

**SYSTEM STARTUPS AND
OPERATION AND MAINTENANCE MANUALS**

PART I: GENERAL

1.1 GENERAL REQUIREMENTS

- A. Submittal requirements for equipment and facility Operations and Maintenance (O&M) Manuals.
- B. System startup with demonstration and instructions.
- C. Testing, adjusting and balancing.

1.2 OPERATION AND MAINTENANCE MANUALS

- A. Furnish manufacturers' O&M Manuals for all equipment. Manuals must contain, as a minimum, the following:
 - 1. Equipment functions, normal operating characteristics, and limiting conditions.
 - 2. Assembly, Installation, alignment, adjustment, and checking instructions.
 - 3. Operating instructions for start-up, normal operation, regulation and control, normal shutdown, and emergency shutdown.
 - 4. Detailed drawings showing the location of each maintainable part and lubrication point with detailed instructions on disassembly and reassembly of the equipment.
 - 5. Troubleshooting guide.
 - 6. Spare parts list, predicted life of parts subject to wear, lists of spare parts recommended to be on hand for both initial start-up and for normal operating inventory, and local or nearest source of spare parts availability.
 - 7. Outline, cross-section, and assembly drawings with engineering data and wiring diagrams.
 - 8. Test data and performance curves.
- B. Furnish parts manuals for all equipment, prepared by the equipment manufacturer, which contain, as a minimum, the following:
 - 1. Detailed drawings giving the location of each maintainable part.
 - 2. Spare parts list with predicted life of parts subject to wear, lists of spare parts recommended on hand for both initial start-up and for normal operating inventory and local or nearest source of spare parts availability.

PART II: PRODUCTS – Not Used.

PART III: EXECUTION

3.1 PREPARATION

- A. Coordinate schedule for start-up of various equipment and systems.

- B. Notify the Project Manager seven (7) days prior to startup of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other damage-causing conditions.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision in accordance with manufacturer's instructions.
- G. When specified in individual Technical Specification sections, require manufacturer to provide an authorized representative to be present at the site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit written report indicating that equipment or system has been properly installed and is functioning correctly.

3.2 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to the Project Manager two (2) weeks prior to Date of Substantial Completion.
- B. Utilize O&M Manuals as the basis for instruction. Review contents of manual with the Project Manager in detail to explain aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at the equipment location.
- D. Prepare and insert additional data in O&M Manuals when the need for additional data becomes apparent during instruction.
- E. At a minimum, the Contractor will demonstrate the following:
 - 1. Products and procedures to be used in maintaining various surfaces, e.g., counter tops, toilet partitions, tile floors and carpeting;
 - 2. procedures to set and maintain landscape irrigation system;
 - 3. procedures to set and maintain security and fire alarm systems; and
 - 4. procedures to set and maintain HVAC systems.

3.3 TESTING, ADJUSTING AND BALANCING

- A. The Contractor shall appoint, employ and pay for the services of an independent firm to perform testing, adjusting and balancing.
- B. Submit reports by the independent firm to the Project Manager describing observations and results of tests and signifying compliance or non-compliance with specified requirements and requirements of the Contract.

END OF SECTION

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