

SECTION 017823

OPERATING AND MAINTENANCE DATA

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall compile product data and related information appropriate for the University's maintenance and operation of products furnished under the Contract.
 - 1. Prepare operating and maintenance data as specified in this Section, as referenced in other pertinent sections of Specifications and as necessary to operate the completed work.
 - 2. Operations and maintenance data, in final format, shall be available to the University prior to substantial completion and in compliance with the Turnover and Closeout specification section.
- B. Instruct the University's personnel in the maintenance of products and in the operation of equipment and systems.
- C. Related Sections:
 - 1. Section 017700 – Contract Closeout Requirements
 - 2. Section 018113 – Sustainable Design Requirements
 - 3. Section 019113 – General Commissioning Requirements

1.2 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by the University's personnel. Manual shall be supplied in hard and electronic format as described below:
- B. Hard Copy Format:
 - 1. Size: 8-1/2" x 11" and a labelled USB Drive with electronic files.
 - 2. Text: Manufacturer's printed data, scanned .pdf and/or neatly typewritten Word file.
 - 3. Drawings:
 - a. Drawings are required in both hard copy and electronic format.
 - b. Provide reinforced punched binder tab, bind in with text.
 - c. Fold larger drawings to the size of the text pages.
 - 4. Provide flyleaf for each separate product, and major component parts of equipment.
 - a. Provide type description of product, and major component parts of equipment.
 - b. Provide indexed thumb tab.

5. Cover: Identify each volume with typed or printed title "OPERATIONS AND MAINTENANCE INSTRUCTIONS".

6. List:

- a. Title of Project.
- b. Identity of separate structure as applicable.
- c. Identity of general subject matter covered in the manual.

C. Binders for Hard Copy:

1. Commercial quality three-ring binders with durable and cleanable plastic covers.
2. When multiple binders are used, correlate the data into related consistent groupings.

D. Electronic Copy

1. The electronic version of the O&M Manual will contain all of the same content as the hard copy version. Electronic copies of the product data and record submittals shall be in pdf format. Drawings shall be in AutoCAD latest version or higher format.
2. Provide a series of files organized in subdirectories with a summary index with hyperlinks to the various documents and or references to separate a labelled USB Drives that contain the information.
3. When electronic submissions are made on electronic media such as a labelled USB Drives, six copies of the electronic media shall be provided.

1.3 CONTENT OF MANUAL

A. Table of contents, typewritten, for each volume, arranged in a systematic order.

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to the content of the volume.
3. List, with each product, the name, address and telephone number of:
 - a. Subcontract or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Identify the area of responsibility of each.
 - d. Local source of supply for parts and replacement.
4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets which are pertinent to the specific product.

2. Annotate each sheet to:
 - a. Clearly identify the specific product or part installed.
 - b. Clearly identify the data applicable to the installation.
 - c. Delete reference to inapplicable information.
- C. Submittal Data:
 1. Include a record copy of the final, approved product submittal. Record copy shall be a clean copy (free of notes from the design professional) which has been updated to reflect the “as-installed” system.
- D. Drawings:
 1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
 2. Coordinate drawings with information on Record Documents to assure correct illustration of completed installation.
 3. Do not use Record Documents as maintenance drawings.
- E. Written text, as required to supplement product data for the particular installation:
 1. Organize in a consistent format under separate headings for different procedures.
 2. Provide a logical sequence of instructions for each procedure.
- F. Original copy of each warranty, bond and service contract issued.
 1. Provide information sheet for the University's personnel, give:
 - a. Proper procedures in the event of failure.
 - b. Instances which might affect the validity of warranties or bonds.
- 1.4 MANUAL FOR MATERIALS AND FINISHES
 - A. Submit a CD with electronic .pdf files and two (2) copies of complete manual in final form.
 - B. Content, for architectural products, applied materials and finishes:
 1. Manufacturer's data, giving full information on products:
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for reordering special-manufactured products.
 2. Instructions for care and maintenance:

- a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods which are detrimental to the product.
 - c. Recommended schedule for cleaning and maintenance.
- C. Content, for moisture-protection and weather-exposed products:
 - 1. Manufacturer's data, giving full information on products.
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
 - 2. Instructions for inspection, maintenance, and repair.
- D. Additional requirements for maintenance data: The respective sections of Specifications.

1.5 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit electronic media containing native .pdf files and two (2) copies of complete manual in final form.
- B. Content, for each unit of equipment and system, as appropriate:
 - 1. Description of unit and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of all replaceable parts.
 - 2. Operating procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 - 3. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
 - 4. Servicing and lubrication required:
 - a. List of lubricants required.
 - 5. Manufacturer's printed operating and maintenance instructions.

6. Description of sequence of operation by control manufacturer.
 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 8. As-installed control diagrams by controls manufacturer.
 9. Each contractor's coordination drawings.
 - a. As-installed color-coded piping diagrams.
 10. Charts of valve tag numbers, with the location and function of each valve.
 11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 12. Other data as required under pertinent sections of Specifications.
- C. Content, for each electric and electronic system, as appropriate:
1. Description of system and component parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 2. Circuit directories of panel boards:
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
 3. As-installed color-coded wiring diagrams.
 4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 5. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Adjustment and checking.
 6. Manufacturer's printed operating and maintenance instructions.

7. List of original manufacturer's spare parts manufacturer's current prices, and recommended quantities to be maintained in storage.
 8. Other data as required under pertinent sections of Specifications.
- D. Additional requirements for operations and maintenance data: See the respective sections of Specifications and General Conditions.

1.6 SUBMITTAL REQUIREMENTS

- A. Submit three (3) copies of preliminary draft of proposed formats and outlines of contents thirty (30) calendar days after approved submittals. Provide two (2) copies in hard format and one (1) electronic file for the Commissioning Agent.
1. Architect will review draft and return one copy (1) with comments.
- B. Submit two (2) copies of completed data in final form twenty (20) calendar days prior the Acceptance Phase of the Project. Provide two (2) copies in hard format and one (1)
2. One (1) copy will be returned with comments.
- C. Submit specified number of copies of approved data in final form prior to final acceptance.

1.7 INSTRUCTIONS OF OWNER'S PERSONNEL

- A. Prior to final inspections or acceptance, fully instruct the University's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems in full conformance with the Turnover and Closeout Procedure and the Commissioning specification sections:
1. Instruction time shall be sufficient to fully instruct all shifts of the University's operating and maintenance personnel.
 2. Provide video and sound recording of each instructional training session.
- B. Operations and maintenance shall constitute the basis of instruction:
1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.
- C. Submit typewritten statement, signed by each of the University's Representatives who have been instructed, describing:
1. Method of Instruction.
 2. Equipment and Systems Operated.
 3. Length of Instruction Period.

- D. Contractor is fully responsible until final acceptance, even though operated by the University's personnel, unless otherwise agreed in writing.

1.8 OPERATING INSTRUCTIONS

- A. List under clear plastic (1/8" thick) all operating, maintenance and starting precautions and procedures to be followed by the University for operating all systems and equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION