

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. This Section specifies the administrative requirements, procedural obligations, terms and conditions and training requirements related to instructing the facility engineering personnel in the proper care, preservation, operations and maintenance of materials, finishes, equipment and systems.
 - a. Preparation and submittal of instructor qualifications, training schedules, and agendas for various building materials, components, systems and equipment.
 - b. Instruction of the University's personnel and adjunct organizations in the proper operation and maintenance of all building materials, components, systems and equipment.

B. Related Sections:

1. Document 00 72 53 - General Conditions (Design-Build)
2. Section 01 77 00 – Closeout Procedures
3. Section 01 78 23 – Operating and Maintenance Data
4. Section 01 78 39 – Project Record Documents
5. Additional training requirements for building systems and/or equipment are specified in the appropriate Specification Sections, Divisions 02 through 33.

1.02 TRAINING MANUALS

- A. The completed FINAL VERSION of the approved Operation & Maintenance Manuals and the redlined set of the record "as-built" drawings shall be used as the basis of instruction. The Subcontractor is not responsible for providing additional copies of these documents for training purposes.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 TESTING AND ACCEPTANCE OF THE SYSTEMS

- A. The Contractor shall, at the time of Final Completion and prior to final acceptance, demonstrate to the University's representative that systems are performing in a satisfactory manner and that all equipment is operating at specified and designed capacity. All tools and instruments required for this demonstration shall be furnished by this Subcontractor.
- B. Make all necessary repairs or adjustments prior to final acceptance, for all equipment furnished under this contract.
- C. Before requesting final acceptance of each system for which he is responsible, each Subcontractor shall:
1. Inspect their Work for completion and operation.
 2. Certify in writing that the system is completed, installed, and operable in compliance with the Contract Drawings and Specifications.

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3.02 DEMONSTRATION, OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Demonstration and Training Instructions: The Subcontractor shall arrange for each installer of work requiring continuing maintenance to meet with University personnel at the project site to provide basic instruction needed for proper maintenance of entire work.
 - 1. Include instructions by manufacturer's representatives where installers are not expert in the required procedures.
 - 2. Review maintenance manuals, record documentation, tools, spare parts and materials, identification system, hazards, cleaning, and similar procedures and facilities.
 - 3. Review maintenance and operations in relation with applicable warranties, agreements to maintain, bonds, and similar continuing commitments.
- B. Demonstrate operation and maintenance of products to the University's personnel during the project commissioning.
 - 1. The detailed review of the materials, components, systems and equipment shall include as minimum the following items:
 - a. Materials, components, systems and equipment
 - b. Safety precautions and procedures
 - c. Installation
 - d. Operational features and functions
 - e. Operational testing and diagnostics
 - f. Preventive and predictive maintenance
 - g. Service: Repair and replacement
 - h. Operation and Maintenance manual content
 - i. Commissioning: Testing, adjusting, calibration and balancing
 - j. Subcontractor furnished spare parts and extra materials
 - k. Recommended "spare parts" inventory not furnished by Contractor
 - l. Specialty tool requirements
 - m. Lubricants
 - n. Fuels
 - o. Identification systems
 - p. Automatic/manual control systems
 - q. Hazards/Material Safety Data Sheets
 - r. Cleaning
 - s. Procurement of replacement parts
 - t. Warranty reviews including terms and conditions, points of contact, return material procedures, effective date, extended warranty options
 - u. Maintenance agreements and similar continuing commitments
 - v. Record "As-Built" Drawings
 - 2. As part of the operations portion of the training session, demonstrate all operational features and functions.

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3. Refer to other specification Sections for additional training requirements associated with engineering, operating and maintenance of various systems/equipment.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with the University's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at designated location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.03 CERTIFICATE OF EQUIPMENT DEMONSTRATION

- A. The Certificates of Equipment Demonstration are to be executed by each Subcontractor as indicated for each separate program.
- B. These documents properly completed and signed must be forwarded to the Design-Builder with or before Final Payment Request.
- C. Specific systems or equipment demonstrations are as noted below.

3.04 TRAINING OF FACILITY ENGINEERING, OPERATING AND MAINTENANCE PERSONNEL

- A. Provide a combination of classroom, field and factory training classes which includes as a minimum the following curricula requirements as indicated hereafter:
 1. SITE WORK AND UTILITIES:
 - a. Water, Storm, and Sanitary Sewer Facilities
 - b. Drainage Structures
 - c. Underdrains
 - d. Electrical Power Service
 - e. Gas Utilities
 2. BUILDINGS AND STRUCTURES
 - a. Concrete
 - b. Unit Masonry
 - c. Metals
 - d. Woods and Plastics
 - e. Thermal and Moisture Protection
 - f. Doors and Windows
 - g. Finishes
 - h. Specialties
 - i. Fixtures, Furnishings and Equipment
 3. HVAC
 - a. Piping and Specialties
 - b. Insulation

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- c. Pumping
 - d. Air Handling and Distribution
 - e. Automatic Temperature Controls
 - f. Testing/Adjusting/Balancing
4. PLUMBING
- a. Piping and Specialties
 - b. Insulation
 - c. Pumping
 - d. Fixtures, Trim and Accessories
 - e. Domestic Water Heaters
5. FIRE PROTECTION SYSTEMS:
- a. Standpipe and Hose Systems
 - b. Wet Pipe Sprinkler Systems
6. ELECTRICAL:
- a. Service and Distribution
 - b. Service Entrance
 - c. Switchboards
 - d. Disconnects
 - e. Grounding
 - f. Transformers
 - g. Panelboards
 - h. Overcurrent Protective Devices
 - i. Contactors
 - j. Voltage Surge Suppression
 - k. Testing
 - l. Interior and Exterior Lighting Fixtures, Lamps and Accessories
 - m. Emergency Lighting
7. COMMUNICATION:
- a. Voice and Data
8. FIRE ALARM SYSTEM:
- a. System Zoning and Operations
 - b. End-Devices
 - c. Carbon Monoxide Monitoring
 - d. Supervisory and Control Interface

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- 1) Sprinkler Systems
 - 2) HVAC Fan Control
 - 3) Telephone
- e. Graphic Enunciators

END OF SECTION 01 79 00

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BSA 13501
April 21, 2013

Ohio University
Multi-Purpose Pavilion
OHU-131005