# SECTION 01783

# OPERATION AND MAINTENANCE DATA

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

### 1.2 SECTION INCLUDES

A. Format and content of operation and maintenance manuals.
   1. Data requirements for materials and finishes.
   2. Data requirements for equipment and operating systems.

B. Instruction of University's personnel.

C. Submission of operation and maintenance manuals.

### 1.3 RELATED SECTIONS

A. Section 01310 - Coordination: Coordination documents and models prepared for performance of the Work, to be incorporated into operation and maintenance data submitted to University's Representative at Contract closeout.

B. Section 01450 - Quality Control: Manufacturer's instructions; test and balance reports.

C. Section 01610 - Basic Product Requirements: Systems demonstration.

D. Section 01770 - Contract Closeout Procedures: Contract closeout procedures.

E. Section 01785 - Product Warranties and Bonds: Requirements for warranties and bonds.

F. Section 01789 - Project Record Documents: Submission of Project record documents.

E. Product Specifications Sections in Divisions 02 through 33: Specific requirements for operation and maintenance data.

### 1.4 QUALITY ASSURANCE

A. Contractor shall ensure that preparation of data shall be done by persons:
   1. Trained and experienced in maintenance and operation of the described products.
   2. Familiar with requirements of this Section.
   3. Skilled in technical writing to the extent required to communicate essential data.
   4. Skilled as drafters competent to prepare required drawings.

### 1.5 FORMAT AND CONTENT OF OPERATION AND MAINTENANCE MANUALS

A. Format for Operation and Maintenance Data Manuals: Contractor shall prepare data in the form of an instructional manual. Contractor shall comply with the general requirements specified below and comply with specific requirements for types of products in Articles following. See Article titled "SUBMISSION OF OPERATION AND MAINTENANCE MANUALS" for number of copies of manuals.

B. Operation and Maintenance Data Organization: Contractor shall organize operation and maintenance data in three-ring binders and organize the contents of each binder following the organization of the Contract Specifications. Contractor shall:
   1. Organize the group of binders and the contents of individual binders in sequence according to the Section numbers and titles as listed in the Table of Contents of the Project Manual. Number the binders consecutively; coordinate with Paragraph below titled "Tables of Contents."
   2. Organize each binder with color-coded tabbed dividers for each distinct product and system, with typed inserts in tabs identifying the product or system.
   3. Organize the contents of each tabbed division according to the Article headings in PART 2 - PRODUCTS in each product Specification Section.
      a. Within each tabbed division, organize the information according to major component parts of equipment and systems, as applicable, and to facilitate locating information.
      b. Separate operation and maintenance data for each product under separate tabbed divisions, where feasible.
      c. Within each tabbed division, include a cover sheet identifying the specific products and component parts included in the tabbed division.
   4. If the products of more than one Specification Section are included in the binder, provide separate, heavy cover stock dividers to separate information for each Section.

C. Binders: Contractor shall use 8-1/2 x 11 inch, standard three-ring binders with heavy duty vinyl covers with hard cardboard backing, black color, with provision on binder spine for inserting identification card; Maximum binder ring size shall be three inches. Contractor shall use multiple binders as necessary to avoid overfilling. When multiple binders are used, Contractor shall correlate data into related consistent groupings.

D. Cover: Contractor shall identify each binder with typed or printed card inserted on binder spine, stating OPERATION AND MAINTENANCE DATA, the Project name and the general subject matter of the contents of the binder.

E. Title Page: In each volume (binder) of operation and maintenance data, Contractor shall include a title page with the following:
   1. Name of the Project.
   2. Names, addresses and telephone numbers of the responsible design professionals (Architect and Architect's or University's consultant, as applicable).
   3. Name, address and telephone numbers of Contractor, including names of contact persons.

F. Table of Contents: In each volume (binder) of operation and maintenance data, Contractor shall include a listing of the contents of the volume. In a separate, first binder, Contractor shall provide a master Table of Contents of operation and maintenance data, identifying the product and systems, the applicable Specification Section number and title, and the operation and maintenance data binder number.

G. Schedule of Products and Systems: In the first volume of the set of operation and maintenance data, Contractor shall include a schedule of products and systems, indexed to the Table of Contents of the volumes (binders) and cross-referenced to the Contract Drawings and Specifications.

H. Operation and Maintenance Data: In each tabbed division of operation and maintenance data for each product or system, Contractor shall provide the following:

   1. On a cover page for each tabbed division, Contractor shall provide the following:
      a. Identify by name, address and telephone number, the manufacturer, supplier and installer. Include names of contact persons, if known.
      b. Identify by name, address and telephone number, local sources of supplies, replacement parts and factory-authorized service.
   2. Within each tabbed division, Contractor shall include complete operation and maintenance data as published by the product manufacturer where feasible. Otherwise, present all data neatly typewritten on

20 pound, correspondence quality bond paper. Contractor shall strike-through information on printed literature where not applicable.

3. Contractor shall supplement the manufacturer's printed data with neatly typewritten text and professionally drafted diagrams as necessary to suit the particular installation for the Project and to fully explain operation and maintenance procedures. Contractor shall provide logical sequence of instructions for each procedure.

I. Drawings: Contractor shall supplement operation and maintenance data to illustrate configurations and relationships of component parts of equipment and systems, and to show control and flow diagrams, as applicable.
   1. Contractor shall not use Project Record Documents as maintenance drawings.
   2. Contractor shall neatly fold drawings to size of text pages and provide reinforced, punched binding edge. Add binding strip as necessary to avoid punching through drawing content.

J. Additional Data: As specified in individual product Specification Sections.

K. Warranty and Guaranty: Contractor shall include copy of each warranty, and any guaranty, bond and service contract issued. Contractor shall provide information sheet identifying:
   1. Proper procedures in event of failure.
   2. Instances that might affect validity of warranties or bonds.

L. Material Safety Data Sheet (MSDS): For products requiring MSDS, according to CCR Title 8 and the University Contractor Safety Handbook, Contractor shall include copy of each applicable Material Safety Data Sheet (MSDS) for products delivered to the site and incorporated into the completed construction.

## 1.6 DATA REQUIREMENTS FOR MATERIALS AND FINISHES

A. Data for Building Products, Applied Materials and Finishes: Contractor shall include product data, with catalog number, size, composition, and color and texture designations. Contractor shall provide information for re-ordering custom manufactured Products.

B. Instructions for Care and Maintenance: Contractor shall include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Data for Moisture Protection and Weather-Exposed Products: Contractor shall include product data listing applicable reference standards, chemical composition, and details of installation. Contractor shall provide recommendations for inspections, maintenance, and repair.

D. Additional Requirements: As specified in individual product Specification Sections.

## 1.7 DATA REQUIREMENTS FOR EQUIPMENT AND OPERATING SYSTEMS

A. Data for Equipment and Operating Systems: Contractor shall include description of each unit or system, and component parts.
   1. Include manufacturer's printed operation and maintenance instructions.
   2. Identify function, normal operating characteristics and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Include sequence of operation by controls manufacturer, as applicable.
   5. Provide diagrams by controls manufacturer for control systems, as applicable and as installed.

B. Piping Data: Contractor shall provide Contractor's coordination drawings, with piping diagrams as installed. Contractor shall provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams. Contractor shall color code diagrams as necessary for clarity.

C. Reports: Contractor shall include test and balancing reports, as applicable and as specified in individual product Specification Sections.

D. Panelboard Circuit Directories: Contractor shall provide electrical service characteristics, controls and communications.

E. Wiring Diagrams: Contractor shall include diagrams of wiring as installed, with color coding as necessary for clarity.

F. Operating Procedures: Contractor shall include:
   1. Start-up, break-in, and routine normal operating instructions and sequences.
   2. Regulation, control, stopping, shut-down, and emergency instructions.
   3. Summer and winter operating instructions.
   4. Special operating instructions.

G. Maintenance Requirements: Contractor shall include:
   1. Routine maintenance procedures and guide for trouble-shooting.
   2. Disassembly, repair, and reassembly instructions.
   3. Alignment, adjusting, balancing, and checking instructions.

H. Servicing and Lubrication: Contractor shall provide servicing and lubrication schedule, and list of lubricants required.

I. Parts Data: Contractor shall provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams as necessary for service and maintenance. Contractor shall:
   1. Include complete nomenclature and catalog numbers for consumable and replacement parts.
   2. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in stock by the University or operator.

J. Software: Contractor shall provide all programming codes, access codes and other data necessary for operation, maintenance, future functioning and modifications of microprocessor-controlled products, independent of Original Equipment Manufacturer (OEM).

K. Additional Requirements: As specified in individual product Specification Sections.

## 1.8 DATA REQUIREMENTS FOR ELECTRIC AND ELECTRONIC SYSTEMS

A. Date Requirements for Electrical and Electronic Systems: Contractor shall provide description of each system and component parts, including:
   1. Function, normal operating characteristics and limiting conditions.
   2. Performance curves, engineering data and tests.
   3. Complete nomenclature and commercial number of replaceable parts.

B. Circuit Directories of Panel Boards: Contractor shall include:
   1. Electrical service.
   2. Controls.
   3. Communications.

C. Wiring Diagrams: As-installed, color-coded wiring diagrams.

D. Operating procedures: Contractor shall provide:
   1. Routine and normal operating instructions.
   2. Sequences required.
   3. Special operating instructions.

E. Maintenance procedures: Contractor shall provide:
   1. Routine operations.
   2. Guide to "trouble-shooting."
   3. Disassembly, repair and reassembly.
   4. Adjustment and checking.

F. Contractor shall provide Manufacturer's printed operating and maintenance instructions.

G. Contractor shall provide list of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

H. Contractor shall prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

I. Additional requirements for operating and maintenance data: Respective sections of specifications.

**1.9 INSTRUCTION OF UNIVERSITY'S PERSONNEL**

A. Instruction of University's Personnel: Prior to Contract Completion review, Contractor shall complete instruction of University's designated personnel in the operation, adjustment and routine cleaning, service and maintenance of products, equipment, and systems. Contractor shall schedule indoctrination and training sessions at times acceptable to University. Contractor shall coordinate with requirements specified in Section 01820 - Demonstration and Training.

B. Basis for Instruction: Contractor shall use operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

C. Instructional Material: Contractor shall prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

**1.10 SUBMISSION OF OPERATION AND MAINTENANCE MANUALS**

A. Submittal: Contractor shall submit six copies to Architect for review and approval prior to submission of final Application for Payment.

**PART 2 - PRODUCTS**

Not Applicable to this Section.

**PART 3 - EXECUTION**

Not Applicable to this Section.

**END OF SECTION**