

**DEPARTMENT OF THE ARMY  
U. S. Army Corps of Engineers  
Washington, DC 20314-1000**

**GUIDANCE FOR THE PREPARATION  
OF  
TECHNICAL MANUALS (TM)**

**Prepared By:**

**CEHNC-ED-ES-G**

**MAY 1996**

## GUIDANCE FOR THE PREPARATION OF TECHNICAL MANUALS

1. Introduction. This guidance has been developed to provide instruction on the mechanics of preparing manuscripts for the U.S. Army Corps of Engineers 5-800 series technical manuals. The guidance reflects the requirements of AR 25-30 which is the governing document for preparation of Department of the Army technical manuals. For convenience and in order to save time for technical manual authors, excerpts from AR 25-30 are included in Attachment A. The U.S. Government Printing Office (GPO) Style Manual should be consulted for word forms, abbreviations and other matters of basic presentation.

2. General Requirements. Technical manuals in the 5-800 series establish criteria and guidance for the design of facilities for the Army. In preparing technical manuals the author should recognize the role of regulations in establishing policy, the role of specifications in establishing contract requirements, the role of training schools in providing technical training, and the role of research in advancing innovations. Technical manuals should be in tune with policy, but should not be used to establish new policy. Technical manuals should be consistent with established practices of contract administration, but should not attempt to establish detailed contract requirements or procedures. Technical manuals should be consistent with teaching methods, but should not be devised solely as teaching textbooks. Technical manuals should permit limited innovation on selected projects, but should not advocate broad innovation on all projects. The author should also recognize that a technical manual published in final form is a Department of Army document and must comply with DA requirements regarding format, coordination, publication, and distribution.

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a. Writing Style. The style of writing should be appropriate for the user and for the purpose intended. "Will" is used to indicate mandatory requirements. "Can" and "may" are used to permit a choice or express a guideline. "Should" is advisory and indicates a desirable procedure. Personal pronouns (I, you, we) are not to be used. Neutral language will be used when either male or female is intended.

b. Abbreviations and Acronyms. Use of abbreviations and acronyms will be held to a minimum and will be defined the first time they appear in a chapter. Use abbreviations and acronyms only for terms that appear repeatedly. As an alternative, abbreviations and acronyms used in the manual may be listed in a separate paragraph or in a glossary.

c. Units of Measure. The International System of Units (SI) will be used when the inch-pound (IP) units do not control the subject matter, text, tables, figures, formulas, and numeric example problems, except where metrication conflicts with codes and standards.

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(2) Make references specific. Do not use general references, such as "current directives," "Department of the Army instructions," "existing regulations" and "pertinent publications."

(3) Agency or command publications and forms generally are not valid references.

(4) Publications cited in the text must be listed in a reference paragraph or appendix.

e. Organization. A manual may be divided to improve readability; for example, parts, chapters, sections, paragraphs, and subparagraphs (to the third subdivision, which is a letter enclosed in parentheses). When subdividing an element, at least two of the same subdivision must be used e.g., if a paragraph has a subparagraph (a), it must also have a subparagraph (b). All parts, chapters, sections, and paragraphs must have a title (except for paragraphs in an appendix, which need not be titled). Subparagraphs may or may not be titled. However, if one subparagraph has a title, all subparagraphs within that paragraph at the same level must have titles. Keep organization simple. A small TM may consist of numbered paragraphs with no other subdivisions. More complex TM's are divided into chapters, and paragraphs are numbered by chapter (1-1, 1-2; 2-1, 2-2, etc.).

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6. Example Manuscript. Attachment B is an example manuscript compiled from various existing manuscripts to show how normal situations are handled.

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8. Example SI Units. Attachment D provides examples of the use of metric measurements in technical manuals.

9. Problems to Avoid. Attachment E provides a list of problem areas frequently encountered and guidance on how they can be avoided.

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No. 5-8XX-X

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DEPARTMENT OF THE ARMY  
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**TITLE**

Paragraph page

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IF MANUAL CONTAINS FIGURES, LIST THEM FOLLOWING THE TABLE OF CONTENTS.

LIST OF FIGURES

- Figures
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  - 3-2. Airfield runway, Taxiway, Apron, and Overrun Grades.
  - 3-3. Airfield Primary Surface End Details.
  - 4-1. Helicopter VFR Runway.
  - 4-2. Helicopter IFR Runway.

IF MANUAL CONTAINS TABLES, LIST THEM FOLLOWING THE LIST OF FIGURES.

LIST OF TABLES

- Table
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  - 2-2. Taxiways.
  - 2-3. Parking Aprons.
  - 3-1. Holding (Engine Runup) Aprons.
  - 3-2. Overrun.

MARGIN: 1" TOP BOTTOM, AND BOTH SIDES  
MAIN PARAGRAPHS ARE BLOCKED

TEXT MATERIAL WILL BE DOUBLE SPACED  
AND TYPED ON ONE SIDE OF PAGE ONLY

## CHAPTER 1

CHAPTERS AND MAIN PARAGRAPHS WILL

### INTRODUCTION

PURPOSE PARAGRAPH STATES SIMPLY AND DIRECTLY WHAT THE MANUAL DOES

1-1. PURPOSE. This manual establishes the minimum water supply requirements for fire protection and domestic purposes at various small military projects.

SCOPE PARAGRAPH STATES SIMPLY AND DIRECTLY THE COVERAGE AND LIMITATIONS OF THE MANUAL

1-2. SCOPE. This manual prescribes the duration and rates of flow required for fire hydrant hose streams and establishes criteria concerning the treatment of water, pumping, pneumatic pressure systems, and the location of fire hydrants. Many special projects and tactical sites have special water requirements that are not covered by other Technical Manuals; this manual covers water supply requirements for some of these sites. Requirements for sites not mentioned will be covered by special instructions from HQUSACE (CEMP-ET), Washington, D.C. 20332-1000, for Army projects; and HQ, USAF/LEEE, Washington, D.C. 20332, for Air Force projects.

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"The following documents form a part of this manual to the extent referenced."

1-3. REFERENCES. Appendix A contains a list of references used in this manual.

1-4. UNITS OF MEASUREMENT. The unit of measurement in this manual is the International System of Units (SI). In some cases inch-pound (IP) measurements may be the governing critical values because of applicable codes, accepted standards, industry

practices, or other considerations. Where the IP measurements govern, the IP values may be shown in parenthesis following a comparative SI value or the IP value may be shown without a corresponding SI value.

1-5. EXPLANATION OF ABBREVIATIONS AND TERMS. Abbreviations and special terms used in this manual are explained in the glossary.

KEEP QUOTATIONS TO A MINIMUM

ACRONYMS ARE TO BE IDENTIFIED THE FIRST TIME THEY APPEAR IN THE TEXT

approach departure zone - A trapezoidal area, symmetrical about the extended runway center line and expanding outward from the ends of the primary surface or the clear area of hoverpoints. Provide for the "straight-in" approach "straight-out" departure to insure a satisfactory level of safety and regulation for aircraft.

autorotation lane - A helicopter landing lane or designated area on a runway for the purpose of practicing landings under simulated engine failure or certain other simulated emergency conditions.

aviation intermediate maintenance (AVIM) - Units that provide mobile, responsive "one-stop" maintenance and repair of equipment for return to user.

aviation unit maintenance (AVUM) - Activities staffed and equipped to perform high frequency "on aircraft" maintenance tasks required to retain or return aircraft

to a serviceable condition. aviation runup area (holding apron) - A paved area adjacent to the taxiway near the runway end where final preflight warmup and engine and instrument checks are performed.

ground point of intercept (GPI) - A point in the vertical plane of the runway centerline or

center of a helipad at which it is assumed that the straight line extension of the glide scope (flight path) intercepts the approach surface base line.

UNDERLINED MATERIAL IN MANUSCRIPT APPEAR IN ITALICS IN PRINTED DOCUMENT

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DO NOT DIVIDE LOWER THAN THE THIRD LEVEL.  
INDENT SUBDIVISIONS AS FOLLOWS:

1-1 LEFT MARGIN (MAIN PARAGRAPH)

a. INDENT 3 SPACES

(1) INDENT 6 SPACES

(a) INDENT 9 SPACES

b. Family Housing at Tactical Sites,

(1) When the maximum single-floor area of the largest building does not exceed 92.9 square meters, the water supply system will be designed to simultaneously supply a fire flow rate of 31.5 liters per seconds (500 gallons per minute) and the domestic demand for 2-hour duration.

(2) When the single-floor area of a building exceeds 465 square meters, refer to MIL-HDBK 1008 for ARMY users and AFM 88-10, Vol. 6 for Air Force user for fire protection water supply requirements for that building.

c. Air Control and Warning Stations. The water supply will be designed to simultaneously provide a 31.5 L/s (500) gpm fire flow rate and domestic water demand for a 2-hour duration.

d. Reserve Centers.

(1) When the reserve center is of noncombustible construction with a maximum floor area of 1,100 square meters or of heavy timber, ordinary, or wood frame construction with a maximum floor area of 740 square meters, the water supply

system will be designed to simultaneously provide a 63 L/s (1,000 gpm) fire flow rate and the domestic demand for a 2-hour duration.

(2) When the building floor area exceeds these limits, refer to MIL-HDBK 1008 for Army users and AFM 88-10, Vol. 6 for Air Force users for fire protection water supply requirements.

SHORT LISTINGS CAN BE USED IN TEXT WITHOUT NUMBER SIMPLPLY INDENTING

2-6 DESIGN AND SELECTION OF PAVEMENTS FOR ARMY AIRFIELDS.

a. Army airfield pavements will be designed according to the mission requirements of each airfield. Airfield pavements may consist entirely of one or a combination of the following classes of pavements:

CLASS	PLANNED AIRCRAFT TRAFFIC	DESIGN BASIS
I	Rotary- and fixed-wing aircraft with  maximum gross weights equal to or less  than 9,070 kg (20,000 lb.)	Note 1
II	Rotary-wing aircraft with maximum gross  weights between 9,071 and 22,680 kg  ( 20,001 and 50,000 lb.)	Note 2
III	Fixed-wing aircraft with maximum gross  weights between 9,070 and 79,380 kg  (20,001 and 175,000 lb.)  and having one of the gear configurations  related in Note 3.	Note 3
IV	Multiple wheel fixed-wing and rotary-wing	Note 4



aircraft other than those considered for  
Class III pavement.

Note 1. Class I pavement design is based on the standard service vehicles used at all Army airfields. This pavement class will accommodate all Army fixed-wing and rotary-wing aircraft except the CH-47 and CH-54's. This pavement design will be used for all airfield facilities other than where Class II, III, or IV pavement design is required. The design is based on 50,000 passes of the most critical aircraft in this class.

#### 5-4 HELICOPTER HOVERPOINTS.

a. General Information. A hoverpoint is a prepared and marked surface used as a reference or control point for arriving or departing helicopters.

b. Layout Criteria. A hoverpoint consists of a paved area 9.1 meters in diameter, domed to a 150 mm height at the center. If a hoverpoint is established on existing pavement, the 150 mm dome need not be constructed. A typical layout of a hoverpoint is illustrated in figure 5-7.

1-1/2" (10 SPACES)

Figure 5-7. Helicopter Hoverpoint.

FIGURE REFERENCE IS SHOWN IMMEDIATELY  
AFTER PARAGRAPH IN WHICH FIRST MENTIONED

1-1/2" (10 SPACES)

LOWER CASE FULL SPELLING REFERENCE TO SPECIFIC CHAPTER,  
PARAGRAPHS, TABLE OR FIGURE. ABBREVIATIONS AND LOWER CASE  
FOR PARENTHETICAL REFERENCE: (chap 5) (para 16) (fig 2-1) etc.

Table 4-2. Domestic Hot-Water Temperatures.

1-1/2" (10 SPACES)

Table 4-3. Hot-Water Demand Per Fixture.

1-1/2" (10 SPACES)

Table 4-4. Hot-Water Demand Per Capita.

(1) The gallons of water per person to be heated each day, the number of hours assumed for the duration of the average heating load, and the number of hours assumed to determine peak hourly requirements will conform with local conditions. The water heating and storage requirements may be determined on the per capita per day basis by using the equation 4-1.

$$A = \frac{GN}{B}$$

(eq 4-1)

EQUATION IDENTIFICATION

COMPLEX EQUATIONS SHOULD BE FURNISHED CAMERA-READY

For mixture of two or more seed kinds, compute as shown in the example in table 7-1 for a 50-50 mixture of Kentucky bluegrass and chewing fescue:

**INCLUDE SIMPLE TABLES AS PART OF THE MANUSCRIPT**

Table 7-1. Mixture Rate.

<u>Seed Kind</u>	Percent kind by Weight in <u>Mixture</u>	Percent Pure Live Seed of <u>Each Kind</u>	Percent Pure Live Seed in <u>Mixture</u>
Kentucky bluegrass	50	68	34
Chewing fescue	50	78	39
Total pure live seed in mixture, %			73
Other than pure live seed, %			27
			100

e. Seed Rates. For single, unmixed species, the data for seeding rate shown in table 7-2 are normally adequate without further computation.

Table 7-2. Seeding Rates.

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### REFERENCES

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##### Departments of the Army and the Air Force

TM 5-811-1/AFM 88-9, Ch. 1  
TM 5-811-4

Electric Power Supply and Distribution  
Electrical Design Corrosion Control

TM 5-812-1

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TM 5-814-3/AFM 88-11, Vol.1

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##### National Bureau of Standards (NBS)

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Publication COM 75-1045 (52 pages) Monograph 31 (July 3, 1961)

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Gehm, H.W. and Bregman, J.I., Handbook of Water Resources and Pollution Control, van Nostrand Reinhold, New York, 1976

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TM PAGE CONTAINING THE COPYRIGHTED**

**SAMPLE  
CREDIT LINES**

When the copyright holder requests a certain credit line, use that wording  
When a credit line is not supplied by the copyright holder, use the following  
example:

Reprint with permission from Smith and Jones, Elements of Electricity,  
p.25, ©1984 by Johnson Corporation.

When noncopyrighted material is used, it is desirable to acknowledge the  
source by a credit such as the following:

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## ATTACHMENT D

### METRIC

#### 1. UNITS OF MEASURE

The International System of Units (SI) will be used unless it is contrary to either the standard practice within the design discipline, or to the product being specified. Detail guidance is available in 8 December 1994 CEMP-E document titled REQUIREMENTS FOR THE USE OF METRIC IN CRITERIA AND GUIDANCE DOCUMENTS, which is available on CCB and TECHINFO in the CEGS database as file METRIC.DOC.

a. When consistent with codes, standards, and industry practices, and where SI products are determined to be practical, economically feasible, and unlikely to cause significant inefficiencies, metric designations used in technical manuals shall be hard SI values, and the corresponding IP values will not be shown.

b. Dual SI and IP units will only be used when approved or directed by CEMP-E and where measurements are governed by critical IP values, that is, where IP values are required to comply with applicable codes and standards that have not been converted to the SI system. In such cases, the SI unit will be a conservatively rounded conversion of the IP value unless an exact conversion is required by the code, standard or practice. When dual units are used, the IP unit will govern, and the SI unit will always appear first; for example: 25 millimeters (0.98 inch).

#### 2. FIGURES AND TABLES

For graphics, figures and tables other than scaled drawings, critical IP units may be combined with SI units in a format that is clear and concise. Otherwise, separate SI and IP figures and tables should be developed when IP measurements are critical.

b. A table will retain IP values only when IP units govern. If IP units govern (soft metric conversion) two tables one with the SI values and one with IP values may be used for clarity if necessary.

#### HARD METRIC TABLE

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<u>Duct Size</u>	<u>Diagonal Angles</u>	<u>Horizontal Angles</u>	<u>Bolt Size</u>
150 sq mm	50x50x1.5 mm	50x50x1.5 mm	6 mm
1375 sq mm	64x64x1.5 mm	64x64x1.5 mm	10 mm

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## SOFT METRIC TABLE

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<u>Duct Size</u>	<u>Diagonal Angles</u>	<u>Horizontal Angles</u>	<u>Bolt Size</u>
150 sq mm (30 in sq)	50x50x1.5 mm (2x2x16 gauge)	50x50x1.5 mm (2x2x16 gauge)	6 mm (1/4 in)
1375 sq mm (54 sq in)	64x64x1.5 mm (2-1/2x2-1/2x16 gauge)	64x64x1.5 mm (2-1/2x2-1/2x16 gauge)	10 mm (3/8 in)

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### 3. PIPING.

Piping, pipe fittings and valves will be indicated in dual units so that the IP units can be used to relate back to the referenced industry standard.

### 4. CONTROL FOR HVAC.

Control equipment and devices including theromostats meters, gauges, operating ranges, setpoints, actuator signals and pressures will be shown in IP units only.