specific area, and for all systems that serve that area. Splitting all air to one TAB contactor and all water to another TAB contractor significantly dilutes the efficacy of the TAB procedures and is never advisable.

End of U-M DG 15990