

**1.1 SECTION INCLUDES**

- .1 Project Record Documents.
- .2 Operations and Maintenance data.

**1.2 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 77 00 - Closeout Procedures.

**1.3 PROJECT RECORD DOCUMENTS**

- .1 Departmental Representative will provide two (2) white print sets of contract drawings and two (2) copies of Specifications Manual specifically for "as-built" purposes.
- .2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.
- .3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.
- .4 'As-Built' Drawings:
  - .1 Record changes in red ink on the prints. Mark only on one set of prints during construction. At completion of work, neatly transfer notations to second set (also by use of red ink).
  - .2 Once red-line As-Built drawings are completed, electronically scan the As-builts at full-size and sufficiently high resolution to allow legibility and clarity of reading the information.
  - .3 Submit both sets of As-Built drawing mark-ups as well as the electronic scan files to Departmental Representative at completion of Work.
  - .4 Stamp all drawings with "As-Built Drawings". Label and place Contractor's signature and date.
  - .5 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
- .5 Record following information:
  - .1 Depths of various elements in relation to a specified datum.
  - .2 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;
  - .3 Field changes of dimension and detail;
  - .4 Location of all new building services and utilities;
  - .5 Chases for mechanical, electrical and other services;
  - .6 All design details dimensions and marked-up to consistently report finished installation conditions;
  - .7 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;
  - .8 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

### **1.3 PROJECT RECORD DOCUMENTS (continued)**

- .6 'As-Built' Specifications: legibly mark in red each item to record actual construction.
- .7 Maintain 'As-Built' documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

### **1.3 REVIEWED SHOP DRAWINGS**

- .1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations & Maintenance manuals.
- .2 Submit full sets at same time and as part of the contents of the Operation and Maintenance Manuals specified.

### **1.4 OPERATIONS AND MAINTENANCE MANUAL**

- .1 Operations & Maintenance Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.
- .2 Manual Language: final manuals to be in English language.
- .3 Number of copies required:
  - .1 Submit two (2) interim copies of the manual for review and inspection by Departmental Representative. Make revisions and additions as directed and resubmit.
  - .2 Upon review and acceptance by Departmental Representative, submit four (4) final hard copies plus three (3) electronic copies in DVD format.
    - .1 Ensure all electronically scanned documents included in the O & M manuals are of sufficiently high resolution to allow legibility and clarity of reading the information.
  - .3 Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
- .4 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to application for Certificate of Substantial Performance of the work.

**1.5 OPERATIONS AND MAINTENANCE MANUAL (continued)**

- .5 Binding:
  - .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
  - .2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
  - .3 Where multiple binders are needed, correlate data into related consistent groupings.
  - .4 Identify contents of each binder on spine.
  - .5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
  - .6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
  - .7 Type lists and notes. Do not hand write.
  - .8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .6 Manual Contents:
  - .1 Cover sheet containing:
    - .1 Date submitted.
    - .2 Project title, location and project number.
    - .3 Names and addresses of Contractor, and all Sub-contractors.
  - .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
  - .3 List of maintenance materials.
  - .4 List of spare parts.
  - .5 List of special tools.
  - .6 Original or certified copy of warranties and product guarantees.
  - .7 Copy of approval documents and certificates issued by Inspection Authorities.
  - .8 Copy of reports and test results performed by Contractor as specified.
  - .9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:
    - .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.
    - .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
    - .3 Parts list.
    - .4 Installation details.
    - .5 Operating instructions.
    - .6 Maintenance instructions for equipment.
    - .7 Maintenance instructions for finishes.

**1.5 OPERATIONS AND MAINTENANCE MANUAL (continued)**

- .7 Shop drawings:
  - .1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.
  - .2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
  - .3 When large quantity of data is submitted, place into separate binders of same size as Operations & Maintenance binders.
- .8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:
  - .1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include complete nomenclature and commercial number of replaceable parts.
  - .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
  - .3 Include installed colour coded wiring diagrams.
  - .4 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
  - .5 Manufacturer's printed operation and maintenance instructions.
  - .6 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
  - .7 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
  - .8 Include test and balancing reports.
  - .9 Additional requirements as specified in individual specification sections.
- .9 Materials and Finishes Maintenance Data:
  - .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
  - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
  - .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
  - .4 Additional Requirements: as specified in individual specifications sections.

1.5 OPERATIONS AND MAINTENANCE MANUAL (continued)

- .10 Maintenance Materials:
  - .1 Extra stock Materials:
    - .1 Provide maintenance materials, in quantities specified in individual specification Sections.
    - .2 Maintenance materials to be from same manufacturer, product line and run as items installed in the Work.
    - .3 Deliver maintenance materials to site and store in location as directed by Departmental Representative.
    - .4 Maintenance materials are not to be used to correct deficiencies.
  - .2 Special Tools:
    - .1 Provide special tools, in quantities specified in individual specification Sections.
    - .2 Provide tags identifying their associated function and equipment.
    - .3 Deliver to site and store in location as directed by Departmental Representative.
- .11 Warranties:
  - .1 Submit, warranty information to Departmental Representative for approval.
  - .2 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
    - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
    - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
    - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, after completion of applicable item of work.
    - .4 Verify that documents are in proper form, contain full information, and are notarized.
    - .5 Co-execute submittals when required.
    - .6 Retain warranties and bonds until time specified for submittal.
  - .3 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
  - .4 Conduct one-year warranty inspection, measured from time of acceptance, by Departmental Representative.
    - .1 Provide list for each warranted equipment, item, feature of construction or system indicating:
      - .1 Name of item.
      - .2 Model and serial numbers.
      - .3 Location where installed.
      - .4 Name and phone numbers of manufacturers or suppliers.
      - .5 Names, addresses and telephone numbers of sources of spare parts.

**1.5 OPERATIONS AND MAINTENANCE MANUAL (continued)**

.11. 4 (continued)

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- .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
- .7 Cross-reference to warranty certificates as applicable.
- .8 Starting point and duration of warranty period.
- .9 Summary of maintenance procedures required to continue warranty in force.
- .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .2 Procedure and status of tagging of equipment covered by extended warranties.
- .3 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .5 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .6 Written verification to follow oral instructions.

**1.6 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS**

- .1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.
- .2 Tag all items with associated function or equipment.
- .3 Provide items of same manufacture and quality as items in Work.
- .4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.
- .5 Clearly mark as to contents indicating:
  - .1 Part number.
  - .2 Identification of equipment or system for which parts are applicable.
  - .3 Installation instructions or intended use as applicable.
  - .4 Name, address and telephone number of nearest supplier.
  - .5 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

**END OF SECTION**