

**PART 1 – GENERAL****SUMMARY**

- A. Provide operation and maintenance manuals for all new operating equipment and systems furnished by the Contractor, and all materials and finishes as noted in specific specification sections.

**RELATED REQUIREMENTS**

- B. Section 01 31 01, Building Information Modeling (BIM)

**O&M, COMMISSIONING, TRAINING and WARRANTY SUBMITTALS**

- C. Delivery Method

The Contractor shall provide the Owner's Authorized Representative (OAR) the manual for the Project as follows:

1. Hardbound, submit two (2) copies of preliminary draft of the complete manual; or,
  2. Electronically, notify the OAR, through the appropriate methodology (Unifier), that an electronic submittal has been uploaded and is ready for review and comment.
  3. If any content will not upload into the Unifier system, deliver electronic material to the OAR in the form of a DVD or external hard drive(s) in digital PDF format, for review and comment.
  4. The Owner's Authorized Representative will review the draft and return one (1) hardbound copy, or electronically through the Unifier system, with submittal comments.
  5. Upon successful completion of all O&M or Warranty manual edits, the OAR will advise, and the final accepted version will be uploaded into the Unifier database, in the proper destination folder. An approved O&M hardbound copy will be published in its complete form and delivered with a transmittal to the OAR.
  6. Delivery Quantity- All contractors will follow established Unifier Business Processes (BP). Upload all approved Project Record documents into the appropriate folder in the Unifier system. This includes, but is not limited to, O&M, Warranty, Project Record Drawings, and Training DVD's. In addition, one (1) hardbound copy and three (3) DVD copies of all finalized and approved O&M, Warranty, Project Record Drawings and two (2) Training DVDs are required to be delivered to the OAR. In lieu of DVDs, external hard drive(s) shall be acceptable.
- D. Provide final O&M Manual(s) for all equipment placed into service and operated by the Owner prior to Final Acceptance.
  - E. Utilizing the Owner provided data collection spreadsheet(s), complete the ETAM 101-New Equipment/Asset Inventory Form, ETAM 102-New Equipment/Asset Preventive Maintenance Task and Schedule Form, the ETAM 104-Equipment Warranty Information Form, and/or the Equipment De-commissioning Checklist

as determined by Owner representatives. <https://www.dfwairport.com/development/index.php> - ETAM Equipment Asset Information EAM Forms. The content for these forms can be extracted from the BIM models which must have the incorporated data built into them. Refer to Section 01 31 01 Building Information Modeling (BIM), if applicable, for BIM related procedures.

- F. Produce and deliver a professional quality video DVD recording for each training / instruction session. DVD will be shot and produced by experienced videographers. DVD's of inadequate quality will be remade at Contractor's expense. OAR approved DVD's will be uploaded into the Unifier database in the appropriate location folder by the contractor. If the upload is not successful, see 1.2, A, 3.

G. **FORMAT of ELECTRONIC SUBMITTAL – O&M AND WARRANTY**

Upload all O&M or WARRANTY data in digital PDF format in the Unifier System in the correct location. If the upload is not successful, see 1.2, A, 3. The Table Of Contents directory will be Hyper-linked to the corresponding O&M, shop drawing, and warranty chapters for expedited access. All digital PDF material is to be formatted for Optical Character Recognition (OCR).

Exported spreadsheets integrated into the ETAM required spreadsheets will be required to be uploaded in the Unifier System.

Upload final Reconciled FM Models that incorporate all of the Data equivalent to the ETAM data sheets into the DFW Common Data Environment (CDE).

H. **FORMAT of HARDBOUND SUBMITTAL – O&M AND WARRANTY**

Prepare hard-copy data in the form of an instructional manual

Binders: Commercial quality, 8-1/2 x 11 inch, 3 (3") inch ring binders with hardback, cleanable, plastic covers. Binder assembly will not exceed 75% of Binder capacity. If multiple binders are required for a complete series, correlate O&M data into related consistent groupings.

Binder and DVD cover preparation: Identify each binder with typed or printed title "Operation And Maintenance Instructions"; or "Warranty" list title and location of Project; DFW Airport Contract and Permit numbers, identify subject matter of contents. Identify each Volume '**X** of **Y**' where it is the **X**th volume of **Y** total volumes in each O&M set for the project; Identify each volume as being in 'Set **A** of **B**' where the volume is part of the **A**th set of **B** total final O&M Manual sets provided for the project. Spine: Insert filler Tab that contains the Contract Name, "Operation and Maintenance Instructions", or "Warranty" title line, and the Contract and Permit Number. DVD Labels are to be the adhesive type, professionally printed and contain same project information relative to the project.

Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

Provide tabbed flyleaf for each separate product and system, with typed description of product and major component parts of equipment.

Text: Manufacturer's original printed data. No second-generation print will be accepted.

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Shop Drawings: Provide with reinforced punched binder tab. Bind in with text, fold larger drawings to size of text pages.

#### QUALITY ASSURANCE

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

#### NEWLY PREPARED DRAWINGS

- A. Newly Prepared Record Drawings: Prepare new drawings instead of following procedures specified for preparation of Record Drawings where new drawings are required by a Change Order issued as a result of acceptance of an alternate, substitution, or other modification and the Architect/Engineer determines that neither the original Contract Drawings nor the shop Drawings are suitable to show the actual installation.

Consult the Architect/Engineer for the proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction.

When completing newly prepared Drawings, utilize the procedures specified for organizing, copying, binding and submittal of Record Drawings. All drawings will include the required DFW "project record" stamp and professional seals, contract and permit numbers, and printed name and signature of the authorized contracted individual.

- 3. All final Project record Drawings will be built from the finalized project CAD files and assembled in a digital PDF format. NO handwritten comments will be accepted on finalized Record Drawings in PDF format. All comments, lines, shapes, etc., will be incorporated into the CAD set prior to the assembly of the final PDF Record Drawings. Both CAD and PDF files are to be copied to a DVD and delivered to the OAR, with appropriate project information on label.

#### 1.2 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designation. Provide information for re-ordering custom manufactured products.
- A. 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.
- B. Moisture-protection and Weather-exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- C. Additional Requirements: As specified in individual Specifications sections.
- D. Provide a listing in Table of Contents for design data, with tabbed flysheet and space for insertion of data.

#### MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Each item of Equipment and Each System: Include description of unit or system, and component parts. Give function, normal operating characteristics, and limiting

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- conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- B. Panel board Circuit Directories: Provide electrical service characteristics, controls, and communications.
  - C. Include as-installed color-coded wiring diagrams.
  - D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.
  - E. Maintenance Requirements: Include routine procedures and guide for troubleshooting; disassembly, repair, re-assembly 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 "as-installed" control diagrams by controls manufacturer.
  - K. Provide Contractor's coordination drawings, with "as-installed" color-coded piping diagrams.
  - L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
  - M. Provide list of original manufacturer's spare parts, and recommended quantities to be maintained in storage for a 12-month period for OAR review and approval. 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.
  - N. As applicable, include test and balancing reports, manufacturer factory test reports and certifications, system commissioning and operation testing reports, system start-up reports, and system maintenance reports prior to turn over.
  - O. Additional Requirements: As specified in individual Specification sections.
  - P. Provide a listing in Table of Contents for design data, with tabbed flysheet and space for insertion of data.

**PART 2 – PRODUCTS**

**2.1 CONTENTS, EACH VOLUME**

- A. Table of Contents: Provide title of Project; names, addresses and telephone numbers of Owner's Authorized Representative 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.
- C. Product Data: Mark each sheet to clearly 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. Do not use Project Record Documents as maintenance drawings.
- E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- F. Warranties: Bind/Insert copy at the end of each applicable section.

**PART 3 - EXECUTION**

Not Used.

**PART 4 - MEASUREMENT AND PAYMENT**

Not Used.

**- END OF SECTION -**