

SECTION 01 75 11

CHECKOUT AND STARTUP PROCEDURES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall initially start up and place equipment installed under the Contract into successful operation, in accordance with the equipment manufacturer's written instructions and as instructed by Supplier at the Site.
2. Provide all material, labor, tools, and equipment required to complete equipment checkout and start-up except as may be specifically noted otherwise.
3. Provide lubricants and other required operating fluids in sufficient quantity for equipment testing, start-up and initial operation until the CONTRACTOR has achieved Substantial Completion for the Project and the OWNER is able to begin full time continuous operation of the Project, unless otherwise shown or noted. OWNER will supply treatment chemicals for start-up.
4. Provide electricity, fuel, water, filters, and other expendables required for start-up of equipment, unless otherwise specified. OWNER will pay for electricity.
5. General Activities Include:
 - a. Cleaning, as required under other provisions of the Contract Documents.
 - b. Removing temporary protective coatings.
 - c. Flushing and replacing lubricants, where required by manufacturer.
 - d. Lubrication.
 - e. Checking shaft and coupling alignments and resetting where required.
 - f. Checking and setting motor, pump, and other equipment rotation, safety interlocks, and belt tensions.
 - g. Checking and correcting (if necessary) leveling plates, grout, bearing plates, anchorage devices, fasteners, and alignment of piping, conduits, and ducts that may place stress on the connected equipment.
 - h. All adjustments required.

B. Coordination:

1. Coordinate checkout and start-up with other contractors, as necessary.
2. Do not start up system or subsystem for continuous operation until all components of that system or subsystem, including instrumentation and controls, have been tested to the extent practicable and proven to be operable as intended by the Contract Documents.
3. OWNER will provide sufficient personnel to assist CONTRACTOR in starting up equipment, but responsibility for proper operation is CONTRACTOR's.
4. Supplier shall be present during checkout, start-up, and when equipment is initially started up and placed into operation, unless otherwise acceptable to ENGINEER.

5. Start-up of heating and air conditioning equipment and systems is dependent upon the time of year. Return to the Site at beginning of next heating or air conditioning season (as applicable) to recheck and start the appropriate systems.
 6. Do not start up system, unit process, or equipment without submitting acceptable preliminary operations and maintenance manuals by CONTRACTOR, in accordance with Section 01 78 23, Operations and Maintenance Data.
- C. OWNER's Assumption of Responsibility for Equipment and Systems:
1. OWNER will assume responsibility for the equipment upon Substantial Completion.
 2. Prior to turning over to OWNER responsibility for operating and maintaining system or equipment:
 - a. Provide training of operations and maintenance personnel in accordance with Section 01 79 23, Instruction of Operations and Maintenance Personnel.
 - b. Complete system field quality control testing in accordance with the Contract Documents.
 - c. Submit acceptable final operations and maintenance manuals in accordance with Section 01 78 23, Operations and Maintenance Data.
 - d. Obtain from ENGINEER final certificate of Substantial Completion for either entire Work or the portion being turned over to OWNER.
- D. CONTRACTOR's Continuation of Responsibility for Equipment and Systems:
1. After Substantial Completion and in conjunction with the start-up and initial operation of the Water Treatment Plant, CONTRACTOR shall complete the required Integrated System Field Test in accordance with specification section 40 61 23 demonstrating all instrumentation and control system equipment and systems are running and fully operational for a continuous 48 hour period. Following successful performance of the Integrated System Field Test, CONTRACTOR shall successfully complete the required continuous 30 consecutive day Operational Availability Demonstration (OAD) in accordance with specification section 40 61 23.

1.2 SUBMITTALS

- A. Closeout Submittals: Submit the following:
1. Certifications:
 - a. Supplier's certification of installation in accordance with Paragraph 3.1.B of this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 SERVICES OF SUPPLIER

- A. When specified, furnish services of competent, qualified representatives of material and equipment manufacturers as specified, including supervising installation, adjusting, checkout, start-up, and testing of materials and equipment.
- B. Certification:
 - 1. When services by Supplier are required at the Site, within 14 days after first test operation of equipment, submit to ENGINEER a letter from Supplier, on Supplier's letterhead, stating that materials and equipment are installed in accordance with Supplier's requirements and installation instructions, and in accordance with the Contract Documents.
 - 2. In lieu of Supplier letter, submit completed form attached to this Section.
 - 3. Include in the final operations and maintenance manual for the associated equipment a copy of the letter or completed form, as applicable.

3.2 MINIMUM START-UP REQUIREMENTS

- A. Bearings and Shafting:
 - 1. Inspect for cleanliness, and clean and remove foreign matter.
 - 2. Verify alignment.
 - 3. Replace defective bearings and those that operate in a rough or noisy manner.
 - 4. Grease as necessary, in accordance with manufacturer's recommendations.
- B. Drives:
 - 1. Adjust tension in V-belt drives and adjust vari-pitch sheaves and drives for proper equipment speed.
 - 2. Adjust drives for alignment of sheaves and V-belts.
 - 3. Clean and remove foreign matter before starting operation.
- C. Motors:
 - 1. Check each motor for comparison to amperage nameplate value.
 - 2. Correct conditions that produce excessive current flow and conditions that exist due to equipment malfunction.
- D. Pumps:
 - 1. Check glands and seals for cleanliness and adjustment before running pump.
 - 2. Inspect shaft sleeves for scoring.
 - 3. Inspect mechanical faces, chambers, and seal rings, and replace if defective.
 - 4. Verify that piping system is free of dirt and scale before circulating liquid through pump.
- E. Valves:
 - 1. Inspect manual and automatic control valves, and clean bonnets and stems.
 - 2. Tighten packing glands to ensure no leakage, but allow valve stems to operate without galling.

3. Replace packing in valves to retain maximum adjustment after system is determined to be complete.
 4. Replace packing on valves that continue to leak.
 5. Remove and repair bonnets that leak.
 6. After cleaning, coat packing gland threads and valve stems with surface preparation of "Molycote" or "Fel-Pro".
- F. Verify that control valve seats are free of foreign matter and are properly positioned for intended service.
- G. Tighten flanges and other pipe joints after system has been placed in operation. Replace gaskets that show signs of leakage after tightening.
- H. Inspect all joints for leakage:
1. Promptly remake each joint that appears to be faulty; do not wait for rust or other corrosion to form.
 2. Clean threads on both parts, and apply compound and remake joints.
- I. After system has been placed in operation, clean strainers, drives, pockets, orifices, valve seats, and headers in fluid system to ensure freedom from foreign matter.
- J. Open steam traps and air vents, where used, and remove operating elements. Clean thoroughly, replace internal parts, and place back into operation.
- K. Remove rust, scale, and foreign matter from equipment and renew defaced surfaces.
- L. Set and calibrate draft gauges of air filters and other equipment.
- M. Inspect fan wheels for clearance and balance. Provide factory-authorized personnel for adjustment when needed.
- N. Check each electrical control circuit to verify that operation complies with the Contract Documents.
- O. Inspect each pressure gauge, thermometer, and other instruments for calibration. Replace items that are defaced, broken, or that read incorrectly.
- P. Repair damaged insulation.
- Q. Excess Gasses and Fluids:
1. Vent gasses trapped in systems.
 2. Verify that liquids are drained from all parts of gas or air systems.

3.3 ATTACHMENTS

- A. The attachment listed below, following the “End of Section” designation, is a part of this Specification Section.
1. Supplier’s Installation Certification Form (one page).

+ + END OF SECTION + +

SUPPLIER'S INSTALLATION CERTIFICATION

Contract No. and Name: _____

Equipment Specification Section: _____

Equipment Name: _____

Contractor: _____

Manufacturer of Equipment: _____

The undersigned Supplier of the equipment described above hereby certifies that Supplier has checked the equipment installation and that the equipment, as specified in the Contract Documents, has been provided in accordance with the manufacturer's recommendations and the Contract Documents, and that the trial operation of the equipment has been satisfactory.

Comments: _____

Date

Supplier Name (print)

Signature of Supplier

Date

Contractor Name (print)

Signature of Contractor