

## GENERAL REQUIREMENTS for CONSTRUCTION

### SECTION 017823 - OPERATION AND MAINTENANCE MANUALS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections and Contractor's Submission Schedule, apply to this Section.

##### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance manual for systems, subsystems, and equipment.
  - 2. Product maintenance data.
  - 3. Systems and equipment maintenance data.
- B. Related Sections:
  - 1. Section 017700 – Contract Closeout Requirements
  - 2. Section 018113 – Sustainable Design Requirements
  - 3. Section 019113 – General Commissioning Requirements

##### 1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

##### 1.4 CLOSEOUT SUBMITTALS

- A. Required Manuals: Section 017700 – Contract Closeout Requirements describes number and type of copies required for contract closeout requirements.

#### PART 2 - PRODUCTS

##### 2.1 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Organize the manual into separate sections by CSI number based on the table of contents of the project manual, for each system and subsystem, and a separate section for each piece of equipment not part of a system. The manual shall contain the following materials, in the order listed:

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1. Title page.
2. Table of contents.
3. Manual contents:
  - a. Operation data.
  - b. Product maintenance data.
  - c. Systems and equipment data

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. [Name and contact information for Construction Manager.]
7. Name and contact information for Design Professional.
8. [Name and contact information for Commissioning Agent.]
9. Names and contact information for major consultants to the Design Professional that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Electronic Copy: Submit electronic (PDF) copy of the manual, to the Design Professional, concurrent with Action Submittal.

### 2.2 OPERATION DATA

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Section and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Operating standards.
3. Operating procedures.
4. Operating logs.
5. [Wiring diagrams.]
6. Control diagrams.
7. Piped system diagrams. |

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8. Precautions against improper use.
9. License requirements including inspection and renewal dates. |

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts. |

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures. |

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification. |

### 2.3 PRODUCT MAINTENANCE DATA

A. Content: Organize data into a separate section, within the O & M Manual, for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in section identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.

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3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Guarantees: Include copies of warranties and guarantees lists of circumstances and conditions that would affect validity of warranties.
1. Include procedures to follow and required notifications for warranty claims.

### 2.4 SYSTEMS AND EQUIPMENT MAINTENANCE DATA

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in a separate section within the O & M Manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.

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5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties: Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties.
1. Include procedures to follow and required notifications for warranty claims. |

### PART 3 - EXECUTION

#### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation shall be provided for review, concurrent, with Action Submittal specified in Individual Specification Section.
1. Correct or modify the manual to comply with the Design Professional's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Design Professional's and Commissioning Authority's comments and prior to commencing demonstration and training.
- B. Product Maintenance Data: Assemble a complete set of maintenance data, in a separate section, within the O & M Manual, indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Data: Assemble a complete set of operation and maintenance data, in a separate section, within the O & M Manual, indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate section within the O & M Manual, for each system and subsystem, in the form of an instructional manual for use by operating personnel.
- D. Manufacturers' Data: Where manual contain manufacturers' standard printed data; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format,

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identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in As-built Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of operation and maintenance manuals.

END OF SECTION 017823