

**SECTION 01 78 23**  
**OPERATION AND MAINTENANCE DATA**

**PART 1 GENERAL**

1.1 SECTION INCLUDES:

- A. Format and content of manuals
- B. Instruction of Owner's personnel
- C. Schedule of submittals

1.2 QUALITY ASSURANCE

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.3 FORMAT

- A. Prepare data in the form of an instructional manual.
- B. Prepare data in electronic format and submit on CD or DVD.
  - 1. Submit four (4) copies of the CD or DVD
  - 2. When multiple disks are used, correlate data into related consistent groupings
- C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of project; identify subject matter of contents.
- D. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- E. Provide manufacturer's printed data, or typewritten data.
- F. Drawings: Provide with reinforced punched binder tab; fold larger drawings to size of text pages.
- G. Prepare a table of contents for each volume, with each product or system description identified, in three parts as follows:
  - 1. Part 1: Directory listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section for each category, identify names, addresses, and telephone numbers of subcontractors and suppliers.
    - a. Significant design criteria
    - b. List of equipment and parts list for each component
    - c. Operating instructions
    - d. Maintenance instructions for equipment and systems
    - e. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
  - 3. Part 3: Project documents and certificates, including the following:
    - a. Shop drawings and product data
    - b. Product submittals as outlined in Section 01 33 00, Paragraph 1.5.
    - c. Certificates and originals of warranties and bonds

1.4 CONTENTS, EACH VOLUME

- A. Provide a table of contents with title of project; names, addresses, and telephone numbers of Architect, Sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- B. For each product or system list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

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- C. Product data - mark each document sheet to identify specific products and component parts, and data applicable to installation, delete inapplicable information.
  - D. Drawings - supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
  - E. Typed text as required supplementing product data, providing logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 40 00.
  - F. Warranties - bind in a copy of each as specified in Section 01 78 36.
  - G. Bonds - bind in photocopy and original of each.
- 1.5 MANUAL FOR MATERIALS AND FINISHES
- A. Building products, applied materials, and finishes - include product data, with catalog number, size, composition, and color and texture designations.
    - 1. Provide information for reordering custom manufactured products.
    - 2. Provide complete itemized paint color list stating manufacturer, color name, interior or exterior, and finish for each color used.
  - B. Instructions for care and maintenance - include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
  - C. Moisture protection and weather-exposed products - include product data listing applicable reference standards, chemical composition, and details of installation.
    - 1. Provide recommendations for inspections, maintenance, and repair.
  - D. Additional requirements as specified in individual product specification sections.
- 1.6 MANUAL FOR EQUIPMENT AND SYSTEMS
- A. Refer to Section 01 91 00 – Commissioning for additional requirements concerning Systems Operations & Maintenance Manuals.
  - B. For each item of equipment and each system, include the description of the unit or system, and component parts identifying function, normal operating characteristics, and limiting conditions.
    - 1. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
  - C. Panel board circuit directories - provide electrical service characteristics, controls, and communications by label machine.
    - 1. Include color-coded wiring diagrams as installed.
  - D. Operating procedures include:
    - 1. Startup, break-in, and routine normal operating instructions and sequences
    - 2. Regulation, control, stopping, shut down, and emergency instructions
    - 3. Summer, winter, and any special operating instructions
  - E. Maintenance Requirements include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
  - F. Provide servicing and lubrication schedule, and list of lubricants required.
  - G. Include manufacturer's printed operation and maintenance instructions.
  - H. Include sequence of operation by controls manufacturer.
  - I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
  - J. Provide control diagrams by controls manufacturer as installed.
  - K. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.

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- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

1.7 INSTRUCTION OF OWNER PERSONNEL

- A. See Section 01 91 00 – "Commissioning" for requirements on Instruction of Owner Personnel.
- B. Before final inspection, instruct the Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- C. List all equipment requiring seasonal operation performance instructions for other seasons within six months.
- D. Use operation and maintenance manuals as basis for instruction.

1.8 SUBMITTALS

- A. Submit two final draft copies of completed volumes fifteen days prior to the scheduled Functional Performance Testing, the Architect/Engineer, and Commissioning Authority will return with comments after functional performance testing.
  - 1. Revise content of all document sets as required prior to final submission.
  - 2. Final Draft Operations and Maintenance Manuals will include updated information from the Preliminary Draft Operations and Maintenance Manuals.
  - 3. Final Draft Operations and Maintenance Manuals will include System Sequence of Operations, including all set points, as approved prior to Functional Performance Testing.
- B. Submit two sets of Final Operations and Maintenance Manuals, within ten days after final inspection at least fifteen days prior to substantial completion.
- C. The Final Operations and Maintenance Manuals will incorporate review comments from the Owner, Commissioning Authority, and Architect/Engineer.
- D. The Final Operations and Maintenance Manuals shall incorporate any changes in the Systems Sequences of Operations identified during Functional Performance Testing.
- E. See Section 01 91 00 – Commissioning for requirements on Submittals of Operation & Maintenance Data.

**PART 2 PRODUCTS**

2.1 Not Used.

**PART 3 EXECUTION**

3.1 Not Used.

END OF SECTION