
DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
CEGS-01730 (MM/YY)

Superseding
CEGS-01730 (MM/YY)

GUIDE SPECIFICATION FOR CONSTRUCTION

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12/98

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GUIDE SPECIFICATION FOR CONSTRUCTION

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OPERATION AND MAINTENANCE SUPPORT INFORMATION (OMSI)
12/98

NOTE: This guide specification covers the requirements for O&M Manuals for Aircraft Refueling systems as part of the Air Force Type III Standard (78-24-28-88). This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-700 for military construction and in accordance with ER 1110-2-1201 for Civil Works construction.

PART 1 GENERAL

1.1 REFERENCES

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest change (Notice) to this guide specification. During the reference reconciliation process, SPECSINTACT will automatically remove references from this paragraph that have been removed from the text.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

Defense Logistics Agency Handbook

H4-I (June 82) Federal Supply Code for Manufacturers; United States and Canada-name to Code

Contractor Responsibility

The Contractor is responsible for providing the technical publications specified herein for all of the components, assemblies, sub-assemblies, attachments, and accessories, required to be supplied in accordance with submittal requirements of each - specification section, regardless of

whether the item was manufactured and assembled in-house or obtained from other sources.

1.2 SUBMITTALS

OMSI Submittal Requirements

OMSI submittals are required in order that complete documentation can be assembled to provide the Government "Activity" with the necessary information and orientation to adequately operate and maintain the new structures/facilities of this project. The Contractor shall submit the OMSI documents and information specified for the equipment listed under the OMSI submittal paragraphs in each technical section. Five (5) copies of each OMSI submittal shall be forwarded to the Contracting Officer no later than 120-days prior to contract completion. OMSI submittals are to be submitted separate from and in addition to Contractor's product approval submittals.

PART 2 PRODUCTS

2.1 DEVELOPMENT OF SUBMITTALS

Provide submittals in separate folders consistent with the Contractor's standard practice. Manufacturer's manuals or data for the components, assemblies, subassemblies, and other operating parts which are provided shall be assembled into a loose-leaf notebook-type folder, indexed by major assembly and component in sequential order. Manuals shall be complete in all respects for all equipment, controls, and accessories provided.

2.2 IDENTIFICATION

On each folder identify and mark as follows:

a. Inscribe on the cover, the words, "OPERATION AND MAINTENANCE MANUAL", the name and location of the building, and the contract number.

b. Equipment manufacturer and/or Contractor's address and telephone number; names, address and telephone numbers of each subcontractor installing equipment; and local representative for each item of equipment.

c. Volume number and title of the folder.

d. The manual shall have a table of contents and be assembled to conform to the table of contents with the tab sheets placed before instructions covering the subject. Sub-divide manuals or provide separate manuals for each of the following categories.

- (1) Operating Instructions
- (2) Maintenance, Service, and Repair Instructions
- (3) Parts Manual

PART 3 EXECUTION

3.1 OPERATING INSTRUCTIONS

The operator's instructions shall include specific instructions and illustrations of the equipment operation required or recommended by the

manufacturer as follows:

3.1.1 Safety

Include manufacturer's safety precautions to be observed while operating under all conditions for which the equipment was designed. Clearly list all major hazards to personnel and equipment safety that are peculiar to systems and equipment described in the manual.

3.1.2 Operator Prestart

Include instructions for prestart checks, lubrication, and service requirements necessary for setting up or preparing each system for use, warm up procedures, and verification of normal operation. Include control diagrams with data to explain detailed operation and control of each item of the equipment.

3.1.3 Starting and Shutdown Procedures and Controls

Include a control sequence describing start up operation and provide shutdown procedures and post-shutdown requirements.

3.1.4 Normal Operating Instructions

Instructions shall be sufficient to enable the mechanic to adjust, stop and start, and operate the equipment properly. Special startup precautions shall be noted, as well as other items requiring action before the equipment may be put into service. Include detailed drawings indicating procedure and valve numbers and status as to normally open/closed.

3.1.5 Emergency Operating Procedures

Include action to be taken in the event of a malfunction of the unit, either to permit a short period of continued operation or to prevent further damage to the unit and to the system in which it is installed.

3.1.6 Operator Service Requirements

Include instructions for operator service requirements during operation of the equipment.

3.1.7 Instruction to Government Personnel

The Contractor shall furnish the services of competent instructors who will give full instruction to the designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements, of the equipment or system specified. Each instructor shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. A minimum of 1 man-day (8-hours) of instruction shall be furnished for each system specified in other sections. When more than 4 man-days of instruction are specified, approximately half of the time shall be used for classroom instruction. All other time shall be used for instruction with the equipment or system. When significant changes or modifications in the equipment or system are made under the terms of the contract, additional instruction

shall be provided to acquaint the operating personnel with the changes or modifications. Government representatives shall be allowed to video tape all classroom and field instructions.

3.2 MAINTENANCE, SERVICE AND REPAIR INSTRUCTIONS

The shop or maintenance manual shall include manufacturer's instructions to maintain the equipment in a safe and serviceable condition. The maintenance or shop manual shall contain all necessary instructions, illustrations, charges and diagrams covering, as a minimum, the items listed below.

3.2.1 Lubrication Instructions

- a. Include a table showing recommended lubricants for specific temperature ranges and applications.
- b. Include chart(s) with schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities. Provide a lubrication schedule showing service interval frequency.

3.2.2 Table of Preventative Maintenance Instructions

Include frequency in time, miles or hours covering routine servicing, lubrication, and adjustments.

3.2.3 Preventative Maintenance Inspection

Points and checklist should be clearly spelled out as part of operator-type inspection in this section. Include chart with schematic diagram and/or a separate inspection checklist - indicating what should be examined for wear or possible malfunction and what should be reported for repair.

3.2.4 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step procedures to enable prompt isolation of the cause of a malfunction with corrective maintenance instructions. Instructions shall clearly indicate why the check out is performed and what conditions are to be sought.

3.2.5 Removal and Replacement Instructions

Provide step-by-step procedures for removal, replacement, disassembly and assembly of all components, assemblies, sub-assemblies, accessories, and attachments normally subjected to wear, damage, malfunction, and frequent replacement. These instructions should provide for a judicious combination of text and illustrations.

3.2.6 Maintenance and Repair Procedure

NOTE: IF THE COMMAND FUELS FACILITY ENGINEER DIRECTS THE DESIGNER TO HYDROSTATICALLY TEST THE SYSTEM TO 1.5 TIMES THE DESIGN PRESSURE, EXCEEDING THE FLANGE RATING, THE DESIGNER SHALL BE REQUIRED TO WRITE THE COMMISSIONING HYDROSTATIC TESTING PROCEDURES; REMOVING ALL BALL VALVES, CONTROL

VALVES, AND INSTRUCTING THE TESTING PEOPLE WHAT VALVES TO CLOSE, WHERE TO CONNECT THE HYDROSTATIC TEST PUMP, BLIND FLANGE PLACEMENTS, AND OTHER SAFETY REQUIREMENTS. IT WILL ALSO BE NOTED THAT THIS TEST IS TO BE DONE EVERY FIVE YEARS, AS DETERMINED BY THE COMMAND FUELS FACILITY ENGINEER.

Provide instructions for tolerances, dimensions, settings, and adjustments normally required for performing routine maintenance servicing. Instructions shall provide the necessary information to bring equipment up to the required serviceable standard when it becomes unserviceable. Include instructions for examining equipment for needed repairs and adjustment, and any tests or inspections required to determine whether or not parts must be replaced.

3.3 PARTS MANUAL

3.3.1 Contents

The parts manual shall provide positive identification and coverage for all of the parts of components, assemblies, sub-assemblies, and accessories of the end item normally subject to wear, malfunctioning, damage, or loss. Include any special hardware requirements (eg., high-strength bolts and nuts). The parts manual may cover more than one model or series or equipments, components, assemblies, subassemblies, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice. Identification of the parts shall be such that all parts may be ordered and centrally stocked by the government without further identification to the make, model, and serial number of the equipment being provided.

3.3.2 Illustrations, Drawings, and/or Exploded Views

Provide clear and legible illustrations, drawings, and/or views to enable easy identification of all individual parts, components, assemblies, sub-assemblies, and accessories of the end item. Show part numbers and description on illustrations or list separately. When the illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to listed part. Parts shown in the listings shall be grouped by components, assemblies, and sub-assemblies with individual parts identified to the assembly.

3.3.3 End Item Manufacturer's Part Numbers

Include parts for which the end item manufacturer has proprietary rights or has exercised design control, and for which the end item manufacturer is the logical supplier. The end item manufacturer shall also assign numbers to purchased production parts, if such parts are altered to meet the prime manufacturer's design configuration. (Repainting, marking, or other nonsignificant operations are not adequate cause for use of exclusively assigned numbers).

3.3.4 Components Assemblies/Parts

Include those components assemblies/parts purchased by the end item

manufacturer for which the end item manufacturer does not have control, and shall be identified by the actual manufacturer's name and part numbers. Detail parts in the manufacturer's assembly, as well as attaching parts, for which the manufacturer does not have design control shall also be identified by the applicable actual manufacturer's parts numbers. This paragraph does not restrict the end item manufacturer from assigning part numbers as long as the actual manufacturer's part number and the Federal Supply Code for Manufacturer H4-1 (FSCM) or manufacturer is shown.

3.3.5 Appendices

End item manufacturer may add an appendix for cross-reference to implement components assemblies/parts requirements when implementation in manual form varies drastically with the style, format, and method of Contractor's standard commercial practice. Subject cross-referenced in an appendix will appear in the following format:

End Item Manufacturer's Alpha Numeric Seq.	Actual Manufacturer's Name and/or FSCM* From H4.1~	Actual Manufacturer Part No.
100001	John Doe & Co. 000000	2000002

*Federal Supply Code for Manufacturers
Cataloging Handbook, Name to Code

3.4 VALIDATION

Each submittal shall be validated by the Contractor or Manufacturer as being accurate and applicable to the systems and equipment provided.

3.5 SPECIFIC EQUIPMENT SUBMITTALS

The technical sections of this specification identify the specific equipment or systems for which OMSI submittals are required. This paragraph and its subparagraph contain a general list of various types of equipment and systems together with the OMSI information required for each type. The applicable OMSI information contained in this paragraph shall be submitted for each specific piece of equipment or system listed under the "OMSI Submittals" paragraph in the technical sections. Operating instructions; maintenance, service, and repair instructions; and parts manuals shall conform to the requirements of their respective paragraph herein. Provide validation in accordance with Paragraph: VALIDATION for all submittals.

3.5.1 Pressure Gages

- a. Manufacturer's descriptive literature, general.
- b. Parts manuals and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Manufacturer's name, model number, serial number, Federal Stock Number (if any).

3.5.2 Automatic Pump Controls

Includes Pressure Indicating Transmitters, Flow Switches, Venturi Tubes, Differential Pressure Transmitters.

- a. Manufacturer's descriptive literature, general.
- b. Parts manual.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specified conditions.
- g. Control wiring diagrams showing all terminations of conductors (and all control devices) labeled to permit identification in the field;
part numbers of all control devices; normally open or normally closed; voltage of all control components.
- h. Name, address and telephone number of the nearest manufacturer's representative.

3.5.3 Meters

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specified conditions.
- g. Name, address and telephone number of the nearest manufacturer's representative.

3.5.4 Oil/Water separator and Accessories

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specified conditions.

- g. Name, address and telephone number of the nearest manufacturer's representative.

3.5.5 Product Recovery Tank and Accessories

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specified conditions.
- g. Name, address and telephone number of the nearest manufacturer's representative.

3.5.6 Hydrant Outlet Pits, Isolation Valve Pits, High Point Vent and Low Point Drain Pits

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- e. Name, address and telephone number of the nearest manufacturer's representative.

3.5.7 Operating Tank Level Indicator

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specified conditions.
- g. Control wiring diagrams showing all terminations of conductors (and all control devices) labeled to permit identification in the field; part numbers of all control devices; normalcy open or normally closed; voltage of all control components.
- h. Name, address and telephone number of the nearest manufacturer's representative.

3.5.8 Pantographs

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specified conditions.
- g. Name, address and telephone number of the nearest manufacturer's representative.
- h. SSEA approval letter.

3.5.9 Piping and Fittings

- a. Certificates of Compliance.
- b. Batch run numbers.
- c. Manufacturer's descriptive literature, general.
- d. Name address and telephone number of manufacturer.

3.5.10 Manual Valves

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specified conditions.
- g. Where specified to have limit switches, control wiring diagrams showing all terminations of conductors (and all control devices) labeled to permit identification in the field; part numbers of all control devices; normally open or normally closed; voltage of all control components.
- h. Name, address and telephone number of the nearest manufacturer's representative.

3.5.11 Flexible Ball Joints

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.

- c. Maintenance, service and repair instructions.
 - d. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
 - e. Name, address and telephone number of the nearest manufacturer's representative.
- 3.5.12 Gaskets and Isolating Gasket Kits
- a. Manufacturer's descriptive literature, general.
 - b. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
 - c. Name, address and telephone number of the nearest manufacturer's representative.
- 3.5.13 Strainers
- a. Manufacturer's descriptive literature, general.
 - b. Parts manual and recommended spare parts list.
 - c. Maintenance, service and repair instructions.
 - d. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
 - e. Name, address and telephone number of the nearest manufacturer's representative.
- 3.5.14 Protective Coatings
- a. Manufacturer's descriptive literature, general.
 - b. Maintenance, service and repair instructions.
 - c. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
 - d. Name, address and telephone number of the nearest manufacturer's representative.
- 3.5.15 Sample Connections
- a. Manufacturer's descriptive literature, general.
 - b. Parts manual and recommended spare parts list.
 - c. Maintenance, service and repair instructions.
 - d. Operating Instructions.
 - e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
 - f. Name, address and telephone number of the nearest manufacturer's

representative.

3.5.16 Filter Separators

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- f. Performance data at specifies conditions.
- g. Name, address and telephone number of the nearest manufacturer's representative.

3.5.17 Water Draw-Off System

- a. Manufacturer's descriptive literature, general.
- b. Maintenance, service and repair instructions.
- c. Operating Instructions.
- d. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- e. Name, address and telephone number of the nearest manufacturer's representative.

3.5.18 Pumps - Fueling, Fuel Transfer, Product Return

- a. Manufacturer's descriptive literature, general.
- b. Parts manual and recommended spare parts list.
- c. Maintenance, service and repair instructions:
- d. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- e. Performance data at specified flow rates. Performance shall include:
 - (1) Head developed, horsepower required and efficiency.
 - (2) Pump curves, flow and power requirements, efficiency, head and operating speed. Curves to show operating points at full range of operating conditions.
- f. Control wiring diagrams showing all terminations of conductors (and all control devices) labeled to permit identification in the field; part numbers of all control devices; normally open or normally closed; voltage of all control components and operational description.

- g. Plan and elevation views of equipment showing clearance required for maintenance and/or replacement.
- h. Name, address and telephone number of the nearest manufacturer's representative.
- i. Shipping and operating weights.
- j. Operating instructions.
- k. Factory run test curves indicating flow, head rpm, vibration amplitude and BHP.

3.5.19 Flexible Hoses

- a. Manufacturer's descriptive literature, general.
- b. Maintenance service and repair instructions.
- c. Manufacturer's name, model number, serial number.
- d. Name, address and telephone number of the nearest manufacturer's representative.

3.5.20 Control Valves

(Submit for each type control valve specified)

- a. Manufacturer's descriptive literature, general.
- b. Operational description of valve and control pilots.
- c. Description of valve assembly complete with parts list.
- d. Recommended spare parts list for main valve and pilot control systems.
- e. Instructions for trouble shooting.
- f. Maintenance, service and repair instructions.
- g. Manufacturer's name, model number and stock number.
- h. Operational Test Data.

3.5.21 Engine-Generator

- a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the system or equipment.
- b. A control sequence describing startup, operation, and shutdown.
- c. Description of the function of each principal item of equipment.
- d. Installation and maintenance instructions.

- e. Safety precautions.
- f. Diagrams and illustrations.
- g. Testing methods.
- h. Performance data.
- i. Lubrication schedule including type, grade, temperature range, and frequency.
- j. Parts list: The list shall indicate sources of supply, recommended spare parts, and name of servicing organization'.
- k. List qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

3.5.22 Fire Alarm and Fire Detecting System

- a. Manufacturer's descriptive literature, general.
- b. Parts manual.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Drawing of component arrangement, schedule of components with sizes, types, and ratings, and wiring diagrams.
- f. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- g. Name, address and telephone number of the nearest manufacturer's representative.

3.5.23 Motor Control Center

- a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the system or equipment.
- b. A control sequence describing startup, operation, and shutdown.
- c. Description of the function of each principal item of equipment.
- d. Installation and maintenance instructions.
- e. Safety precautions.
- f. Diagrams and illustrations.
- g. Parts list.
- h. Drawing of component arrangement, schedule of components with sizes, types, and ratings.

- i. Manufacturer's name, model number, serial number.
- j. Name, address and telephone number of the nearest manufacturer's representative.

3.5.24 Non-Automatic Transfer Switch

- a. Manufacturer's descriptive literature, general.
- b. Parts list.
- c. Maintenance, service and repair instructions.
- d. Operating Instructions.
- e. Drawing of component arrangement, schedule of components with sizes, types, and ratings, and wiring diagrams.
- f. Manufacturer's name, model number, serial number, Federal Stock Number (if any).
- g. Name, address and telephone number of the nearest manufacturer's representative.

3.5.25 Pump Control Panel (PCP)

- a. General description and specifications.
- b. Comprehensive discussion of both hardware and operating program.
- c. Installation and initial checkout procedures.
- d. Detailed electrical and logical description.
- e. Complete troubleshooting procedures, diagrams, and guidelines.
- f. Complete alignment and calibration procedures for components.
- g. Preventive maintenance requirements.
- h. Detailed system schematics, system field assembly drawings, and system component specifications and dimensions.
- i. Complete spare parts lists.
- j. Interface requirements and capabilities.
- k. Signal identification and timing diagrams.
- l. Complete as-built bill of materials, control drawings, schedules, and sequence of operations.
- m. Safety precautions.
- n. Control sequence describing start-up, operation, and shutdown. Control sequence shall be integrated with startup and operation of

the motor control center.

- o. Part list which shall indicate sources of supply, recommended spare parts, and name of servicing organization.
- p. Manufacturer's name, address, and telephone number.

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