

## **OPERATING AND MAINTENANCE DATA**

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### **1. GENERAL**

#### **1.1 Description**

- .1 This Section supplements the requirements for the provision of O&M Manuals as described in Section 01300.
- .2 Furnish complete operations manuals and maintenance information as specified in this Section for installation check-out, operation, maintenance, and lubrication requirements for each unit of mechanical, electrical, and instrumentation equipment or system and each instrument.
- .3 Customize the operations manuals and maintenance information to describe the equipment actually furnished. Do not include extraneous data for models, options, or sizes not furnished. When more than one model or size of equipment type is furnished, show the information pertaining to each model, option, or size.

#### **1.2 Submittals**

- .1 The submission and acceptance of the "Equipment Operating and Maintenance Instruction" manual is a condition precedent to the certification of Substantial Performance.
- .2 Submit operation manuals and maintenance information in accordance with Section 01300. Submittals may be checked for general compliance with the requirements of this Section.
- .3 Submit complete operations manuals and maintenance information as soon as possible after review of project submittals but no later than 120 calendar days before the date of Substantial Performance.
- .4 Submit operations and maintenance data in electronic format: text sections compatible with Microsoft Word; drawings and graphics in PDF format.

#### **1.3 General Requirements**

- .1 Provide materials of equal clarity and quality as the originals.
- .2 Provide drawings, diagrams, and manufacturer's literature which are legible.
- .3 All instructions in the O&M Manuals are to be in simple language.
- .4 Edit manufacturer's standard documents to delete extraneous information not applicable to the equipment, assembly, subassembly, or material supplied. Cross out or remove and eliminate any extraneous material for models, options, or sizes not furnished.

### **2. PRODUCTS**

- .1 Not used

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### 3. EXECUTION

#### 3.1 Contents and Organization

- .1 Provide the manufacturer's standard O&M Manuals for the equipment or instrument supplied. If the Manufacturer's standard manuals do not contain all the required information, provide the missing information in supplementary documents and drawings.
- .2 When more than one piece of identical equipment or instruments is supplied, provide only one (1) set of operations manuals.
- .3 One (1) set of operations manuals may be provided when more than one piece of similar equipment or instruments are supplied, such as different sizes of the same model, and all similar pieces are covered in the same standard manufacturer's O&M Manual.
- .4 When similar equipment or instruments are provided by the same manufacturer, but are not covered in the same standard manufacturer's O&M Manual, their specific manuals may be included in the same electronic manual.
- .5 Provide a cover page, as the first page of each manual, with the following information:
  - .1 Contract name and number
  - .2 Equipment number or, if more than one piece of equipment is provided, equipment numbers for equipment or instruments covered by the manual. Include functional description of equipment after each number.
- .6 Provide a table of contents listing the contents of the manual and identifying where specific information can be located.
- .7 Include the specific information described below in the O&M Manuals:
  - .1 General Information
    - .1 Functional title of the system, equipment, material, or instrument
    - .2 Relevant Specification Section number and Drawing reference
    - .3 Address and telephone number of the manufacturer and the nearest manufacturer's representative
  - .2 Equipment Data
    - .1 Insert Specification Section and completed equipment and instrumentation data sheets for equipment supplied. Attach all addenda, change orders, and change directives that refer to that specific item of equipment.
    - .2 One month prior to shipping the asset to site, the THPS Supplier shall submit, in an electronic format, a detailed asset datasheet that lists all equipment, all connected devices, and product specifications. Format of the asset datasheet to be approved by the City.

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- .3 Operation Information
  - .1 Include the manufacturer's recommended step-by-step procedures for starting and stopping under normal and emergency operation. Include all specified modes of operation including recommended operation after the assembly or equipment has been in long-term storage.
  - .2 Provide control diagrams with data and information to explain operation and control of systems and specific equipment. Identify normal operating setpoints and alarm conditions.
  - .3 Provide technical information on all alarms and monitoring devices provided with the equipment.
- .4 Technical Data
  - .1 Insert manufacturer's technical specification and data sheets.
  - .2 Insert manufacturer's certified performance and calibration curves for the equipment and instruments.
- .5 Maintenance Information
  - .1 Provide descriptions and schedules for manufacturer's recommended routine preventative maintenance procedures including specific lubrication recommendations. Indicate service intervals: daily, weekly, monthly, quarterly, semi-annually, annually, or after "X" hours of operation.
- .6 Maintenance Instructions
  - .1 Provide requirements to set up and check out each system for use. Include all required and recommended step-by-step inspections, lubrications, adjustments, alignments, balancing, and calibrations. Include protective device settings and warnings and cautions to prevent equipment damage and to insure personnel safety.
  - .2 Provide manufacturer's description of routine preventive maintenance, inspections, tests, and adjustments required to ensure proper and economical operation and to minimize corrective maintenance and repair.
  - .3 Provide manufacturer's recommendations on procedures and instructions for correcting problems and making repairs.
  - .4 Provide step-by-step procedures to isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or requires replacement.
  - .5 Provide step-by-step procedures and list special required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies,

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subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings, and adjustments required.

### **.7 Assembly Drawings**

- .1 Provide Drawings which completely document the equipment, assembly, subassembly, or material for which the instruction is written. Provide the following Drawings as applicable: fabrication details, wiring and connection diagrams, electrical and piping schematics, block or logic diagrams, shop drawings, installation drawings, layout and dimension drawings, and electrical component fabrication drawings.
- .2 Provide clear and legible illustrations, Drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies.

### **.8 Bills of Materials**

- .1 Provide a clear, legible copy of the bill of materials that was shipped with the equipment. The bill of materials should list all equipment, instruments, components, accessories, tools, and other items that were shipped with the equipment.

### **.9 Lubrication Data**

- .1 Provide a table showing recommended lubricants for specific temperature ranges and applications.
- .2 Provide charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
- .3 If the equipment or instrument is not lubricated, add a sheet under this Tab with the words "Not Applicable".

## **3.2 Field Changes**

- .1 Following the acceptable installation and operation of an equipment item, modify and supplement the item's instructions and procedures to reflect any field changes or information requiring field data.

## **3.3 Commissioning Data**

- .1 Provide hard cover three-ring binder for 215 mm x 280 mm paper labelled on both the cover and spine "Commissioning Data" three (3) copies of:
  - .1 All completed equipment testing and commissioning forms, arranged in specification section order.

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- .2 All completed equipment checklists and performance reports, including noise and vibration analysis, instrumentation calibration data, and all other relevant information.
- .3 All system performance reports
- .2 In addition to the above specified binders, provide a disc (compact disc or DVD) of the above documents scanned into electronic format.

#### **3.4 Warranties**

- .1 Provide hard cover three-ring binder for 215 mm x 280 mm paper labelled "Warranties" three (3) copies of:
  - .1 A list in Specification Section order of all warranties and guarantees required by the Contract Documents and all manufacturers' standard warranties and guarantees. Include contact names and telephone numbers. Indicate the time frame of each warranty or guarantee on the list.
  - .2 For each asset that has a warranty, detailed warranty information as follows;
    - .1 Asset name
    - .2 Asset ID
    - .3 Warranty ID
    - .4 Warranty name
    - .5 Warranty description
    - .6 Warranty duration
    - .7 Warranty units (months)
    - .8 Warranty status
    - .9 Manufacturer name
    - .10 Manufacturer part number
    - .11 Vendor name
    - .12 Contact name
    - .13 Contact title
    - .14 Contact phone number
    - .15 Contact fax number
    - .16 Contact email

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- .17 Contact website
- .3 Include a copy of all written warranties and guarantees.

**END OF SECTION**