

**SECTION 23 08 11
DEMONSTRATIONS AND TESTS FOR BOILER PLANT**

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Procedures for on-site demonstration and testing of equipment and systems, including temporary facilities.
- B. Instruction of Government operating personnel.
- C. All demonstrations, instructions and testing must be completed prior to Government acceptance for beneficial use.
- D. Plumbing and emergency power systems are not included.

1.2 DEFINITIONS

- A. Start-Up: Initial inspection, cleaning, lubrication, adjustment, and operation of equipment and systems by the contractor with the assistance of the representatives of the equipment manufacturers.
- B. Pre-Tests: The final stage of the start-up procedure. This occurs after all adjustments have been made except for minor fine-tuning that can be done during the pre-test. Serves as verification that the systems are ready for the final test. Witnessing of pre-test by COR is not required.
- C. Final Tests: Tests, witnessed by the COR or their representative, which demonstrate that all equipment and systems are in compliance with requirements. At VA expense, VA may utilize the services of an independent testing organization or consultant to witness the tests.

1.3 RELATED REQUIREMENTS

- A. Section 23 05 10, COMMON WORK RESULTS FOR BOILER PLANT and STEAM GENERATION: Operating and maintenance manuals
- B. Section 23 05 10, COMMON WORK RESULTS FOR BOILER PLANT and STEAM GENERATION: Demonstration, instructions and testing of temporary equipment
- C. Section 23 05 51, NOISE and VIBRATION CONTROL FOR BOILER PLANT: Sound and vibration levels; sound tests and vibration testing of rotating equipment
- D. Section 23 21 11, BOILER PLANT PIPING SYSTEMS: Leak testing of piping systems, pressure testing of non-boiler safety valves
- E. Section 23 52 33, WATER-TUBE BOILERS: Demonstration and testing of water tube boilers, burners, controls and accessories
- F. Section 23 09 11, INSTRUMENTATION and CONTROL FOR BOILER PLANT: Demonstration and testing of boiler plant instrumentation, controls and computer work station
- G. Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS: Requirements for commissioning, systems readiness checklists, and training

1.4 QUALITY ASSURANCE

- A. Experienced, trained technical service personnel who are representatives of the equipment manufacturers and system designers shall demonstrate, provide instructions, pre-test and final test, as specified, the following equipment:
 - 1. Boilers and economizers
 - 2. Burners
 - 3. Control systems.
 - 4. Instrumentation.
 - 5. Deaerating feedwater heater
- B. Experienced technicians shall demonstrate and provide instructions on the following equipment:
 - 1. Pumps and piping systems
 - 2. Ventilation and heating systems
 - 3. Compressed air systems
 - 4. Control and safety valves
- C. The person responsible for programming the computer workstation shall demonstrate and provide instructions on hardware, software and programming.
- D. The RE, upon request, will provide a list of personnel to receive instructions and will coordinate their attendance at agreed-upon times.
- E. All safety devices (new and existing) shall comply with the VHA Boiler Plant Safety Manual. Testing shall be witnessed by the COR/RE and results recorded on the forms included in the testing manual. Submit 3 copies of the final test reports to the VA for approval.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Names and qualifications of personnel performing demonstrations, instructions and tests.
- C. Certification that pre-testing is complete. Copies of boiler-burner and feedwater deaerator pre-test data as specified.
- D. Preliminary schedule of all demonstrations, instructions and final tests two weeks prior to proposed dates.
- E. Provide an Operator Training Syllabus to be approved by the Design Engineer of Record and Commissioning Authority.
- F. Provide reports within three weeks after satisfactory completion of demonstrations, instructions, and tests. List date, type of work, persons participating, amount of time, test results, calculations of test results, test data.

- G. Completed System Readiness Checklists provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION FOR FINAL TESTS, DEMONSTRATIONS, AND INSTRUCTIONS

- A. Verify that equipment and systems are fully operational. Complete all start-up and pre-test activities for all equipment and systems. Complete all construction and finish work.
- B. Arrange for all test personnel for all equipment to be continuously present during one period of time so that all equipment and systems can be tested in their interrelated functions. For instance, feedwater deaerator will be tested during the boiler testing, and instrumentation performance will be evaluated in conjunction with boiler testing.
- C. Deliver maintenance and operating manuals four weeks prior to instruction period.
- D. Furnish all special tools.

3.2 FINAL TESTS

- A. Demonstrate proper operation of each equipment and system.
- B. Provide tests on equipment as specified in the individual specification sections.

3.3 STARTUP AND TESTING

- A. The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR and Commissioning Agent. Provide a minimum of 7 days prior notice.

3.4 COMMISSIONING

- A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.
- B. Components provided under this section of the specification will be tested as part of a larger system. Refer to Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

3.5 DEMONSTRATIONS AND TRAINING

- A. Demonstrate operation and maintenance of equipment and systems to Government personnel no more than four weeks prior to scheduled Government operation of the plant.

- B. Use operation and maintenance manuals as basis of instruction. Review contents of manuals with personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shut-down of each item of equipment. Allow Government personnel to practice operating the equipment under supervision of instructors.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.
- E. Provide video with audio of all instructions given orally to VA personnel. Provide four copies of the tapes.
- F. Provide services of manufacturer's technical representative for four hours to instruct VA personnel in operation and maintenance of units.
- G. Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS.

3.6 TIME ALLOCATED FOR DEMONSTRATIONS AND INSTRUCTIONS

- A. At least 32 total instructor hours to include boilers, economizers, burners, burner controls, combustion controls, instrumentation.
- B. At least 16 total instructor hours to include computer workstation and programs.
- C. At least 8 total instructor hours to include pumps, steam turbine, feedwater deaerator, and other equipment.
- D. Do not exceed three trainees per session, one-four hour session, per day, per trainee.

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