

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements the preparation and submittal for operating and maintenance manuals including the following:
 - 1. Operating and maintenance manuals for building systems or equipment.
 - 2. Instruction manual covering the care, preservation and maintenance of architectural products and finishes.
 - 3. Instruction of Owner's operating personnel in operation and maintenance of building systems and equipment.

1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittal and content is acceptable.
 - 2. The Contractors shall clarify and update reviewed manual content to correspond to all revisions and field conditions made after submittal review.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit on digital media acceptable to Architect and by uploading to web-based project software site. Enable reviewer comments on draft submittals.
 - 2. Submit paper copies as indicated: Submit Emergency Manuals in hard copy and electronic form as indicated unless otherwise agreed to in writing by the Owner and Architect.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
 2. Unless otherwise agreed to in writing by the Owner and Architect, provide a minimum of one hard copy binder for each manual indicated in this Section, in addition to text searchable annotated electronic file(s). The Contractor shall coordinate and confirm all content, desired hard copy binders for each manual and any desires of the Owner for manual medium for building operations and maintenance.
- E. Comply with Section 01 77 00 for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. All PDF files shall be searchable.
 2. File Names and Bookmarks: Bookmark individual documents based on Specification Division, Section and file names for easy navigation and searching. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Emergency Manuals, Paper Copy: Submit emergency manuals in the form of hard copy as well as electronic, bound and labeled volumes.
1. Binders: Heavy duty, three ring, vinyl covered, loose leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 inch by 11 inch (215 mm by 280 mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "EMERGENCY MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple volume sets.
 2. Dividers: Heavy paper dividers with plastic covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.

4. Supplementary Text: Prepared on 8-1/2 inch by 11 inch (215 mm by 280 mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.5 CONTENT OF MANUALS

- A. Arrange typewritten table of contents for each volume, in systematic order:
 1. List of each product required to be included with name, address, and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Local source of supply for parts and replacement.
 2. Identifying each product by product name and other identifying symbols.
- B. Product Data:
 1. Include only those sheets which are pertinent to specific product with product clearly identified.
 2. Delete references to inapplicable information.
 3. Annotate each sheet to clearly identify specific product or part installed, and data applicable to installation.
- C. Drawings:
 1. Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and systems and control and flow diagrams.
 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
- D. Written Text: As necessary to supplement product data for the installation to provide logical sequence of instructions for each procedure, organized in a consistent format and in logical sequence of instructions for each procedure.
- E. Recommended Spare Parts: Furnish a list of recommended spare parts for each equipment item that will be needed to support that item of equipment for a 12 month period. Spare parts list shall contain the following information:
 1. Parts Descriptions.
 2. Manufacturer's Part Number.
 3. Shelf Life.
 4. Recommended Quantity.
 5. Unit Price.

6. Name and address of the part manufacturer.
7. Name and address of a local supplier for the part.

1.6 EQUIPMENT AND SYSTEMS MANUAL REQUIREMENTS

- A. Submit electronic copies of completed manuals 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 replaceable parts.
 2. Operating procedures:
 - a. Start up, break in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shutdown 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 schedule, including 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, price lists, illustrations, assembly drawings and diagrams required for maintenance, predicted life of parts subject to wear and items recommended to be stocked as spare parts.
 8. As-installed control diagrams by controls manufacturer.
 9. Each subcontractor's coordination drawings including as installed color coded piping diagrams.
 10. Charts of valve tag numbers, with location and function of each valve.
 11. Water treatment procedures and tests.
 12. Final balancing reports for mechanical systems.
 13. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 14. 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.

- d. Circuit directories of panelboards.
 - e. Electrical service.
 - f. Controls.
 - g. Communications.
 2. As installed color coded wiring diagrams.
 3. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 4. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Adjustment and checking.
 5. Manufacturer's printed operating and maintenance instructions.
 6. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 7. Other data as required under pertinent sections of specifications.
 - D. Include warnings of detrimental maintenance practices.
 - E. Prepare and include additional data when need for such data becomes apparent during instruction of Owner's personnel or as required under pertinent Specification Section.
 - F. Refer to individual Sections of Project Manual for additional requirements for operating and maintenance data.
 - G. Provide complete information for products and equipment specified in:
 1. Division 11: Equipment
 2. Division 14: Conveying Equipment
 3. Division 21: Fire Suppression
 4. Division 22: Plumbing
 5. Division 23: Heating, Ventilating, and Air-Conditioning (HVAC)
 6. Division 26: Electrical Systems.
 7. Division 27: Communications
 8. Division 28: Electronic Safety and Security
- 1.7 EMERGENCY MANUALS
- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
 - B. Prepare emergency manuals and data bound in commercial quality 3-ring binders for immediate use in emergency situations:

1. Organize with index tabs.
 2. Identify each volume with type or printed title as instructed by Owner.
 3. Annotated electronic files are also required for each manual.
- C. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- D. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- E. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- F. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.
- 1.8 ARCHITECTURAL PRODUCTS MANUAL REQUIREMENTS
- A. Submit annotated electronic files in final form unless otherwise required by the LAHJ.
 - B. Refer to individual Sections of Project Manual for submittal requirements.
 - C. Content: Manufacturer's data, giving full information on products, catalog numbers, sizes, and composition; and finish designations.
 - D. Information required for re-ordering.
 - E. Instructions for care and maintenance.
 1. Manufacturer's recommended lubricants.

2. Manufacturer's recommendations for types of cleaning agents and methods.
 3. Cautions against cleaning agents and methods which are detrimental to product.
 4. Recommended maintenance and cleaning schedule.
- F. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

1.9 ARCHITECTURAL FINISHES MANUAL REQUIREMENTS

- A. Submit annotated electronic files in final form unless otherwise required by the LAHJ..
- B. Contractor is to provide finish information and samples of actual materials installed in Project. Provide separate line item for each type of finish installed. Attach small sample of each finish that matches finish installed. Provide information on manufacturer, catalog number, finish designation, or other information necessary for Owner to match finish in the future.
- C. Refer to individual Sections of Project Manual for submittal requirements.
- D. Contractor will provide heavy, cardboard pages printed in required page format, approved by Architect, to attach samples and information to for assembly into notebook format.
- E. Contractor shall compile information and samples for Manual on Architectural Finishes throughout construction period to simplify assembly at Project closeout.

1.10 SUBMITTAL SCHEDULE

- A. Submit electronic file of completed data in final form 30 days prior to demonstrations of equipment.
- B. Copy will be returned approved or with comments for revisions.
- C. Submit approved data in final form within 10 days prior to equipment demonstrations and prior to final inspection or acceptance.

1.11 INSTRUCTIONS OF OWNER'S PERSONNEL

- A. Prior to final inspection, instruct the Owner's personnel in operation, adjustment, and maintenance of products equipment and systems. Provide instruction at mutually agreed upon times.
 1. For equipment that requires seasonal operation, provide similar instruction during other seasons.
 2. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain aspects of operation and maintenance.

SERVERFARM - ARK1
DESIGN DEVELOPMENT

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PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION