

SECTION 23 08 00
COMMISSIONING OF HVAC

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers the Contractor's and Commissioning Authority (CA) responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.
- B. The CA, hired by the District directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.
- C. The following HVAC equipment is to be commissioned, including commissioning activities for the following specific items:
 - 1. Fire Smoke Dampers.
- D. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections. See proposed Prefunctional Checklists and Functional Test Procedures at the end of this section.

1.02 SUBMITTALS

- A. Updated Submittals: Contractor to keep the CA informed of all changes to fire smoke damper system documentation made during programming and setup; revise and resubmit when substantial changes are made.
- B. CA to draft Prefunctional Checklists and Functional Test Procedures for fire smoke damper system: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:
 - 1. System name.
 - 2. List of devices.
 - 3. Step-by-step procedures for testing each fire smoke damper actuator and or relay after installation, including:
 - a. Process of verifying proper hardware and wiring installation.
 - b. Process of performing operational checks of each controlled component.
 - c. Plan and process for calibrating fire smoke damper actuators.
 - d. Description of the expected field adjustments for fire smoke damper actuators should control responses fall outside of expected values.
 - 4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a fire smoke damper actuator has "passed" and is operating within the contract parameters.
 - 5. Description of the instrumentation required for testing.
- C. Prefunctional Checklists and Functional Test Procedures: Submit for approval from engineer.
- D. Fire smoke damper actuator O&M Manual Requirements. In addition to documentation specified elsewhere, contractor to compile and organize at minimum the following data on the system:
 - 1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. Provide an index and clear table of contents.
 - 2. Full as-built set of drawings.
 - 3. Full fire smoke damper list; in addition to the information on the original fire smoke damper actuator submittal, include a listing of all rooms with the following information for each room:
 - a. Floor.
 - b. Room number.
 - c. Room name.

- d. Fire Smoke Damper unit ID.
- e. Reference drawing number.
- 4. Full print out of all schedules and adjustments made after testing and acceptance of the system.
- 5. Marking of all fire smoke damper systems on the as-built floor plan and HVAC drawings with their system designations.
- 6. Maintenance instructions, including calibration requirements and methods, etc.
- 7. Fire smoke damper equipment component submittals, parts lists, etc.
- 8. Warranty requirements.
- 9. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
- E. Project Record Documents (provided by the contractor):
 - 1. Submit updated version of fire smoke damper system documentation, for inclusion with operation and maintenance data.
 - 2. Show actual locations of all fire smoke damper actuator on project record drawings.
- F. Training Manuals (provided by the contractor):
 - 1. Provide three extra copies of the fire smoke damper system training manuals in a separate manual from the O&M manuals.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of District.
- B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to District; such equipment, tools, and instruments are to become the property of District.

PART 3 EXECUTION

3.01 PREPARATION

- A. Contractor to cooperate with the CA in development of the Prefunctional Checklists and Functional Test Procedures.
- B. Contractor to furnish additional information requested by the CA.
- C. Contractor to prepare a preliminary schedule for fire smoke damper system testing and completion for use by the CA; update the schedule as appropriate.
- D. Contractor to notify the CA when fire smoke damper system testing and testing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the CA has the scheduling information needed to efficiently execute the commissioning process.
- E. Contractor to put all HVAC equipment and systems into operation and continue operation during each working day of testing and commissioning, as required.

3.02 INSPECTING AND TESTING - GENERAL

- A. Contractor to submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.
- B. Contractor to perform the Functional Tests directed by the CA for each item of equipment or other assembly to be commissioned.
- C. CA to provide two-way radios for use during the testing.
- D. Fire Smoke Damper Stroke Setup and Check:

1. For all fire smoke damper actuator positions checked, verify the actual position by visually checking the damper position through the access door.
 2. Command fire smoke damper closed by simulating a fire/smoke condition; visually verify that fire smoke damper modulates closed.
 3. Command fire smoke damper open by simulating a fire/smoke condition had cleared; verify position is full open.
 4. If actual fire smoke damper position does not reasonably correspond, investigate issue.
- E. Deficiencies: Contractor to correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to District.
- F. Prior to start of work, contractor to check and evaluate the areawide fire alarm system and all fire smoke dampers to ensure proper function. Note fire smoke dampers issues and repair under this project.
- G. After work has been completed, commission the area wide fire alarm system and all fire smoke dampers to ensure proper function.

3.03 FIRE SMOKE DAMPER SYSTEM FUNCTIONAL TESTING

- A. Prefunctional Checklists for fire smoke damper system components will require a signed and dated certification that all systems is complete as required to accomplish the requirements of the Contract Documents.
- B. Do not start Functional Testing until all components have themselves been successfully Functionally Tested in accordance with the contract documents.
- C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the fire smoke damper system as required by the CA.
- D. Demonstrate to the CA:
1. That all specified functions and features are set up, debugged and fully operable.
 2. Fire alarm interlocks and response.
- E. If the fire smoke system or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions or modes tested, contractor to correct all systems, equipment and components required at no additional cost to District.

3.04 OPERATION AND MAINTENANCE MANUALS

- A. Contractor to submit manuals related to items that were commissioned to CA for review; make changes recommended by CA.
- B. CA will add commissioning records to manuals after submission to District.

3.05 DEMONSTRATION AND TRAINING

- A. Contractor shall demonstrate operation and maintenance of fire smoke damper system to District personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Notify engineer when testing will occur, engineer to witness 10% of the total number of fire smoke damper actuator replacement testing.
- B. These demonstrations are in addition to, and not a substitute for, Prefunctional Checklists and demonstrations to the CA during Functional Testing.
- C. Contractor shall provide classroom and hands-on training of District's designated personnel on operation and maintenance of the fire smoke damper system to be commissioned. Provide the following minimum durations of training:
1. Fire Smoke Dampers: 4 hours.
- D. Provide the services of manufacturer representatives to assist instructors where necessary.

END OF SECTION

**PROPOSED FINAL PROJECT COMMISSIONING CHECK LIST – PREFUNCTIONAL TESTING**

PROJECT. NAME	Fire Smoke Damper Actuator Replacements	EQUIP #		SERIAL #	
ADDRESS	3300 Quimby Road	CITY	San Jose	STATE	California
MODEL	FSTF120, FSLF120, FSNF120, FSAF120, FSAF120A			EQUIP LOC	Buildings A, B, C, D, E, F, G, P
SERVING	Buildings A, B, C, D, E, F, G, P			DATE	

PREFUNCTIONAL TESTING

Verify all fire-smoke damper prefunctional checklists are complete. Prior to performing any functional tests, the commissioning pre-start, start-up, and verification checklists and applicable manufacturer's pre-start and start-up recommendations should be completed.

Prefunctional checklist items include, but are not limited to, the following:

- ☐ Damper assemblies are installed per contract documents and manufacturer's installation instructions.
- ☐ Actuator checkout is complete to ensure all damper input/output points are wired correctly.
- ☐ Normal power, and emergency if applicable, is provided to each damper assembly at proper voltage.
- ☐ Damper assembly is clean of any construction debris, dirt, or other foreign materials.
- ☐ Damper assembly does not appear to be askew, twisted, or misaligned in any way that could prevent proper damper movement.
- ☐ Access to damper assembly and all components is acceptable for testing, maintenance, and replacement.
- ☐ Location of each damper assembly is clearly and correctly located on as-built drawings.
- ☐ The fan system and the normal and emergency power panel/circuit associated with each damper are fully documented.

Witnessed:

General Contractor

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PROPOSED FINAL PROJECT COMMISSIONING CHECK LIST – FUNCTIONAL TESTING

PROJECT. NAME	Fire Smoke Damper Actuator Replacements	EQUIP #		SERIAL #	
ADDRESS	3300 Quimby Road	CITY	San Jose	STATE	California
MODEL	FSTF120, FSLF120, FSNF120, FSAF120, FSAF120A			EQUIP LOC	Buildings A, B, C, D, E, F, G, P
SERVING	Buildings A, B, C, D, E, F, G, P			DATE	

FUNCTIONAL TESTING

Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.

Functional checklist items include, but are not limited to, the following:

- ☐ For fire smoke damper actuator position, verify the actual position by visually checking the damper position through the access door.
- ☐ Command fire smoke damper closed by simulating a fire/smoke condition; visually verify that fire smoke damper modulates closed.
- ☐ Command fire smoke damper open by simulating a fire/smoke condition had cleared; verify position is full open.
- ☐ If actual fire smoke damper position does not reasonably correspond, investigate issue.
- ☐ Correct deficiencies and re-inspect or re-test, as applicable.

Witnessed:

Construction Management

General Contractor

Design Engineer

District Representative