

## **DIVISION 41**

# **MATERIAL PROCESSING AND HANDLING EQUIPMENT**

**Part 1            General**

**1.1                DESCRIPTION**

- .1            This section refers to testing mechanical piping and equipment.

**1.2                QUALITY ASSURANCE**

- .1            Use factory trained representatives and submit manufacturer's check sheets for starting the following specialty equipment:
  - .1            Pumps
  - .2            Control components
  - .3            Back-up generators
  - .4            HVAC system
- .2            Prior to starting, testing, adjusting, and cleaning processes, verify with the Contract Administrator any tests required to be witnessed. Provide sufficient notice to the Contract Administrator prior to commencement of procedures.
- .3            Contract Administrator shall be allowed to witness any testing, adjusting, starting, and cleaning procedures.
- .4            Assume all costs associated with starting and testing, including the supply of testing or cleaning medium.
- .5            Prior to starting equipment or systems, secure and review manufacturer's installation, operation, and starting instructions. Read in conjunction with procedures defined herein.
- .6            Use manufacturer's or supplier's starting personnel where required to ensure integrity of manufacturer's warranty.
- .7            Compare installations to published manufacturer's data and record discrepancies. Items proving detrimental to equipment performance shall be corrected prior to equipment starting.
- .8            Some processes involved in starting procedures defined in this section may be duplications of authorities verification. To facilitate expedient completion of project, arrange for authorities to assist or witness these procedures.
- .9            All starting, testing, procedures shall be in accordance with applicable portions of ASME, ASHRAE, AABC, CSA, NFPA, SMACNA, ASTM, and ASPE.
- .10           Personnel involved in starting, testing and adjusting procedures shall be experienced in the design and operation of mechanical equipment and systems being checked and shall be able to interpret results of the readings and tests.
- .11           Assume all liabilities associated with starting and testing procedures.

**Part 2 Products**

**2.1 NOT USED**

**Part 3 Execution**

**3.1 GENERAL TESTING**

- .1 Test all equipment and material where required by contract specification or authority having jurisdiction to demonstrate its proper operation. All tests shall be witnessed by the Contract Administrator.
- .2 Provide all equipment, materials and labour for tests and pay all expenses for conducting same. All instruments shall be tested by an approved laboratory and test results and certificates showing degree of accuracy shall be furnished to the Contract Administrator. If permanent gauges, thermometers, etc. are used for tests these shall not be installed until just prior to the tests to avoid possible changes in calibration.
- .3 Meet with Division 26 – Electrical manufacturers, suppliers, and other specialists as required to ensure all phases of work are properly coordinated prior to commencement of each particular testing procedure. Establish all necessary manpower requirements.
- .4 Should tests indicate defective work or performance at variance with specified requirements, make all changes immediately to correct the defects.
- .5 The Contractor shall be in charge of the work during tests. He/she shall assume responsibility for damages in the event of injury to the personnel, building or equipment and shall bear all costs for liability, repairs and restoration.
- .6 Operate and test motors and speed switches for correct wiring and sequences and direction of rotation. Check and record overload heaters in motor starters.
- .7 Confirm voltages and operating amperages at full load.
- .8 Perform tests as specified and upon completion of mechanical installation, provide certification of tests with detailed data as required. Itemize each test as to time performed and personnel responsible. Obtain certificates of approval, acceptance and compliance with rules and regulations from authorities having jurisdiction. Include these certificates in the Operation and Maintenance manuals. This work will not be considered complete until such certificates have been delivered to the Contract Administrator.

**3.2 PROCEDURES**

- .1 Procedure shall be identified in the following three (3) distinct phases:
  - .1 Pre-Starting: Visual inspection.
  - .2 Starting: actual starting procedure.
  - .3 Post-Starting: Operational testing, adjusting or balancing, and equipment run-in phase.
- .2 Check the installation is as defined by contract documents and as per manufacturer's recommendations including manufacturer's installation check sheets.

### **3.3 CONTRACTOR TESTING RESPONSIBILITIES**

- .1 The contractor shall be required to provide the following tests as part of his construction contract.
  - .1 Process Valves
    - .1 Test operation of all manually actuated valves
    - .2 Test operation of all electrically actuated valves through both system operation and manual override.
  - .2 Sewage Pumps
    - .1 Prior to operation check proper rotation
    - .2 Check and set all fluid levels
    - .3 Confirm all pump alarm condition signals
    - .4 Confirm motor voltage and amperage draw
    - .5 Provide draw down tests to demonstrate performance
  - .3 Flow meter
    - .1 Calibrate before testing

### **3.4 PERFORMANCE TESTING**

- .1 After the mechanical installations are completed and pressure tested, conduct performance tests to demonstrate that the equipment and systems actually meet the specified requirements.
- .2 Lubricate all bearings, adjust and/or replace and set all direct drives and "V" belt drives for proper alignment and tension; calibrate and adjust all thermostats, thermometers, operate and test all motors and speed switches for correct wiring, sequences, check all heaters in motor starters; replace and clean all filters, flush out lines and equipment, remove and clean all strainers; fill all water systems and purge all air; clean fan wheels, heating and cooling coils; fasten all loose and rattling pieces of equipment. Equipment and other apparatus must operate quietly and develop specified capacities; control valves must operate freely.
- .3 Operating tests shall be made on all systems and items of equipment. For testing, vary conditions to simulate operating conditions to test start up, operation sequence, normal shutdown, safety shutdown and all automatic and manual functions.
- .4 Furnish written test reports to the Contract Administrator noting the tests made and any adjustments made.

**END OF SECTION**