

National Defense Industrial Association

(NDIA)

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**Fundamentals**

**of**

***“Engineering Drawing Practices”***

## Fundamentals

### *“Engineering Drawing Practices”*

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#### References:

- **Mil-Std-100G** “DoD Standard Practice for Engineering Drawings”
- **ASME Y14.1** “Decimal Inch Drawing Sheet Size and Format”
- **ASME Y14.24** “Types and Applications of Engineering Drawings”
- **ASME Y14.34** “Associated Lists”
- **ASME Y14.35** “Revision of Engineering Drawings”
- **ASME Y14.100** “Engineering Drawing Practices”

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**MIL-STD-100G “DOD Standard Practice for Engineering Drawings”. This standard, along with ASME Y14.100M, establishes the essential requirements and reference documents applicable to the preparation and revision of engineering drawings and associated lists for or by Departments and Agencies of the Department of Defense. ASME Y14.100M is the preferred requirements document for engineering drawing practices. This standard should only be used in lieu of ASME Y14.100 M where the necessity for a DoD design activity is fully justified and Government logistics support is required.**

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#### **Standard Provides (Mil- Std-100G):**

- a. Standard practices for the preparation of engineering drawings, drawing format and media for delivery.**
- b. Requirements for drawings derived from or maintained by Computer Aided Design (CAD).**
- c. Procedures for the creation of titles for engineering drawings.**
- d. Numbering, coding and identification procedures for engineering drawings, associated lists and documents referenced on these engineering drawings and associated lists.**
- e. Locations for Marking on engineering drawings.**



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#### Acronyms (Mil- Std-100G):

- CAGE: Commercial and Government Entity**
- DFARS: Defense Federal Acquisition Regulation Supplement**
- DL: Data List**
- DoDISS: Department of Defense Index of Specification and Standards**
- IDL: Indentured Data List**
- PIN: Part or Identifying Number**
- PL: Parts List**
- WL: Wire List**

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#### Definitions (Mil- Std-100G):

- ❑ **Altered Item:** Any altered item is an existing item, under the control of another design activity or defined by a nationally recognized standardization document, that is subjected to physical alteration to meet the design requirements.
  
- ❑ **Assembly:** A number of parts or subassemblies or any combination thereof joined together to perform a specific function, and subject to disassembly without degradation of any of the parts.
  
- ❑ **Associated List:** A tabulation of pertinent engineering information pertaining to an item depicted on an engineering drawing or on a set of engineering drawings.

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#### Definitions (Mil- Std-100G):

- ❑ **Commercial and Government Entity (CAGE) Code.** A five (5) character code listed in Cataloging Handbook H4/H8, commercial and Government Entity (CAGE) Code, which is assigned to commercial and Government activities that manufacture or develop items, or provide services or supplies for the Government.  
[http://www.gidm.dlis.dla.mil/bin/cs/begin\\_search.asp](http://www.gidm.dlis.dla.mil/bin/cs/begin_search.asp)
- ❑ **Department of Defense Index of Specification and Standards (DoDISS).** The DoD publication that lists unclassified Federal and military specifications and standards, related standardization documents, and voluntary standards approved for use by DoD.
- ❑ **Digital Data.** Data stored on a computer system which employs a display on which the user and the computer interact to create entities for the production of layouts, drawings, numerical control tapes, or other engineering data.

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#### Definitions (Mil- Std-100G):

- ❑ **Part or Identifying Number (PIN).** The identifier assigned by the responsible design activity **or by the controlling nationally recognized standard** which uniquely identifies (relative to that design activity) a specific item. The PIN generally includes the controlling drawing or document number and optional suffix. The PIN does not include the drawing revision identifier, drawing size, or CAGE Code.



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#### **Applicability (Mil- Std-100G):**

- Types and Application of Engineering Drawings: ASME Y14.24M and Chapter 200 as contained herein.**
- Drawing Titles: Chapter 300**
- Numbering Coding and Identification: Chapter 400**
- Markings on Engineering Drawings: ASME Y14.100M and Chapter 500 as contained herein.**
- Revisions of Drawings: ASME Y14.35M**
- Associated Lists: ASME Y14.34M**

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#### **Chapter 100 – Preparation of Drawings/Lists (Mil- Std-100G):**

- Basic practices contained in ASME Y14.100M**
- Provides visibility to specific government requirements.**
- Areas included: Graphic Symbols, Printed Board Drawings, Data Preparation, Drawing Marking, Code Identification.**

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#### Chapter 200 – Types of Engineering Drawings (Mil- Std-100G):

**General.** This chapter defines and illustrates the types of engineering drawings normally prepared by or for Departments and Agencies of the Department of Defense.

**Drawing Types.** Drawing types shall be in accordance with ASME Y14.24M.

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## Chapter 300 – Drawing Titles (Mil- Std-100G):

**General.** This chapter establishes procedures for creating titles for engineering drawings and names for items detailed thereon.

**Drawing Title.** The drawing title shall be the name by which the part or item will be known and shall consist of a **basic item name**, **Government type designator**, if applicable, and **sufficient modifiers** to differentiate like items in the same major assembly. Reference to major assemblies or end items shall not be included as part of the drawing title for subassemblies and parts **except when necessary to differentiate** such items from similar items.

**Approved Item Names.** Approved item names are those item names listed in **Cataloging Handbook H6**, Federal Item Name Directory for Supply Cataloging.

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#### Chapter 300 – Drawing Titles (Mil- Std-100G):

**Type Designators.** Type designators, a combination of letters and/or numbers **assigned by the Government** for the purpose of item identification, are assigned in accordance with approved type designator – nomenclature systems such as:

Joint Electronics Type Designation System	MIL-STD-196
Army Nomenclature System	MIL-STD-1464
Mark and Mod Nomenclature System	MIL-STD-1661
Type Designation, Assignment and Method of Obtaining	MIL-STD-1812

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## Chapter 300 – Drawing Titles (Mil- Std-100G):

**Procedures for Creating Drawing Titles.** Titles for drawings requiring modifiers shall be in two parts. The first part shall be the name. The second part shall consist of those additional modifiers and Government type designators necessary to complete the identification of the item.

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## Chapter 300 – Drawing Titles (Mil- Std-100G):

### General Rules.

1. No abbreviations of any portion of the name shall be made, except those necessarily used trademarked names and words ASSEMBLY (ASSY), SUBASSEMBLY (SUBASSY), or INSTALLATION (INSTL). Approved abbreviations are listed in ASME Y1.1. In general, the use of abbreviations should be avoided.
2. Titles of subassembly and detail drawings shall be consistent with the titles of the next assembly drawings, **except where interchangeability of parts between assemblies makes consistency impractical or is prohibited** by the Government design or procuring activity. The drawing title shall be shown in uppercase letters.

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## Chapter 300 – Drawing Titles (Mil- Std-100G):

### General Rules.

3. When a drawing is prepared to replace an existing drawing with a different number and the title of the drawing being replaced is in accordance with instructions contained herein, the same title shall be used. When the title of the drawing being replaced is not in accordance with these instructions, a new drawing title shall be developed.
4. A drawing title shall be as brief and simple as possible, shall describe the item and shall distinguish between similar items.

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## Chapter 300 – Drawing Titles (Mil- Std-100G):

### General Rules.

5. The names of parts detailed on a drawing shall consist of a noun or noun phrase. Modifiers may be used to distinguish between parts on the same drawing.
6. For words with dual or multiple definitions, the Military definitions shall have precedence.
7. If the drawing title appears on each sheet of a multisheet drawing, **the exact same title** shall appear on all sheets.

(Examples given on next slide)

**Chapter 300 – Drawing Titles (Mil- Std-100G):****General Rules.**

The following words shall never be used alone but, may be the last word of a noun phrase:

<b>Apparatus</b>	<b>Equipment</b>	<b>Plant</b>
<b>Assembly</b>	<b>Group</b>	<b>Ship</b>
<b>Assortment</b>	<b>Installation</b>	<b>Subassembly</b>
<b>Attachment</b>	<b>Kit</b>	<b>Tackle</b>
<b>Compound</b>	<b>Machine</b>	<b>Tool</b>
<b>Device</b>	<b>Mechanism</b>	<b>Unit</b>
<b>Element</b>	<b>Outfit</b>	<b>Vehicle</b>

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#### Chapter 300 – Drawing Titles (Mil- Std-100G):

**Procedures for Creating Drawing Titles.** Titles for drawings requiring modifiers shall be in two parts. The first part shall be the name. The **second part** shall consist of those additional modifiers and Government type designators necessary to complete the identification of the item.

##### First Part of Title

SPRING, HELICAL COMPRESSION

##### Second Part of Title

RECOIL ADAPTER

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#### Chapter 400 – Numbering, Coding & Identification (Mil- Std-100G):

**General.** This chapter establishes numbering, coding, and identification procedures for engineering drawing, associated lists, and documents referenced thereon. It also provides identification direction for parts, materials, processes, and treatments specified on these engineering drawings and associated lists.

**CAGE Code.** The CAGE Code is a five-position code, of numeric or alphanumeric characters, applicable to activities which have designed, produce or are producing or supply items used by the Government. **(See CAGE Cataloging Handbook, H4/H8)**

Organization which **neither manufacture nor control design** (e.g., dealers, agents, vendors of items produced by others) are assigned type “F” CAGE Codes and shall not be included as a design activity on a drawing.

Type “A” CAGE Codes, **for manufacturers**, are applicable for use on drawings

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#### Chapter 400 – Numbering, Coding and Identification (Mil- Std-100G):

**Drawing Number.** The drawing number consists of letters, numbers or combination of letters and numbers, which may or may not be separated by dashes. The drawing number shall be assigned from numbers controlled by the design activity whose CAGE Code is assigned to the drawing.

**Drawing Identification.** The drawing number and original design activity CAGE Code establish a **drawing identification that shall be unique to that drawing.**

**Part or Identifying Number.** The Part or Identifying Number (PIN) shall consist of letters, number or combinations of letters and numbers. **PINs shall not exceed 15 characters, shall not include the drawing revision, and shall not be changed except as permitted.**

**Find Number.** A find number may be assigned to an item for the **purpose of cross-referencing an item identified in a Parts List (PL)** or table on the drawing to the location of the item in the field of the drawing.

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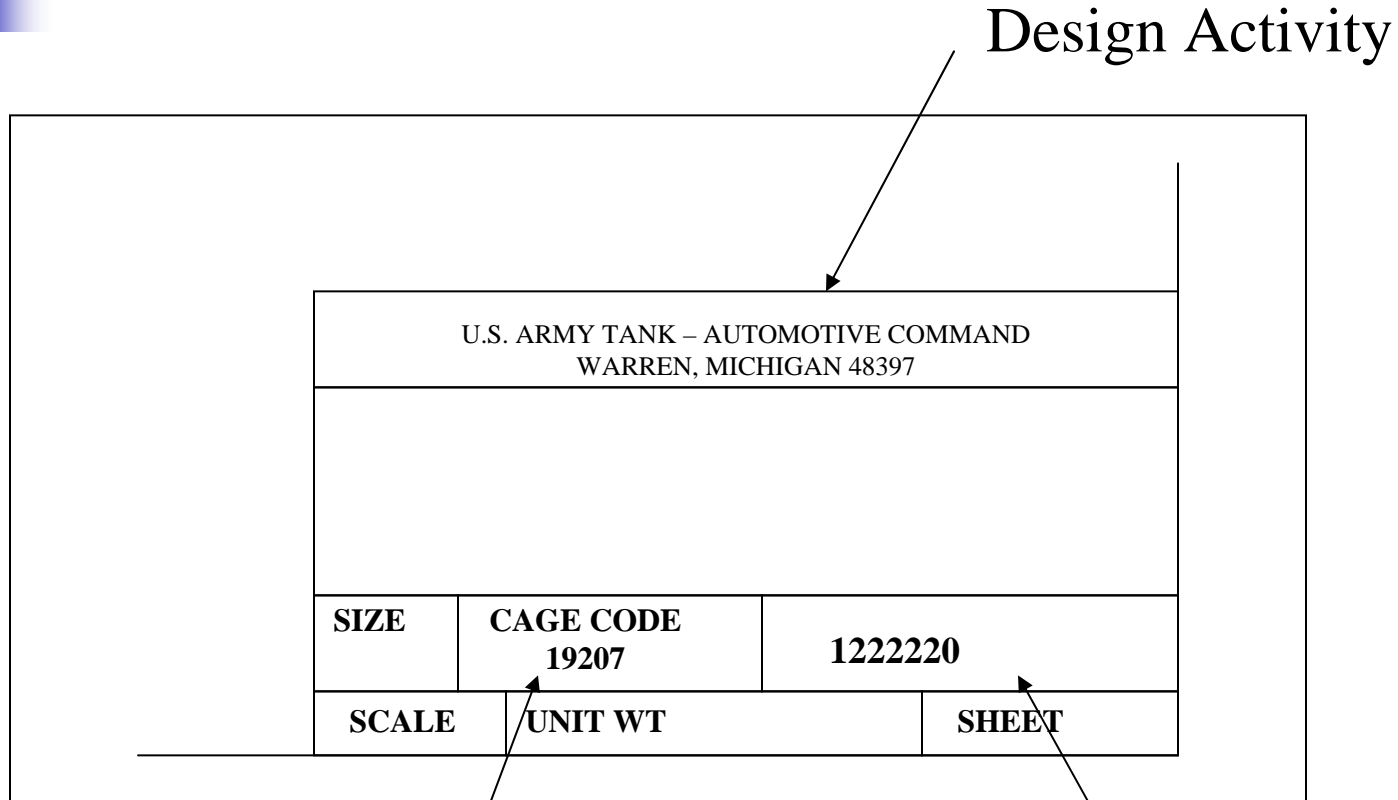
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### Chapter 400 – Numbering, Coding and Identification (Mil- Std-100G):

**Identification Requirements.** All drawings, associated lists and like items shall be assigned identifications:

- New drawings and associated lists.
  - Existing drawings and associated lists.
  - Referenced documents.
  - CAGE Code.
  - Drawing Number Structure
- 
- Letters **I, O, Q, S, X and Z** shall not be used
  - Letters shall be uppercase
  - Numbers shall be Arabic numerals (Fractions, Decimals and Roman Numerals shall not be used.
  - Blank spaces are not permitted.
  - Symbols such as: parentheses (), asterisks \*, degree o, plus +, shall not be used, except when referencing a document whose ID contains such a symbol.
  - The CAGE Code, drawing format size letter, and drawing revision letter are not considered part of the drawing number.

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CAGE Code

Drawing No.

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#### Chapter 400 – Numbering, Coding and Identification (Mil- Std-100G):

- ❑ **Records.** A complete and accurate record of drawing numbers shall be maintained by **the design activity allocating or assigning the numbers**. Duplicate drawing number assignment within an assigned CAGE Code shall be avoided.
- ❑ **Associated Lists.** Associated lists shall be assigned the **same identifying numbers as the parent drawing to which it pertains**. This identifier shall be prefixed by the letters “PL”, “DL”, “IL”, “WL”.
- ❑ **Maintaining Design Activity Identities.** When drawings are redrawn, the original design activity CAGE Code and drawing number shall be shown in their applicable locations as on the original documentation.



## Chapter 500 – Markings on Drawings (Mil- Std-100G):

### General.

1. This chapter and ASME Y14.100M establish requirements for application of markings on drawings.
2. Primarily for standardization marking nomenclature, graphics, and to set minimum for management data for drawing maintenance.