

SECTION 017823
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 TYPES OF O&M MANUALS

- A. Equipment and Systems Manuals shall be provided for plumbing, HVAC, controls, electrical, fire protection, fire alarm, elevators, and special operating equipment and systems.
- B. Architectural Products Manuals shall be provided for care and maintenance of architectural products, including applied materials and finishes.
- C. Moisture Protection and Weather-Exposed Products Manuals shall be provided for instructions on inspection, maintenance and repair of products exposed to the weather or designed for moisture-protection purposes.
- D. General Products Manuals shall be provided for data and maintenance instructions for those products that are not assigned to one of the other manuals defined in this Section.
- E. The specific requirements for Manuals are identified in the Technical Specifications.

1.02 GENERAL REQUIREMENTS

- A. Each Separate Prime Contractor shall prepare Manuals for its own installations. For joint installations by the General Construction Contractor and another Separate Prime Contractor, the General Construction Contractor shall prepare and submit the Manuals. For joint installations by more than one Separate Prime Contractor other than the General Construction Contractor, the Contractor who is the principal source of information shall prepare and submit the Manuals. In the case of disagreement about which Contractor is the principal source, the University will make a determination.
- B. Unless otherwise approved or directed by the University, each Prime Contractor shall consolidate all Manuals of the different types (types identified in paragraph 1.01) into a single Manual and submittal. The Manual may have more than one volume, depending on the complexity of the system(s) or product(s).
- C. For preparation of Manuals, the Contractor shall use personnel thoroughly trained and experienced in operating and maintenance of the equipment or system involved. Where written instructions are required, the Contractor shall use personnel skilled in technical writing to the extent necessary for communication of essential data. Where drawings or diagrams are required, the Contractor shall use draftsman capable of preparing drawings clearly in an understandable format.

1.03 SUBMITTALS

- A. Manuals shall be submitted prior to Substantial Completion. In certain circumstances, the University may allow separate Manuals to be submitted for different equipment, systems, products, or components as soon as that equipment, system, product, or component involved is installed, and tested if appropriate, and determined to be acceptable by the University.

- B. The Contractor shall submit one (1) Draft O&M Manual to the University. After review by the University and/or the Professional, the University will return the Manual with any corrections to be made. The Contractor shall make necessary corrections and submit the required number, as identified below, or another number specified by the University, of Final O&M Manuals to the University.
 - 1. Equipment and Systems Manuals: three (3) copies
 - 2. Architectural Products Manuals: two (2) copies
 - 3. Moisture Protection and Weather-Exposed Products Manuals: two (2) copies
 - 4. General Products Manuals: two (2) copies
- C. In certain cases, the Contractor and the University may agree that an O&M Manual, or a copy of an O&M Manual, may be prepared and submitted in an electronic format suitable to both the Contractor and the University.
- D. For equipment or systems requiring User Training, a Draft O&M Manual for that equipment or system shall have been complete and shall be provided at the Training.

1.04 O&M MANUAL ORGANIZATION

- A. Manuals shall be prepared in the form of an instructional manual for use by University operating and maintenance personnel.
- B. Manuals shall be prepared in heavy-duty, commercial-quality, durable, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2" by 11" paper. The binder spine shall provide a clear plastic sleeve to hold labels identifying the contents. The inside cover of the binder shall provide a pocket to receive additional or folded sheets.
- C. When information for the Manuals is of significant volume, Manuals shall be organized into a set of manageable-sized binders. Where two or more binders are necessary to accommodate data, the data shall be compiled in binders in related groupings. The Project Manual table of contents shall be used as a guide. Instructions for equipment that are similar and/or part of the same or related systems shall be in a single binder, if at all possible. Where necessary, binders shall be cross-referenced to provide essential information for proper operation or maintenance of the piece of equipment or system.
- D. Each binder shall be identified on the front and on the spine with the printed title "OPERATION AND MAINTENANCE MANUAL," the Project name, and the subject matter covered. With multiple-volume sets of manuals, the identification shall indicate the volume number of each binder.
- E. When a binder is organized into separate sections for different equipment, systems, products, or components, heavy paper dividers with celluloid tabs shall be used to separate sections. The tabs shall indicate the section contents. On the divider, a typed description of the product, and major parts of equipment included, shall be provided.
- F. Protective transparent plastic jackets designed to enclose diagnostic software shall be provided for computerized electronic equipment.

1.05 O&M MANUAL CONTENT

- A. At a minimum, each Manual shall contain the following:
 - 1. title page
 - 2. table of contents
 - 3. general information
 - 4. copies of each warranty, bond, and/or service contract issued (as applicable)

- B. Additionally, each Manual shall contain a combination of the following items necessary to adequately describe and detail the installation of the product and detail its operation and maintenance:
 - 1. copies of product data
 - 2. drawings
 - 3. written text
- C. The title page should be provided in a transparent plastic envelope as the first sheet of each Manual. It should provide the following information:
 - 1. subject matter covered by the Manual
 - 2. Contract number and name
 - 3. date of submittal
 - 4. name, address, and telephone number of the Contractor
 - 5. name, address, and telephone number of the Professional for the Project
- D. A table of contents shall be provided after the title page. If there are multiple binders for a Manual, a comprehensive table of contents for all binders should be provided in each binder. The table of contents should be typewritten. The table of contents should be arranged systematically according to the Project Manual format, and should include each product identified by product name or other appropriate means.
- E. A general information section shall be provided immediately following the table of contents. This section should list each product included in the Manual, identified by product name. With each product, the list should include the names, addresses, and telephone numbers of the following:
 - 1. the subcontractor or installer
 - 2. the maintenance contractor (if applicable)
 - 3. a local source for replacement parts
- F. Product data should be in the form of manufacturer's standard printed data. Only those sheets pertinent to the part or product installed should be included. Each sheet should be marked to identify the part(s) or product(s) included in the Work.
- G. Drawings, shop drawings, or diagrams, as required, should supplement manufacturer's printed data, to illustrate the relationship between component parts of equipment or systems, or to provide control or flow diagrams.
 - 1. Drawings should be provided with reinforced punched binder tabs and bound-in with the text. Oversized drawings should be folded to the same size as the text pages so they can be used as a fold-out. For drawings too large to be used practically as a fold out, drawings should be neatly folded and placed in the front or rear pocket of the binder. For drawings provided in the front or rear binder pocket, a typewritten page should be included both in the binder and with the drawings as a cross reference.
 - 2. Record Drawings shall not be used as part of O&M Manuals.
- H. Written text shall be provided when product data is not available and information is necessary for proper operation and maintenance, when drawings need supplemental explanation for proper operation and maintenance, and/or when additional information is necessary to supplement data included in the Manual. Written text should be organized in a consistent format, outlined as appropriate, and sequenced logical under separate headings, as appropriate.

- I. A copy of each applicable warranty, equipment performance bond or certification, and service contract shall be provided. Included should be written data outlining procedures to be followed in the event of equipment or system failure, and written data identifying the circumstances and conditions that would affect validity of the warranty or bond.
- J. Equipment and Systems Manuals shall contain, in addition to those items identified in paragraph 1.05, for each piece of equipment or system, the following items.
 1. A complete description of each unit and related component parts, to include:
 - a. manufacturer's name, model number, and serial number
 - b. equipment or system function
 - c. operating characteristics
 - d. limiting conditions
 - e. performance curves
 - f. engineering data and tests
 - g. complete nomenclature and number of replacement parts (spare parts list)
 2. For each component part or piece of equipment, printed operating and maintenance instructions, assembly drawings and wiring diagrams required for maintenance, and a list of items recommended to be stocked as spare parts
 3. Detailed essential maintenance procedures, including those for routine operations, troubleshooting guide, disassembly, repair and reassembly, alignment, adjusting, and checking
 4. Detailed operating procedures, including:
 - a. start-up procedures
 - b. equipment or system break-in
 - c. routine and normal operating instructions
 - d. regulations and control procedures
 - e. instructions on stopping
 - f. shut-down and emergency instructions
 - g. summer and winter operating instructions
 - h. required sequences for electric or electronic systems
 - i. special operating instructions, including testing procedures
 5. Detailed schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts
 6. For systems requiring controls, a description of the sequence of operation and as-installed control diagrams by the control manufacturer
 7. Any Coordination Drawings
 8. Charts of valve tag numbers, with the location and function of each valve
 9. For electrical and electronic systems, complete circuit directories of panel boards, including electric service, controls, and communication
- K. Architectural Products Manuals shall contain, in addition to those items identified in paragraph 1.05, the following items.
 1. Manufacturer's Data, including:
 - a. manufacturer's catalog number
 - b. size
 - c. material composition
 - d. color

- e. texture
 - f. reordering information for specially-manufactured products
2. Care and maintenance instructions, including:
- a. manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning
 - b. information regarding cleaning agents and methods that could prove detrimental to the product
 - c. manufacturer's recommended schedule for cleaning and maintenance
- L. Moisture Protection and Weather-Exposed Products Manuals shall contain, in addition to those items identified in paragraph 1.05, Manufacturer's Data which includes:
- 1. applicable standards
 - 2. chemical composition
 - 3. installation details
 - 4. inspection procedures
 - 5. maintenance information
 - 6. repair procedures

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

(Not Used)

END OF SECTION 017823