

SECTION 23 99 00 - ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for complete adjusting and balancing work as required in Contract Documents.

1.2 SUBMITTALS

- A. Provide information in report form listing items required by specifications. Report shall be typed and three copies submitted for review. Results shall be guaranteed. Contractor shall be subject to recall to site to verify report information before acceptance of the report by the Owner's Representative.
- B. Report format shall consist of the following:
 - 1. Title sheet with job name, Contractor, Engineer, date, balance contractor's name, address, telephone number and contact person's name and the balancing technician's name.
 - 2. Individual test sheets for air handlers, terminal units, air distribution, exhaust fans, duct traverses, pumps, air handling coils, reheat coils, radiation, convectors, cabinet unit heaters and unit ventilators.
 - 3. Manufacturers pump and fan curves for equipment installed with design and actual operating conditions indicated.
 - 4. One complete set of reproducible record contract drawings single line sketch of system marked up with terminal unit numbers, room numbers, testports locations, register, grille and diffuser numbers to correlate test sheet. (Number the air outlets by room numbers). Data shall be provided with reports.
 - 5. Provide commentary of installed system with respect to deviations from Contract Documents system performance and craftsmanship of the installation.

1.3 QUALIFICATIONS

- A. Follow procedures and methods published by one or more of the following:
 - 1. Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).
 - 2. Individual manufacturer requirements and recommendations.
- B. Maintain qualified person at project for system operation, trouble shooting, change pulleys and perform mechanical adjustments in conjunction with balancing procedure.

- C. Balancing contractor shall be current member of AABC or NEBB or approved by the Engineer.

1.4 GENERAL REQUIREMENTS

- A. Before concealment of systems visit the job site to verify and advise on type and location of balancing devices and test points. Make changes as required to balancing facilities.
- B. Place systems in satisfactory operating condition.
 - 1. Adjusting and balancing shall be accomplished as soon as the systems are complete and before Owner takes possession.
 - 2. Prior to balancing adjust balancing devices for full flow; fill, vent and clean hydronic systems, replace temporary filters and strainers.
 - 3. Initial adjustment and balancing to quantities as called for or as directed by the engineer, to satisfy job conditions.
 - 4. Adjusting and balancing shall be accomplished under appropriate outdoor temperature conditions. All outdoor conditions (Db, Wb, and a description of the weather conditions) at the time of testing shall be documented in the report.
 - 5. Change pulleys as required to meet system performance requirements. Adjust and align pulleys, to obtain proper settings and operation.
 - 6. Replace balancing cocks, flow balancers and dampers in new systems that cannot be manipulated to satisfy balancing requirements.
 - 7. Identify flow balancers, balancing cocks and dampers in existing systems that cannot be manipulated to satisfy balancing requirements.
 - 8. Traverse main ducts to determine total system air quantities after all outlets have been set or prior to final adjustment if the system does not meet design requirements. A sum of room cfm's is not acceptable.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Provide tools, ladders, recording meters, gauges, thermometers, velometers, anemometers, Pitot tubes, inclined gauge manometers, magnehelic gauges, amprobes, voltmeters, psychrometers and tachometers required. Instruments used shall be accurately calibrated as per AABC or NEBB requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine Bid Documents and notify Owner's Representative of any questions regarding balancing, within thirty days after receipt of bid and prior to starting work.

3.2 AIR SIDE

- A. Test, adjust and record the following:
1. Motors:
 - a) RPM
 - b) BHP
 - c) Full load amps
 - d) Sheave sizes, number and size of belts
 - e) Shaft diameter
 - f) Complete nameplate data
 2. Fans:
 - a) Cfm
 - b) RPM
 - c) Suction static pressure
 - d) Discharge static pressure
 - e) Sheave sizes, number and size of belts, key sizes, shaft, diameter
 - f) Complete nameplate data
 - g) Sketch of system's inlet and outlet connections
 - h) Location of test port
 3. Duct: Traverse Zones
 - a) Cfm
 - b) Static pressure
 4. AHU: DOAS Unit, Furnaces and VRF indoor units
 - a) Minimum outdoor air Cfm
 - b) Total discharge and return Cfm
 - c) Static profile thru unit
 - d) Complete nameplate data
 5. Coil:
 - a) Entering air temperature (DB/WB)
 - b) Leaving air temperature (DB/WB)
 - c) Static differential
 - d) Face velocity and area
 - e) Cfm
 - f) Complete nameplate data

6. Registers/Grilles/Diffusers:
 - a) Cfm (within 10%)
 - b) Set, adjust and record air flow pattern
7. Filter Banks:
 - a) Nameplate data
 - b) Static pressure drop

3.3 WATER SIDE

- A. Test, adjust and record the following:
 1. Coils: Including, but not limited to convectors, fin tube radiation sections, unit ventilators, fan coils, cabinet heaters, unit heaters, heat pumps.
 - a) GPM (coil and bypass)
 - b) Entering water temperature
 - c) Leaving water temperature
 - d) Water pressure drop
 - e) Complete nameplate data
 - f) Entering steam pressure
 2. Pumps:
 - a) Check rotation
 - b) GPM
 - c) Pump off pressures (suction and discharge)
 - d) Running suction pressure
 - e) Running discharge pressure
 - f) Running load amps
 - g) RPM - motor
 - h) Complete nameplate motor and pump
 3. Boilers:
 - a) GPM
 - b) Entering water temperature and pressure
 - c) Leaving water temperature and pressure
 - d) Complete nameplate data
 - e) Leaving steam pressure

END OF SECTION