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1. SCOPE

1.1. Purpose. The purpose of this standard is to standardize the digital interface between organizations or systems exchanging digital forms of technical information necessary for the logistic support of weapon systems throughout their life cycle. The initial area addressed by this standard involves the interface with computer technologies which are automating the creation, storage, retrieval, and delivery of hard copy forms of technical manuals and engineering drawings; however, this standard does not yet exploit the full potential of emerging computer-based technologies. Technologies such as solid modeling for system design, the interactive retrieval and use of technical information, expert systems (artificial intelligence), and other potential computer applications for weapon systems of the future can be addressed by extending this standard as needed.

1.2. Application. This standard addresses technical information such as training and maintenance manuals with their associated illustrations; product definition data, such as the engineering drawings and specifications which are part of the traditional technical data packages used for item acquisition; and, the evolving product data concept which provides for transfer and archival storage, of the product information necessary to the acquisition process, in a form directly usable by computer applications. This military standard standardizes the format and information structures of digital data files used for the transfer and archival storage of digital technical information. The format, information structures, and transfer procedures established herein are applicable in all cases where the information can be prepared and received in the form of ASCII text files, product definition data files, raster image files, or graphics files. The standard is not restricted in any way in its application.

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2. REFERENCED DOCUMENTS

2.1. Government documents.

2.1.1. Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation, form a part of this standard to the extent specified herein.

SPECIFICATIONS

MILITARY

- MIL-B-131 - Barrier Materials, Watervaporproof, Greaseproof, Flexible, Heat-sealable.
- MIL-M-9868 - Microfilming of Engineering Documents
- MIL-D-28000 - Digital Representation for Communication of Product Data: Application Subsets
- MIL-M-28001 - Markup Requirements and Generic Style Specification for Electronic Printed Output and Exchange of Text

STANDARDS

FEDERAL

- FED-STD-1064 - Telecommunications: General Aspects of Group 4 Facsimile.
- FED-STD-1065 - Telecommunications: Facsimile Coding Schemes and Coding Control Functions for Group 4 Facsimile Apparatus.

MILITARY

- MIL-STD-804 - Formats and Coding of Aperture Cards.
- MIL-STD-1777 - Internet Protocol (IP)
- MIL-STD-1778 - Transmission Control Protocol (TCP)
- MIL-STD-1780 - File Transfer Protocol (FTP)

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2.1.2. Other Government documents, drawings, and publications.

The following other Government documents, drawings, and publications form a part of this standard to the extent specified herein.

- FIPS PUB 1-2 - Code for Information Interchange, Its Representation, subsets and extensions
- FIPS PUB 25 - Recorded Magnetic Tape for Information Interchange (1600 CPI, PE) (ANSI X3.39)
- FIPS PUB 50 - Recorded Magnetic Tape for Information Interchange (6250 CPI, Group-coded Recording) (ANSI X3.54)
- FIPS PUB 79 - Magnetic Tape Labels and File Structure for Information Interchange (ANSI X3.27)
- FIPS PUB 100 - PKD-STD-1041 Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for operation with Packet-Switched Data Networks (PSDN), or between two DTE's by Dedicated Circuit (DDN X.25).
- FIPS PUB 128 - Computer Graphics Metafile (CGM) (ANSI X3.122)

(Copies of the referenced federal and military specifications, standards and handbooks are available from the Department of Defense Single Stock Point, Commanding Officer, Naval Publications and Forms Center (NPFC), 5801 Tabor Avenue, Philadelphia, PA 19120. For specific acquisition functions, these documents should be obtained from the contracting activity or as directed by the contracting activity. FIPS PUB documents are available to government agencies only from NPFC; non-government availability is from the National Technical Information Service.)

2.2. Other publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise specified the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. The issues of the documents that have not been adopted shall be those in effect on the date of the cited DODISS.

AMERICAN SOCIETY FOR TESTING & MATERIALS

- ASTM D 3951 - Standard Practices for Commercial Packaging

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(Applications for documents should be addressed to the American Society for Testing & Materials, 1916 Race Street, Philadelphia, PA 19103)

ASSOCIATION for INFORMATION and IMAGE MANAGEMENT (AIIM)

AIIM MS32 - Association for Information and Image Management, Microrecording of Engineering Source Documents on 35-mm Microfilm

(Application for documents should be addressed to The Association for Information and Image Management, 1100 Wayne Avenue, Silver Spring, MD 20910)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Y14.1 - American National Standard, Drawing Sheet Size and Format

(Application for documents should be addressed to ASME, United Engineering Center, 345 E. 47th Street, New York, 10017).

INTERNATIONAL CONSULTATIVE COMMITTEE ON TELEGRAPHY AND TELEPHONY (CCITT)

CCITT Recommendation T.70 - Network-Independent Basic Transport Service for the Telematic Services

CCITT Recommendation T.71 - LAPB Extended for Half-Duplex Physical Level Activity

(Application for documents should be addressed to American National Standards Institute Communications Department, 1430 Broadway, New York, NY 10018)

Non-government publications are generally available for reference from libraries and technical groups.

2.3. Order of precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence.

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3. DEFINITIONS

3.1. Definitions of terms.

3.1.1. Acceptance testing. - The testing performed by a user to determine the suitability of a translator for a specific environment.

3.1.2. Application profile for CGM. - A defined set of specific entity types which are used to completely and unambiguously represent the information requirements for a particular application.

3.1.3. Application subset for IGES. - A defined set of specific entity types which are used to completely and unambiguously represent the information requirements for a particular application.

3.1.4. ASCII. - American Standard Code for Information Interchange used extensively in data transmission. The code includes 128 upper and lower case letters, numerals and special purpose symbols, each encoded by a unique 7-bit binary number.

3.1.5. ASCII text. - A sub-set of the ASCII, common to all computer devices, consisting principally of the printable characters.

3.1.6. Body. - Contains the central part of the document as distinct from front and rear matter. In the case of technical publications, the body is presented in some form of logical hierarchy consistent with the applicable specification for that type of document.

3.1.7. Computer Aided Design (CAD). - A process which uses a computer system to assist in the creation, modification and display of a design.

3.1.8. Computer Graphics Metafile (CGM). - Standard for the description, storage, and communication of graphical information in a device-independent manner.

3.1.9. Descriptive markup. - Markup that describes the structure and other attributes of a document in a non-system-specific manner, independently of any processing that may be performed on it. In particular, it uses tags to express the element structure.

3.1.10. Destination system. - The computer hardware and software system receiving transferred data.

3.1.11. Digital data. - Data represented in discrete discontinuous form as contrasted with analog data represented in continuous form.

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3.1.12. Document. - The term "document" applies to the information content of a variety of different printed or digital entities that contain technical information. These entities may be technical manuals, drawings, specifications, lists, engineering change notices, or other information, relating to the design, acquisition, manufacture, test, inspection, or maintenance of items. Within this standard, use of the word "document" should be interpreted in that context.

3.1.13. Declaration file. - A file accompanying any set of transferred files comprising a document; provides all information necessary to the successful disposition of the digital files at the destination, but has no purpose beyond that function.

3.1.14. Document type. - A class of documents having similar characteristics; for example journal, article, technical manual, or memo.

3.1.15. Document type declaration. - A markup declaration that contains the formal specification of a document type definition.

3.1.16. Document type definition (DTD). - Rules, determined by an application, that apply SGML to the markup of documents of a particular type. A document type definition includes a formal specification, expressed in a document type declaration, of the element types, element relationships and attributes, and references that can be represented by markup. It thereby defines the vocabulary of the markup for which SGML defines the syntax.

3.1.17. Drawing. - A specific type of engineering data that discloses, either directly or by reference, by means of pictorial or textual presentations, or combinations of both, the physical and functional end-product requirements of an item.

3.1.18. Engineering data. - Any data (government, contractor, or vendor) which contains authoritative engineering definition or guidance, on material, items, equipment system practices, methods, and processes relating to the design, manufacture, acquisition, test, inspection, or maintenance of items or services. It includes the following: drawings, associated lists, contractor or vendor specifications, standards, documents referenced on drawing lists, revision authorization documents, engineering change orders, government or industry associated specifications and standards, and other related documents.

3.1.19. Engineering drawing. - See "drawing".

3.1.20. File. - A digital repository of organized information consisting of records, items or arrays, and data elements.

3.1.21. File set. - The collection of files which comprise a complete document.

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3.1.22. Format. - A specific arrangement of data.

3.1.23. Front matter. - That portion of a document that precedes the body of the document and may consist of one or more of the following: cover page, title page, list of effective pages, record of changes, foreword, preface, safety warnings, table of contents, and lists of tables and illustrations.

3.1.24. Illustration. - A picture, graph, diagram, or other form of graphical representation contained within a technical publication.

3.1.25. Initial Graphics Exchange Specification (IGES). - A neutral file format for the representation and transfer of product definition data among CAD/CAM systems and application programs.

3.1.26. Institute for Interconnecting and Packaging Electronic Circuits. - Trade association and ANSI approved standards body which has developed printed circuit board standards.

3.1.27. Markup. - SGML tags that are added to the data of a document in order to convey information about it.

3.1.28. Metafile. - A mechanism for retaining and transferring graphical data and control information. The information contains a device independent description of one or more graphic images.

3.1.29. Office Document Architecture/Office Document Interchange Format (ODA/ODIF). - An explicit document architecture and interchange format standard which allows exchange of compound documents (i.e., documents composed of various content types, such as character, raster graphics, and geometric (computer) graphics content).

3.1.30. Page Description Language (PDL). - A programming language to describe the displayable appearance of a page containing text, graphics, and sampled images. Used to communicate a high level, device independent description of a document between a composition system and a display system.

3.1.31. Pixels. - physical picture elements.

3.1.32. Product Data Exchange Specification/Standard for the Exchange of Product Data (PDES/STEP). - Standards (under development) for communicating a complete product model with sufficient information content so as to be interpretable directly by advanced CAD/CAM applications such as generative process planning, CAD directed inspection, and automatic generation and verification of NC Cutter path data. PDES is being developed as a national standard and STEP is being developed as the international counterpart under the sponsorship of ISO TC 184/SC4.

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3.1.33. Product data. - All data elements necessary to define the geometry, the function, and the behavior of a piece part or an assembly of parts over its entire lifespan. The term includes all product definition data elements as well as additional logistics elements for reliability and maintainability.

3.1.34. Product definition data. Denotes the totality of data elements required to completely define a product. Product definition data includes geometry, topology, relationship, tolerances, attributes and features necessary to completely define a component part or an assembly of parts for the purpose of design, analysis, manufacture, test, and inspection.

3.1.35. Raster. - The closely spaced parallel lines produced on a display device. An image is formed by modulating the intensity of the individual pixels. A binary representation, "raster form," of the pixels can be used to digitally represent an image.

3.1.36. Raster graphics. - The presentation or storage of images in raster forms.

3.1.37. Rear matter. - That portion of a document that follows the body and may consist of one or more of the following: appendices, indexes, and glossaries.

3.1.38. Record. - A collection of related items of data, treated as a unit.

3.1.39. Source system. - The computer hardware and software that will structure technical information for interchange in accordance with this standard.

3.1.40. Standard Generalized Markup Language (SGML). - A standard that defines a language for document representation which formalizes markup and frees it of system and processing dependencies. It provides a coherent and unambiguous syntax for describing whatever a user chooses to identify within a document.

3.1.41. System. - Specific suite of computer hardware and software. As used in the terms "Source System" and "Destination System," the term does not necessarily correspond one to one with "site" or "base" in that most prime contractor sites and DoD installations have more than one system.

3.1.42. Tape set. - A group of one or more magnetic tapes which collectively represent the collection of related files comprising a specific delivery of a document or documents.

3.1.43. Tape volume. - A single reel of magnetic tape with recorded data.

3.1.44. Test data. - A set of data developed specifically to test the adequacy of a computer or system.

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3.1.45. Validation. - The process of checking the format and the structure of a MIL-STD-1840 file set against the requirement of this standard.

3.1.46. Vector graphics. - The presentation or storage of images as sequences of line segments.

3.2. Acronyms used in this standard.

ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ATOS	Automated Technical Order System
CAD	Computer Aided Design
CAD/CAM	Computer Aided Design and Computer Aided Manufacturing
CALS	Computer-aided Acquisition and Logistic Support
CAM	Computer Aided Manufacturing
CCITT	Committee Consultatif Internationale de Telegraphique et Telephonique (ENGLISH: International Consultative Committee on Telegraphy and Telephony)
CDRL	Contract Data Requirements List
CGM	Computer Graphics Metafile
CPI	Characters Per Inch
DDN	Defense Data Network
DODISS	Department of Defense Index of Specifications and Standards
DTD	Document Type Definition
EDIF	Electronic Design Interchange Format
FIPS	Federal Information Processing Standard
GOSIP	Government Open Systems Interconnection Profile
IGES	Initial Graphics Exchange Specification
IPC	Institute for Interconnecting and Packaging Electronic Circuits

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ISO	International Organization for Standardization
NBS	National Bureau of Standards
NC	Numerical Control
ODA/ODIF	Office Document Architecture/Office Document Interchange Format
PDES	Product Data Exchange Specification
PDL	Page Description Language
PE	Phase Encoded
SC	Subcommittee
SGML	Standard Generalized Markup Language
STEP	Standard for the Exchange of Product Model Data
TC	Technical Committee
TCP/IP	Transmission Control Protocol/Internet Protocol
VHDL	VHSIC Hardware Description Language
VHSIC	Very High Speed Integrated Circuit

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4. GENERAL REQUIREMENTS

4.1. Document types. This standard covers two types of documents:

- a. Technical Publications
- b. Product Data

4.1.1. Technical publications. Technical publication information covered by this standard consists of text and associated illustrations. The files of a technical publication consist of:

- a. A declaration file, in 7 bit ASCII, which uniquely identifies the document (one declaration file per document, mandatory).
- b. Text files, in ASCII, tagged in accordance with MIL-M-28001 as specified by the contract or other form of agreement, containing the front and rear matter and the body of the document text (at least one text file per document, mandatory). Each file is accompanied by identifying header records.
- c. Illustration files in IGES format, CGM format, or raster format, as specified by the contract or other form of agreement. Each file is accompanied by identifying header records.
- d. Technical publication files in PDL form, as specified by the contract or other form of agreement.
- e. Other files as listed in table I (see 5.1.3).

4.1.1.1. Declaration files. Declaration files shall be prepared in accordance with the requirements of section 5 of this standard and there shall be one declaration file with each document delivered in digital form. Declaration files shall only contain the characters permitted by Section 1 of FIPS PUB 1-2.

4.1.1.2. Text data files. Text files shall only contain digital data prepared in accordance with MIL-M-28001.

4.1.1.3. Document type definition data files with no contained textual data. Document Type Definition files shall be as specified by the contract or other form of agreement.

4.1.1.4. Illustration data files (not applicable to PDL delivery forms). Each set of document files shall have a separate file for each illustration. The illustration files shall only contain digital data encoded in accordance with MIL-D-28000, FIPS PUB 128, or FED-STD-1064; the file encodings which are applicable will be specified by the contract or other form of agreement.

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4.1.1.4.1. IGES illustration data files. IGES illustration files shall be Class I application data subsets as specified by MIL-D-28000. The use of the class II application subsets for illustrations data files may be specified by the contract.

4.1.1.4.2. Raster illustration data files. Raster illustration files shall be in accordance with the requirements of Appendix A of this Standard.

4.1.1.4.3. CGM illustration data files. CGM data shall be as specified by the contract or other form of agreement.

4.1.1.5. PDL data files. PDL files shall be as specified by the contract or other form of agreement.

4.1.1.6. Gray scale illustration data files. Requirements for half-tone illustrations will be as specified by the contract or other form of agreement.

4.1.1.7. Special word data file. Special word files shall be as specified by the contract or other form of agreement.

4.1.1.8. Output specification data files. Output specification files shall be as specified by MIL-M-28001.

4.1.2. Product data. Product data covered by this standard consist of engineering and system support data in encoded IGES or raster format as specified by the contract or other form of agreement. The files of a Product Data document consist of:

- a. A declaration file, in 7 bit ASCII, which uniquely identifies the document (one declaration file per document, mandatory).
- b. Engineering drawing data files in IGES or raster format as specified by the contract or other form of agreement, accompanied by identifying header records; or
- c. Electrical/electronic application data files in IGES format, accompanied by identifying header records.

(Future revisions of this standard will address product data files in IPC, VHDL, EDIF, and PDES formats.)

4.1.2.1. Declaration files. Declaration files shall be prepared in accordance with the requirements of section 5 of this standard.

4.1.2.2. Engineering drawing data files. The engineering data file representations of engineering drawings shall be only IGES or raster files. The specific form of the transferred files shall be as specified by the contract or other form of agreement.

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4.1.2.2.1. IGES engineering drawing data files. IGES engineering drawing data files shall be Class II application data subsets as specified by MIL-D-28000.

4.1.2.2.2. Raster engineering drawing data files. Raster engineering drawing data files shall be in accordance with the requirements of Appendix A of this standard.

4.1.2.3. Electrical/electronic application data files. Electrical/electronic application data files shall be Class III application data subsets as specified by MIL-D-28000.

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5. DETAILED REQUIREMENTS

5.1. File structure for transfer. This section specifies the structure, content, and order of the digital information that accompanies and describes the content of a group of files that comprise a document to be interchanged. The group of files shall consist of:

- a. one declaration file
- b. at least one data file.

The declaration file shall precede the data files of a document. If more than one document is transferred in a single transaction, all of the declaration files shall be grouped at the beginning of the sequence of files in order to facilitate locating specific documents. The group of files for a specific technical publication or product data document may be in any order, but the group must be contiguous. The document file groups shall follow the declaration files in the same order in which their related declaration files occur.

5.1.1. Declaration file. The declaration file provides information about the identifications, source, destination, classification, etc. of the document and gives a count of the files in the set of files that make up the complete document.

5.1.1.1. Declaration file name. The file name for a declaration file shall be four characters long, with the first character being "D" and the next three characters being the ASCII representation of a number from 001 to 999. For multiple file sets transferred as a group, the numbers begin at 001 and are incremented sequentially for each document being transferred in order to provide each document with a unique declaration file name.

5.1.1.2. Declaration file content. The records specified in this section are required. When circumstances dictate that there is no relevant data to place in a record, the ASCII string "NONE" shall be used. Each record shall have a record identifier as the first characters in the record; the last character in the identifier string shall be a colon and a space character. In the following description of the records, the record identifier that shall be used is found enclosed in parentheses immediately following the record type. (The "Record" number is for the convenience of the reader and is not a part of the record.) The declaration file records are:

RECORD 1. - Source system (srcsys:). A character string containing the name, address, and other information needed to identify the system from which the information originated.

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RECORD 2. - Source system document identifier (srcdocid:). The character string used by the source system to uniquely identify a document, e.g., a technical publication number, engineering drawing number, or database file set identifier.

RECORD 3. - Source system related document identifier (srcrelid:). A character string used by the source system to identify another document to which this document is closely related (e.g., this document is a supplement to another document).

RECORD 4. - Highest revision and change level in the document (chglvl:). A character string indicating the revision, change level, and date of this document. If no changes have been incorporated this record should contain the word, "ORIGINAL". Date format shall be YYYYMMDD, where YYYY is the year, MM is the month, and DD is the day of the month.

RECORD 5. - Date of issue of the latest change to the document (dteisu:). If the document is an original, this shall be the date of issue of the document. Date format shall be YYYYMMDD, where YYYY is the year, MM is the month, and DD is the day of the month.

RECORD 6. - Destination system (dstsys:). A character string containing the name, address, and other information needed to identify the destination system to which the document is going.

RECORD 7. - Destination system document identifier (dstdocid:). A character string used by the destination system to uniquely identify this document; this shall be the service or agency document number, e.g., a technical publication number or title, engineering drawing number, or database file set name.

RECORD 8. - Destination system related document identifier (dstrelid:). A character string used by the destination system to identify another document to which this document is closely related (i.e., this document is a supplement to another document).

RECORD 9. - Date of transfer (dtetrn:). The date the document was transferred by the source system to the transmission media. Date format shall be YYYYMMDD, where YYYY is the year, MM is the month, and DD is the day of the month.

RECORD 10. - Delivery accounting (dlvacc:). Free form record giving delivery information specified by the contract or other form of agreement., such as contract number, CDRL item, etc.

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RECORD 11. - File count (filont:). A character string count of the numbers of each type of data files in the document. Precede each file count with the letter from table I, used in the "data file name" to identify the type of file. Separate each number with a comma, except for the last. Spaces may be used as additional separators after each comma. For example, a record containing the string "T8, Q4, C1, R1" would indicate the document includes eight text files, four IGES files, one CGM file, and one raster illustration file. If there are no files of a particular type in a document, then the letter and file count are omitted.

RECORD 12. - Title Security Label (ttlols:). A character string stating the security/sensitivity level or other restrictions on the title of the document.

RECORD 13. - Document Security Label (docols:). A character string stating the highest security/sensitivity level or other restrictions on any file in the document.

RECORD 14. - Document Type (doctyp:). A character string used by the source system to uniquely identify a document or engineering drawing type, e.g. job guide, schematic diagram, work card, or assembly drawing.

RECORD 15. - Document Title (docttl:). A character string identifying the document, e.g., a technical publication or engineering drawing title.

5.1.1.3. Declaration file format. The content and format of data appearing in Records 1, 2, 3, 4, 6, 7, 8, 10, and 12 will be specified by contract or other agreement prior to actual transmission of documents. An example of a declaration file is shown in figure 1.

5.1.2. Data file type. The data files may be of the types shown in table I. Except as described below the data files shall be as specified by the contract or other form of agreement.

- a. Text files, in ASCII and tagged in accordance with MIL-M-28001, containing the front and rear matter and the body of the document text. The text file may or may not contain the DTD files.
- b. Illustration files, in IGES format, CGM format, or in raster format; and containing the illustrations for the document.
- c. Product data files, in IGES format or in raster format.

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srosys: AJAX Inc. 100 Doe St., San Diego, CA 92110
 srodocid: Benchmark 14
 srorelid: Benchmark 12
 chglvl: 1
 dteisu: 19810801
 dstsys: ATOS System, Hill Air Force Base, UT 84056
 dstdocid: 4SA6-11-4
 dstrelid: 4SA6-11
 dtetrn: 19850710
 dlvacce: CDRL item 6 of Contract 1XYZ1085, DUE 31JUL85
 filont: T8, Q4, C1, R1
 ttlcls: Unclass
 doocls: Unclass
 doctyp: A character string
 doottl: A character string
 sroreldoc: NONE
 chgdte: 19830606

FIGURE 1. Example of a declaration file.

5.1.3. Data file name. The file name for data files shall be eight characters long, with the first four characters being the same as the declaration file name ("D001" to "D999"). The fifth character shall be a code letter from table I identifying the type of data file. The last three characters shall be a character representation of a decimal number from "001" to "999". The first data file for a document shall use "001" and the number shall increment sequentially for each file of the document, so that each file has a unique file name.

Note:

Each data file name includes the declaration file name as the first four characters in order to facilitate the reconstruction of the transmitted "document." The file naming convention described for the declaration file and the data files is intended to provide the declaration file and the files of the document with "in transit" labels that are not intended to have a life beyond the point where the destination system has assimilated the document into its own database.

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TABLE I. <u>Data file name code letters</u> (Fifth character in a data file name).	
Code Letter	Data File Type
T	Textual file
G	DTD file with no contained textual data.
H	Output specification file
Q	IGES file
R	Raster file
C	CGM file
X	Special word file
P	PDL file
Z	Gray Scale Data

5.1.4. Data file header records. Each data file shall have identifying header records as specified by this section. All of the records specified in this section are required. When circumstances dictate that there is no relevant data to place in a record, the ASCII string "NONE" shall be used. Each record shall have a record identifier as the first characters in the record; the last characters in the identifier string shall be a colon and then a space character. In the following description of the records, the record identifier that shall be used is found enclosed in parentheses immediately following the record type. (The "Record" number is for the convenience of the reader and is not a part of the record.)

5.1.4.1. Textual data file header records. The file header records for the SGML, textual data files shall contain the following information:

RECORD 1. - Source system document identifier (srodocid:). This is a character string used by the source system to uniquely identify this document, e.g., the technical publication number. (This record is identical to Record 2 in the document declaration file.)

RECORD 2. - Destination system document identifier (dstdocid:). A character string containing the service or agency document number, e.g., the technical publication

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number. (This record is identical to Record 7 in the document declaration file.)

RECORD 3. - Text file identifier (txtfilid:). This record shall contain the code, from table II, identifying the content of this file.

RECORD 4. - Data File Security Label (doccls:). Character string stating the security/sensitivity level or other restrictions on the data file.

RECORD 5. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

5.1.4.2. Document Type Definition data file header records. The file header records for the Document Type Definition data files shall contain the following information:

RECORD 1. - Source system document identifier (srdocid:). This is a character string used by the source system to uniquely identify the document, e.g., the technical publication number, to which this DTD is applicable. (This record is identical to record 2 in the document declaration file.)

RECORD 2. - Destination system document identifier (dstdocid:). A character string containing the service or agency document number, e.g., the technical publication number, to which this DTD is applicable. (This record is identical to record 7 in the document declaration file.)

RECORD 3. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

5.1.4.3. IGES data file header records. The file header records for the IGES data files shall contain the following information:

RECORD 1. - Source system document identifier (srdocid:). For a technical publication the contents of this record shall be identical to record 1 of the text file which references this file. For product data this record shall be in accordance with 5.1.5.

RECORD 2. - Destination system document identifier (dstdocid:). A character string containing the destination organization's document number, e.g., the technical publication or engineering drawing number. For a technical publication this record is identical to header record 3 of the text data file that references this illustration, and to record 7 of the declaration file. When there are multiple references to this file throughout the text data files, the

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contents of this record shall be the same as record 3 of the text data file in which the first occurrence of the reference is found.

RECORD 3. - Text file identifier (txtfilid:). For illustration data files the contents of record 3 shall be identical to record 3 of the text file which references this illustration. For product data enter the character string, NONE.

RECORD 4. - Figure identifier (figid:). The figure identifier shall be the figure number with which the figure is referenced, with optional sheet numbers preceded by the string "-S" and with an optional overflow number preceded by a period character. For example, "5" would be the identifier for figure 5, "12-S10.3" would be the identifier for overflow drawing 3 of sheet 10 of figure 12. Foldout figures shall be identified with additional "-F" characters followed by the number of 8.5 x 11 inch sheets that will be needed to produce the foldout.

RECORD 5. - Source system graphics filename (srogph:). For technical publication, the string value found with the required attribute "boardno" in the tag "<graphic...>". For product data, enter none.

RECORD 6. - Data file security label (docols:). Character string stating the security/sensitivity level or other restrictions on the data file.

RECORD 7. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

TABLE II. <u>Code to identify the content of a file subdivided according to one of three options.</u>		
OPTION	CODE	MEANING
A	W	All text contained in one file
B	FRONT	All text of the front matter is contained in a single file
	BODY	All text of the body matter contained in a single file
	REAR	All text of the rear matter is contained in a single file
C		Front Matter
	COV	- cover or title page
	LEP	- list of effective pages
	WRN	- warning pages
	PRM	- promulgation record
	CHR	- change record
	FOR	- foreword or preface
	TOC	- table of contents lists of
	LOI	- lists of illustrations and tables
	SUM	- safety summary
		Body Matter
	PTn CHn SEcn	- Where each "n" represents an identifying part, chapter, and section number for the portion of the body matter contained in the file.
		Rear Matter
	APP-x	- appendix (where "x" is the appendix letter)
	GLS	- glossary
	INX	- index
	FOV	- foldout section

Option A. All Textual material for the document is contained in one data file.

Option B. Textual material for the document is divided according to "front" matter, "body", and "rear" matter.

Option C. Textual material for the front, body, and rear matter is subdivided within the front, body or rear matter.

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5.1.4.4. Raster data file header records. The file header records for the raster data files shall contain the following information:

RECORD 1. - Source system document identifier (srodocid:). For technical publications the contents of this record shall be identical to record 1 of the text file which references this illustration. For product data files this record is defined in 5.1.5.

RECORD 2. - Destination system document identifier (dstdocid:). A character string containing the destination organization's document number, e.g., the technical publication number, CAGE code. For technical publications this record is identical to header record 3 of the text data file that references this illustration, and to record 7 of the declaration file.

RECORD 3. - Text file identifier (txtfilid:). For illustration data files the contents of record 3 shall be identical to record 3 of the text file which references this illustration. For product data enter the character string, NONE.

RECORD 4. - Figure identifier (figid:). For technical publications the figure identifier shall be the figure number with which the figure is referenced, with optional sheet numbers preceded by the string "-S" and with an optional overflow number preceded by a period character. For example, "5" would be the identifier for figure 5, "12-S10.3" would be the identifier for overflow drawing 3 of sheet 10 of figure 12. Foldout figures shall be identified with additional "-F" characters followed by the number of 8.5 x 11 inch sheets that will be needed to produce the foldout. For product data enter none.

RECORD 5. - Source system graphics filename (srogph:). For technical publication, the string value found with the required attribute "boardno" in the tag "<graphic...>". For product data, enter none.

RECORD 6. - Data file security label (doccls:). Character string stating the security/sensitivity level or other restrictions on the data file.

RECORD 7. - Pixel count (pixcnt:) Two six character strings separated by a comma representing the integer count of pixels across the horizontal and vertical dimension of the image, respectively. (Use leading zeros if required.)

RECORD 8. - Pixel resolution value and image orientation (pixres:). A five character string with four characters representing the resolution density (use leading zeros if

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required) followed by a P or an L to indicate a portrait or landscape page, respectively. Additional information about orientation is contained in Appendix A.

RECORD 9. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

5.1.4.3. CGM data file header records. The file header records for the CGM data files shall contain the following information:

RECORD 1. - Source system document identifier (srodocid:). The contents of this record shall be identical to record 1 of the text file which references this illustration.

RECORD 2. - Destination system document identifier (dstdocid:). A character string containing the destination organization's document number, e.g., the technical publication number, CAGE code. This record is identical to header record 2 of the text data file that references this illustration, and to record 7 of the declaration file.

RECORD 3. - Text file identifier (txtfilid:). The contents of this record shall be identical to record 3 of the text file which references this illustration.

RECORD 4. - Figure identifier (figid:). The figure identifier shall be the figure number with which the figure is referenced, with optional sheet numbers preceded by the string "-S" and with an optional overflow number preceded by a period character. For example, "5" would be the identifier for figure 5, "12-S10.3" would be the identifier for overflow drawing 3 of sheet 10 of figure 12. Foldout figures shall be identified with additional "-F" characters followed by the number of 8.5 x 11 inch sheets that will be needed to produce the foldout.

RECORD 5. - Source system graphics filename (srogph:). The string value found with the required attribute "boardno" in the tag "<graphic...>".

RECORD 6. - Data file security label (doccls:). Character string stating the security/sensitivity level or other restrictions on the data file.

RECORD 7. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

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5.1.4.6. PDL file header records. The file header records for a PDL data file shall contain the following information:

RECORD 1. - Source system document identifier (srodocid:). This is a character string used by the source system to uniquely identify this document, e.g., the technical publication number. This record is identical to Record 2 in the declaration file.

RECORD 2. - Destination system document identifier (dstdocid:). A character string containing the service or agency document number, e.g., the technical publication number. This record is identical to record 7 in the declaration file.

RECORD 3. - Text file identifier (txtfilid:). This record shall contain the code, from table II, identifying the content of this file.

RECORD 4. - Data file security label (docols:). Character string stating the security/sensitivity level or other restrictions on the data file.

RECORD 5. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

5.1.4.7. Gray scale header records. The file header records for gray scale (half tone) illustration files shall contain the following information:

RECORD 1. - Source system document identifier (srodocid:). The contents of this record shall be identical to record 1 of the text file which references this illustration.

RECORD 2. - Destination system document identifier (dstdocid:). A character string containing the destination organization's document number, e.g., the technical publication number, CAGE code. This record is identical to header record 2 of the text data file that references this illustration, and to record 7 of the declaration file.

RECORD 3. - Text file identifier (txtfilid:). The contents of record 3 shall be identical to record 3 of the text file which references this illustration.

RECORD 4. - Figure identifier (figid:). The figure identifier shall be the figure number with which the figure is referenced, with optional sheet numbers preceded by the string "-S" and with an optional overflow number preceded by a period character. For example, "5" would be the identifier for figure 5, "12-S10.3" would be the identifier for overflow drawing 3 of sheet 10 of figure 12. Foldout

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figures shall be identified with additional "-F" characters followed by the number of 8.5 x 11 inch sheets that will be needed to produce the foldout.

RECORD 5. - Source system graphics filename (srcgph:). The string value found with the required attribute "boardno" in the tag "<graphic...>".

RECORD 6. - Data file security label (doccls:). Character string stating the security/sensitivity level or other restrictions on the data file.

RECORD 7. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

5.1.4.8. Special word file header records. The file header records for the special word files shall contain the following information:

RECORD 1. - Source system document identifier (srodoid:). The contents of this record shall be identical to record 1 of the text file to which this special word file is applicable.

RECORD 2. - Destination system document identifier (dstdoid:). A character string containing the destination organization's document number to which this special word file is applicable, e.g., the technical publication number, CAGE code. This record is identical to record 7 of the declaration file.

RECORD 6. - Data file security label (doccls:). Character string stating the security/sensitivity level or other restrictions on the data file.

RECORD 7. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

5.1.4.9. Output specification data file header records. The file header records for the output specification data files shall contain the following information:

RECORD 1. - Source system document identifier (srodoid:). This is a character string used by the source system to uniquely identify the document to which this output specification is applicable, e.g., the technical publication number. This record is identical to Record 2 in the document declaration file.

RECORD 2. - Destination system document identifier (dstdoid:). A character string containing the service or

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agency document number to which this output specification is applicable, e.g., the technical publication number. This record is identical to Record 7 in the document declaration file.

RECORD 3. - Notes (notes:). Notes shall consist of free form text consistent with the number of characters permitted for records in this file.

5.1.5. Document identifier record format. The following shall be the format and content of record 1 of product data file header records when specified by the contract or other form of agreement. This format facilitates the transfer of information included with aperture cards and has application when the product data originates aperture card form or is required for subsequent issue in that form. Record 1, the "source system document identifier" record for IGES and raster data files shall include the information required by paragraphs 5.1.9(a)(1) through (21) of MIL-STD-804. The information shall be contained in an 80 byte string of data elements corresponding to the 80 column card format. The record information shall be placed in the order specified in section 5.1.9(a) of MIL-STD-804 with the following exceptions (blank fill unused columns):

Columns 1 and 2 (Type of document) - Use the applicable document type code from table III.

Columns 23 and 24 (Revision)

- a. When an individual sheet/page of multi-sheet documents is contained in a single file image and that sheet has its own revision letter, use that letter. If the revision letter is only indicated on the front sheet, use that letter.
- b. When multi-sheet documents are contained in a single file image and each sheet/page has its own revision letter, use the latest letter.
- c. When a revision is identified by a numeric, convert to a letter and use the letter. (See table IV.)

Columns 25 and 26 (Kind of accompanying document) Use the applicable type code of table III.

Column 35 (Distribution statement code) Distribution codes specified by the contract or other form of agreement shall be entered in this column.

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TABLE III - Document type codes.

AL	Application/Auxiliary List	SL	Specification List/String
AR	Article		
AT	Attachment		
AW	Art Work		
CB	Circuit Board	SS	System Schematic
CC	Classification Characteristics	TB	Test Bulletin
CP	Company Specification	TD	Tool Drawing or List
CS	Company Standard	TL	Tabulating List
DL	Document/Drawing List	TP	Test Procedures
D7	Undimensioned Drawing	TR	Test Requirement
EL	Equipment List	TS	Test Specifications
FL	Functional List	UL	Usage List
GL	Gauge List	WB	Wiring Board or Wire Print Board
IL	Index List		
IN	Rev Notice to Basic Document	WD	Wiring Diagram
KD	Kit Drawings	WH	Wiring Harness
LD	Logic Diagram	WL	Wiring List
MI	Master Index List	WT	Wire Table
ML	Master List	1L	Acquisition Data Only
MP	Master Pattern	2L	Maintenance Data Only
NC	Numerical Control Data	3L	Acquisition and Maintenance Data
NO	Nuclear Ordnance Data	4L	Acquisition Data Package List Document
PB	Program Bulletin		
PD	Program Document		
PL	Parts List		
QA	Quality Assurance Data		
QL	Qualified Product List		
RD	Redistribution List		
RL	Running List		
SD	Schematic Diagram		

Columns 39-42 (Image Number) A right justified, sequential file image number for each individual sheet/page of a document shall be used. (See table V.)

Columns 43-46 (Number of images) The total number of file images per individual sheet/page of a document shall be used. (See table V.)

Columns 78-80 (Sheet Number) A document sheet/page identification shall be used. (See table V.)

Column 50 (Document position code) Position codes as defined by table VI shall be used.

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TABLE IV. Numeric to alpha conversion chart.

N	A	N	A	N	A	N	A	N	A
1	A	45	BE	89	DJ	133	FN	177	HU
2	B	46	BF	90	DK	134	FP	178	HV
3	C	47	BG	91	DL	135	FR	179	HW
4	D	48	BH	92	DM	136	FT	180	JY
5	E	49	BJ	93	DN	137	FU	181	JA
6	F	50	BK	94	DP	138	FV	182	JB
7	G	51	BL	95	DR	139	FW	183	JC
8	H	52	BM	96	DT	140	FY	184	JD
9	J	53	BN	97	DU	141	GA	185	JE
10	K	54	BP	98	DV	142	GB	186	JF
11	L	55	BR	99	DW	143	GC	187	JG
12	M	56	BT	100	DY	144	GD	188	JH
13	N	57	BU	101	EA	145	GE	189	JJ
14	P	58	BV	102	EB	146	GF	190	JK
15	R	59	BW	103	EC	147	GG	191	JL
16	T	60	BY	104	ED	148	GH	192	JM
17	U	61	CA	105	EE	149	GJ	193	JN
18	V	62	CB	106	EF	150	GK	194	JP
19	W	63	CC	107	EG	151	GL	195	JR
20	Y	64	CD	108	EH	152	GM	196	JT
21	AA	65	CE	109	EJ	153	GN	197	JU
22	AB	66	CF	110	EK	154	GP	198	JV
23	AC	67	CG	111	EL	155	GR	199	JW
24	AD	68	CH	112	EM	156	GT	200	KY
25	AE	69	CJ	113	EN	157	GU	201	KA
26	AF	70	CK	114	EP	158	GV	202	KB
27	AG	71	CL	115	ER	159	GW	203	KC
28	AH	72	CM	116	ET	160	GY	204	KD
29	AJ	73	CN	117	EU	161	HA	205	KE
30	AK	74	CP	118	EV	162	HB	206	KF
31	AL	75	CR	119	EW	163	HC	207	KG
32	AM	76	CT	120	EY	164	HD	208	KH
33	AN	77	CU	121	FA	165	HE	209	KJ
34	AP	78	CV	122	FB	166	HF	210	KK
35	AR	79	CW	123	FC	167	HG	211	KL
36	AT	80	CY	124	FD	168	HH	212	KM
37	AU	81	DA	125	FE	169	HJ	213	KN
38	AV	82	DE	126	FF	170	HK	214	KP
39	AW	83	DC	127	FG	171	HL	215	KR
40	AY	84	DD	128	FH	172	HM	216	KT
41	BA	85	DE	129	FJ	173	HN	217	KU
42	BB	86	DF	130	FK	174	HR	218	KV
43	BC	87	DG	131	FL	175	HR	219	KW
44	BD	88	DH	132	FM	176	HT	220	LY

Notes:

1. N-Numeric; A-Alphabetic
2. Letters I,O,Q,S,X, and Z are not to be used

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TABLE V. Determination of numeric entries for columns 39-80.

CONDITION	COLUMNS 39-42 (FILE NUMBER)	COLUMNS 43-46 (NUMBER OF FILES)	COLUMNS 78-80 (SHEET NUMBER)
1. WHEN AN ENGINEERING DOCUMENT CONTAINS ONLY ONE SHEET AND REQUIRES ONLY A SINGLE FILE. (SEE FIGURE 2 CONDITION 1 FOR EXAMPLE)	USE 0001	USE 0001	USE 001
2. WHEN AN ENGINEERING DOCUMENT CONTAINS TWO OR MORE SHEETS THAT ARE SEQUENTIALLY NUMBERED 1, 2, 3, 4 OR A, B, C, D AND SO FORTH AND ARE CONTAINED IN ONE FILE PER SHEET (SEE FIGURE 2 CONDITION 2 FOR EXAMPLE)	USE 0001 FOR SHEET 1 OR A USE 0001 FOR SHEET 2 OR B USE 0001 FOR SHEET 3 OR C USE 0001 FOR SHEET 4 OR D	USE 0001 FOR SHEET 1 OR A USE 0001 FOR SHEET 2 OR B USE 0001 FOR SHEET 3 OR C USE 0001 FOR SHEET 4 OR D	USE 001 FOR SHEET 1 OR A USE 002 FOR SHEET 2 OR B USE 003 FOR SHEET 3 OR C USE 004 FOR SHEET 4 OR D
3. WHEN AN ENGINEERING DOCUMENT CONTAINS TWO OR MORE PAGES THAT ARE NOT SEQUENTIALLY NUMBERED AND EACH PAGE IS CONTAINED IN A SINGLE FILE. SUCH AS: A. TITLE PAGE, i, ii, 1.1, 1.A, 1.B; PAGE 2, 2.1, 2.2; PAGE 3; AND SO FORTH (SEE FIGURE 2 CONDITION 3 FOR EXAMPLE)	USE 0001 FOR TITLE PAGE USE 0002 FOR PAGE 1 USE 0003 FOR PAGE ii USE 0004 FOR PAGE 1-1 USE 0005 FOR PAGE 1.A USE 0006 FOR PAGE 1.B USE 0001 FOR PAGE 2 USE 0002 FOR PAGE 2.1 USE 0003 FOR PAGE 2.2 USE 0001 FOR PAGE 3	USE 0006 FOR TITLE PAGE USE 0008 FOR PAGE 1 USE 0008 FOR PAGE ii USE 0008 FOR PAGE 1-1 USE 0006 FOR PAGE 1.A USE 0006 FOR PAGE 1.B USE 0003 FOR PAGE 2 USE 0003 FOR PAGE 2.1 USE 0003 FOR PAGE 2.2 USE 0001 FOR PAGE 3	USE 001 FOR FIRST PAGE USE 001 FOR PAGE 1 USE 001 FOR PAGE ii USE 001 FOR PAGE 1-1 USE 001 FOR PAGE 1.A USE 001 FOR PAGE 1.B USE 002 FOR PAGE 2 USE 002 FOR PAGE 2.1 USE 002 FOR PAGE 2.2 USE 003 FOR PAGE 3
4. WHEN TWO OR MORE SHEETS OF AN ENGINEERING DOCUMENT ARE CONTAINED IN ONE FILE (SEE FIGURE 2 CONDITION 4 FOR EXAMPLE).	USE 0001 FOR EACH FILE REQUIRED	USE 001 FOR EACH FILE REQUIRED	USE 001 FOR FIRST FILE. USE LOWEST APPLICABLE SHEET NUMBER CONTAINED IN THE REMAINING FILES
5. WHEN ENGINEERING DOCUMENTS REQUIRE BOTH SINGLE AND MULTIPLE FILES PER SHEET. (SEE FIGURE 2 CONDITIONS 5 FOR EXAMPLE). (F1, F2, & F3 REPRESENT A SINGLE SHEET DOCUMENT THAT MUST BE DIVIDED BETWEEN 3 FILES TO INCLUDE THE WHOLE PAGE AT A USABLE SCALE.)	USE 0001 FOR FIRST FILE USE 0001 FOR F1 USE 0002 FOR F2 USE 0003 FOR F3	USE 0001 FOR FIRST FILE USE 0003 FOR F1 USE 0003 FOR F2 USE 0003 FOR F3	USE 001 FOR FIRST SHEET USE 002 FOR F1 USE 002 FOR F2 USE 002 FOR F3

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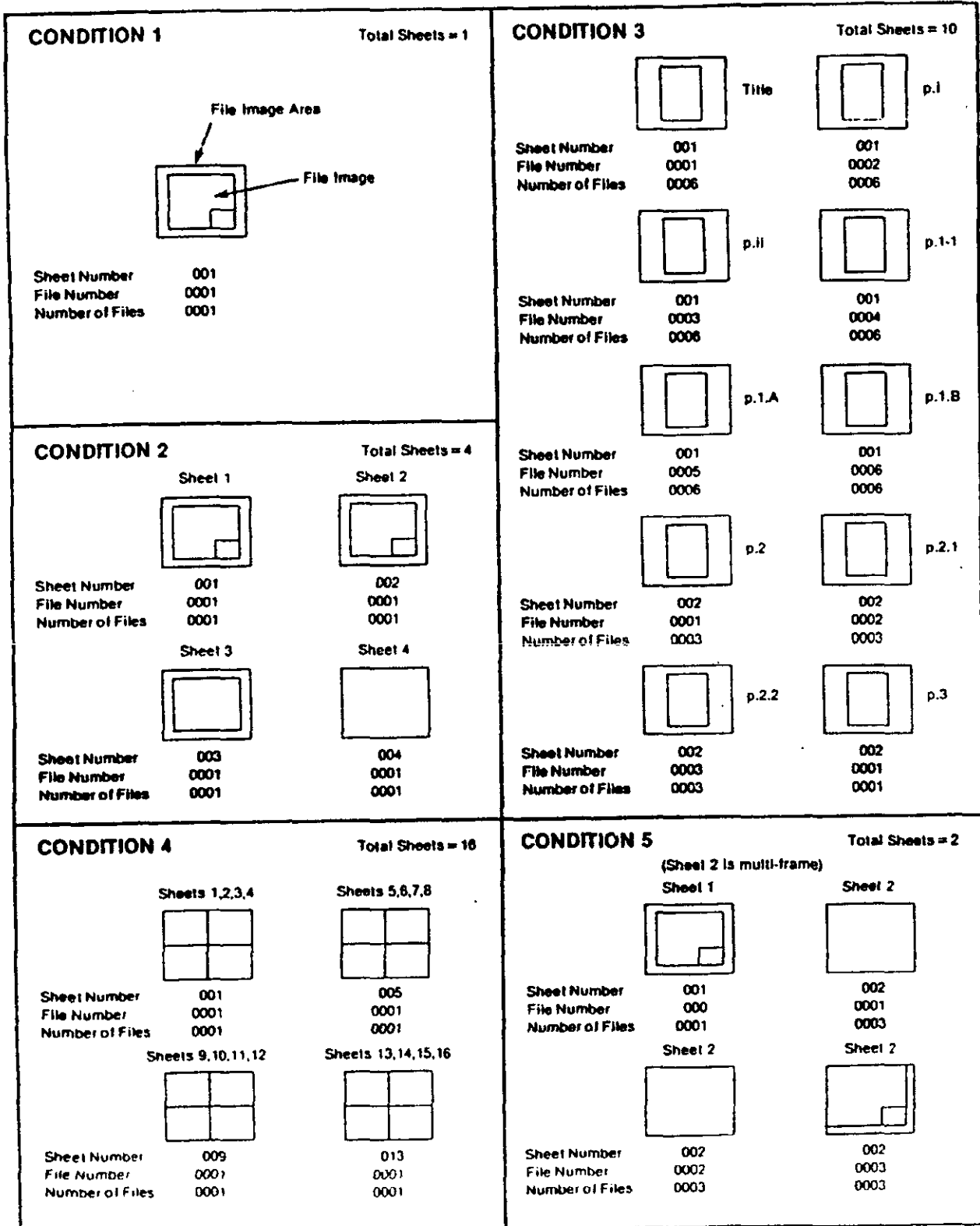


FIGURE 2. Image content examples.

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TABLE VI - Scanning position codes.

Code ¹	Explanation ²
A	A document, size A, 8 1/2 x 11 inches ³ .
B	A document, size B, 11 x 17 inches ³ .
B	Two each, size A, documents ³ .
B	ADPE computer document 11 x 15 inches ³ .
C	A document, size A, 8 1/2 x 11 inches ⁴ .
C	A document, size C, 17 x 22 inches ³ .
C	A document, size B, 11 x 17 inches ⁴ .
C	ADPE computer document, 11 x 15 inches ⁴ .
C	Any combination of one to three size A documents ⁴ .
C	Four each size A documents ³ .
D	A document, size D, 22 x 34 inches ³ .
E	A document, size E, 34 x 44 inches ³ and a document, size F, 28 x 40 inches ³ .
E	A document, sizes G, H, J or K (widths 11, 28, 34, & 40 inches) with variable lengths (22 1/2 to 176 inches) ⁵ . Also include any other single or multiple page document larger than size D not specified above ⁵ .

- 1 - Scanning position codes are associated with the reduction ratios used when the document is microfilmed.
- 2 - Document sizes and their metric equivalents (per ANSI-Y14.1) have no direct relationship to the position codes.
- 3 - Document centered on its X-Y axis when positioned in the image area of the file.
- 4 - Document not centered on its X-Y axis when positioned in the image area of the file.
- 5 - Document centered (using format zones) on its X-Y axis when positioned in the image area of the file.

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5.2. Media options. This section specifies the details of the transfer media preparation.

5.2.1. Magnetic tape. The tape format for delivery of the files to a destination system shall be written in accordance with FIPS PUB 79. The tape volume labels and file labels shall comply with Level 3 or Level 4 of the standard. Acceptable tape densities are 1600 and 6250 CPI only on 9-track tapes in accordance with FIPS PUBS 25, 50, and 79. Multi-volume tapes are possible, and several documents can be delivered on a set of tape volumes; however, to limit confusion and error, a tape set should be limited to three volumes except when a single technical document requires more than three volumes.

5.2.1.1. Volume identifier. The tape volume identifier shall consist of a six-character name; the first four characters are arbitrarily assigned to identify the set and the last two are the tape number in the set. The tape number for the first tape may be space characters or "01"; the subsequent tape numbers shall be numbered sequentially, "02" and up. The character set for the labels shall be limited to the ASCII numbers 0-9 and the upper-case letters. The first character shall not be a number. The owner and accessibility fields of the volume label will be ignored when the tape is read into the destination system.

5.2.1.2. Volume tape set example. Following is an example of Volume 1 of a hypothetical tape set written in ANSI Level 3 format with two documents on the tape (See figure 3). Beginning at the physical beginning of tape (BOT) mark on the tape shall be the Volume header (VOL1). Next shall be the two levels of file headers (HDR1, HDR2) for the first file (Declaration file: DO01), followed by a tape mark (TM). The blocks of the first declaration file follow, trailed by another tape mark, the end of file data (EOF1, EOF2) and another tape mark. The headers, tape marks, declaration file, and end of file are then written for another document, followed by the two text files for that document. Labels HDR3-9, EOF3-9, EOV3-9 may be written by the sending system. The destination system must be able to ignore these labels if the destination system cannot process them. When the physical end of tape (EOT) mark is reached, the end of volume (TM, EOV1, EOV2, TM and TM) shall be written. Any further files for the two documents would be on volume two or three of the tape set. In actuality, many more files should fit on a single tape than shown in this example.

5.2.1.3. Declaration file. The declaration file shall be written in sequential variable length records. Each record has a dedicated use, and each record is required. All the data shall be in ASCII character format. The records shall be ANSI type D variable length records with a maximum record length of 256 bytes and block lengths of 2048 bytes. (Do not include the Record number in the record field.) Whenever a declaration file name is

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defined, that file name (character string) shall be placed in the 17 character ANSI file label field.
Columns

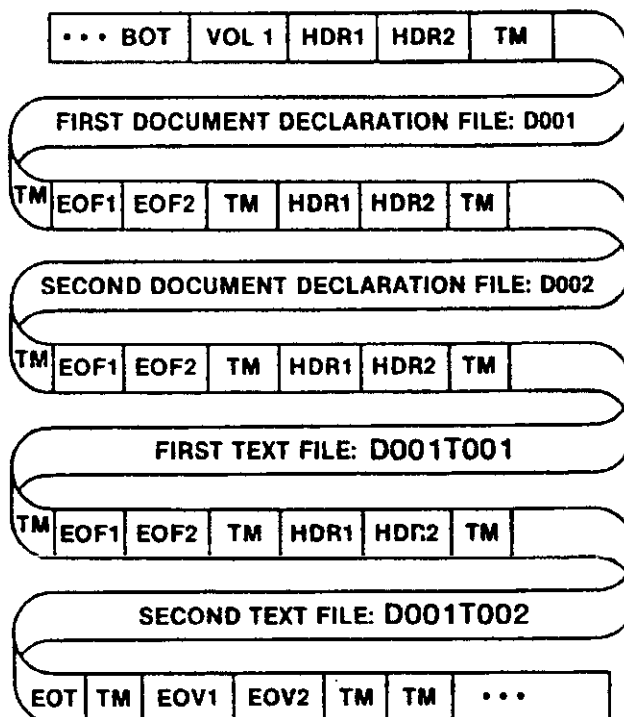


FIGURE 3. Hypothetical tape volume 1.

5.2.1.4. Text files. The data header records in the text files shall be ANSI type D variable length records with maximum record length of 256 bytes and block length of 2048 bytes. They shall be followed by the text records containing the document text and SGML markup.

5.2.1.5. IGES files. The IGES data file header records shall be written as ANSI type F fixed-length 80 byte records with block lengths of 2000 bytes.

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5.2.1.6. Raster files. The data in the first block of a raster file shall be written with 128 byte ANSI type F fixed-length records with block lengths of 2048 bytes. The second and succeeding physical blocks of the file shall contain the image data encoded in raster CCITT group 4 code. All the data header records shall be written in the first physical block of the file, with the block padded to the appropriate size.

5.2.1.7. Page description language files. The data shall be recorded on magnetic tape in accordance with the manner prescribed by the contract or other form of agreement.

5.2.1.8. Special word files. The data shall be recorded on magnetic tape in accordance with the manner prescribed by the contract or other form of agreement.

5.2.2. Optical disk. The data shall be recorded on optical disk media in accordance with the requirements of the contract or other form of agreement.

5.3. Packaging. It shall be the responsibility of the sender of the digital document to use best commercial practices in the packaging of media used to transfer the document.

5.3.1. Encoded magnetic computer media. A packing slip showing the names and volume numbers of each reel or disk shall be included in each package. If the media is magnetic tape, a packing slip shall be affixed to each reel of tape and shall indicate the recording density, 1600 or 8250 CPI. A printed listing of the content of included declaration files shall be on the packing slip or attached to it.

5.3.1.1. Protection. Encoded tapes, disks, and other electromagnetically inscribed information transfer media shall be protected against exposure to the close proximity of electric motors, magnets, and scanning devices. Such exposure may cause total or partial loss of the encoded data.

5.3.1.2. Packaging. Encoded magnetic computer tapes and disks shall be placed in a barrier bag or be wrapped in barrier sheet material. The barrier material or bag shall conform to the Type I Class 2 material of MIL-B-131, with at least one of its laminants containing aluminum foil. The package then shall be placed in an appropriate shipping carton. The exterior packaging shall conform to ASTM D 3981.

5.3.1.3. Marking. Encoded magnetic computer tape or disk shipping containers shall be conspicuously labeled with a warning as shown in figure 4.

5.3.2. Other computer media. Additional instructions for protection, packing or marking will be specified by the contract or other form of agreement if applicable.

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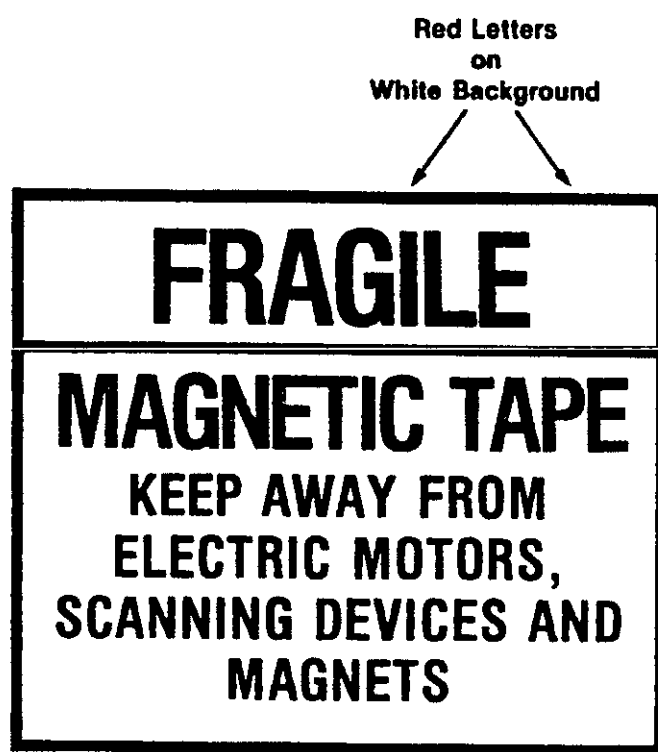


FIGURE 4. Example of a warning label.

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6. NOTES

6.1. Intended use. This standard directs the application of standards and specifications which are intended to provide the capability for reliable and economical transfer of various digital representation forms of technical information. The standards implemented herein have been chosen because they are widely supported and accepted by national or international standards bodies. Because of the rapidly evolving technology, many of these standards are themselves evolving significantly, and will be further implemented in future revisions of this standard.

6.2. Document digital data forms. The term document has a wide range of meanings, and to avoid confusion the meanings need to be clearly defined as they are applied in this military standard. As used herein, the term "document" applies to the information content of a variety of different types of technical data (see definition of document in section 3.1). However, that information content can be transferred in different forms which in turn can be processed to different degrees by the recipient and which have different intended uses and applications. Two distinctly different forms of the digital representation of technical information are:

- a. Document images. Traditional information products, formatted for human interpretation, that can be acquired in either hard copy or digital form. The principal uses of the document image are storage and retrieval for viewing and annotation or excerpting. Raster data files and PDL data files are of this type.
- b. Processable data. Digital source data from which document images can be produced. The data itself can be updated or transformed for other applications. IGES product data files, CGM vector data files, and SGML textual data files are of this type.

Document images and processable data are two different forms of digital data in which "documents" (information content) can be exchanged. This military standard addresses both categories of "documents."

6.3. Destination system. Throughout this standard, the phrase "destination system" is used in lieu of any specific designation of a military service or DOD agency. This convention does not preclude this standard from being used for information transfer to non-DOD agencies and private sector organizations.

6.4. Transfer of textual data. The automated interchange and processing of textual documents is governed by the markup, style specifications, and the page description requirements of MIL-M-28001. MIL-M-28001 translates the multiple document

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structures, formats and styles of specifications such as MIL-M-38784 into rigorously defined terms and logical constructs needed for electronic interchange and publishing purposes. MIL-M-28001 allows for the inclusion of illustrations by referencing external graphics files. This standard provides for both vector and raster illustration forms of the graphics files which MIL-M-28001 would utilize. Future revisions of this standard will address the use of ODA/ODIF for more advanced forms of compound documents. MIL-M-28001 applies the SGML markup language of ISO Standard 8879 which provides a coherent and unambiguous syntax for describing whatever a user chooses to identify within a document. The language includes:

- a. An "abstract syntax" for descriptive markup of document elements.
- b. Markup declarations that allow the user to define a specific vocabulary of generic identifiers and attributes for different document types.
- c. Provision of arbitrary data content.
- d. Entity references: a technique for referring to content located outside the mainstream of the document.
- e. Special delimiters for processing instructions to distinguish them from descriptive markup.

6.4.1. Transfer of vector graphics data. The standards adopted for the transfer of vector graphics data are ANSI Y14.26M (IGES) and FIPS PUB 128 (CGM). Both standards are applicable to the transfer of graphics data used for illustration purposes. IGES is most likely to be applicable where the data originates from a CAD system. The developing availability of CGM could provide for more efficient transfer and more compact storage of illustration files intended only for inclusion in publications.

6.4.1.1. Transfer of vector graphics data in IGES form. ANSI Y14.26M (IGES) provides a neutral format for the representation and transfer of product definition data among CAD systems and application programs, or the archival storage of the product definition data in a standardized form that will make possible the retrieval and use of the data after many years. Information is transferred by entities that represent geometry annotation, attributes, and logical relationships of the product model. This standard uses MIL-D-28000 to define the representation of three application subsets in ANSI Y14.26M (IGES) format: technical illustrations, engineering drawings, and electrical/electronic applications.

6.4.1.2. Transfer of vector graphics in CGM form. FIPS PUB 128 (CGM) Computer Graphics Metafile standard provides a generic mechanism for the transfer of graphics information between

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different graphics software systems, different graphics devices and different graphic software installations. Thus, CGM facilitates the portability of graphics data, provides a uniform interface for picture description, promotes the sharing of graphics information, aids graphics programmers and provides a standard archival storage format.

6.4.2. Transfer of raster data. The standard form adopted for the transfer of raster data is the CCITT group 4 compression code for facsimile data transmissions as specified by FED-STD-1064.

6.4.3. Transfer of product data. Product data is by definition engineering data which spans the entire range of disciplines from conceptual design and engineering analysis to manufacturing planning, production, test, inspection and deployment. Files of product data are expected to go through repeated exchanges between prime contractors, subcontractors, government project managers, and test laboratories without loss of information content.

6.4.3.1. Forms of product data. Product data can be exchanged by way of the neutral data formats. ANSI Y14.26M (IGES) is in widespread use for mechanical part models and has extensions to technical illustrations, electrical printed wiring boards, architectural engineering, manufacturing, and finite element analysis. The PDES/STEP standards, which are under development, will be addressed in a future revision of this standard. Two other standards, EDIF and VHDL, are being developed for integrated circuit product designs. It is expected that these along with IPC for printed circuit product designs will be addressed in future revisions of this standard.

6.4.3.2. ANSI Y14.26M (IGES) data exchange. ANSI Y14.26M (IGES) defines a neutral file format and a standard set of entities which are used to transfer and store product definition data created by computer aided design and engineering systems. The set of entities is sufficiently comprehensive to define geometry, annotations, and viewing parameters, and specify logical relationships for the data of any system. Unfortunately, allowing transfer of any of the entity forms defined by IGES permits multiple, "correct" representations of the data which can create ambiguities or lead to the storage of data in so many different forms that there can be no assurance that any given translator will have the capability to transform the information into the usable native format of the destination system. The solution to this unmanageable situation has been to develop the application subsets of MIL-D-28000. Each engineering application has different requirements for the data needed to describe the product model. The first step in specifying how an applications area can exchange its product description as a digital dataset is to carefully define the information content to be transmitted. The second step is to specify how this information is mapped unambiguously into each IGES entity. The resulting list of IGES

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entities, and their meaning in the context of the application, forms what is termed the application subset. An application subset of IGES can then be defined as a set of specific IGES entity types which are used to completely and unambiguously represent the information requirements of the product for a specific application.

6.4.3.3. EDIF or IPC product definition data exchange.

Application of the EDIF or IPC standards for delivery of digital product definition data may be required in order to deliver classes of information not covered by MIL-D-28000. The contract may specify delivery of electronic printed circuit board data in accordance with the applicable MIL-D-28000 class III, EDIF, or IPC formats; or the contractor may be directed to propose the formats. The proposed formats may include approved government or commercial standards.

6.4.3.4. VHDL product definition data exchange. Delivery of digital product definition data for integrated circuits in accordance with the specified format of VHDL may be specified by the contract.

6.4.4. Telecommunications. GOSIP will be able to interoperate with the DOD protocols; it is, therefore, encouraged that DOD acquisitions during the 1987 to 1990 transition period require the delivery of systems to the data communication protocol specifications of GOSIP. While the Government Open Systems Interconnection Profile specification is under development, the draft specification is available from the National Bureau of Standards, Institute for Computer Science and Technology, Gaithersburg, MD 20899.

6.5. Subject term (key word) listing. The following subject terms (key words) are applicable:

Initial Graphics Exchange Specification
Language, Page Description
Manuals, technical
Publications, technical
Publishing, electronic
Standard Generalized Markup Language

6.6. Changes from previous issue. Asterisks or vertical lines are not used to identify the changes effected in this revision due to the extensiveness of the changes.

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APPENDIX A

RASTER DATA REQUIREMENTS

10. GENERAL

10.1. Introduction. This appendix describes the requirements for the preparation of the files containing the raster form of illustration or product data.

10.2. Scope. This appendix is a mandatory part of this standard for raster data applications.

20. REQUIREMENTS

20.1. Preparation of raster data. Data that is required in raster form by any DoD component shall be prepared for submission to a designated destination system by utilizing the provisions of FED-STD-1064 as specified for Group 4, Class 1 facsimile terminals with the exception of pixel resolution and drawing size. These exceptions are described as follows:

20.1.1. Normal pixel resolutions. Unless otherwise specified by the procuring activity a default resolution of 200 x 200 pixels per inch, with a permissible tolerance of plus or minus 1 percent, shall be used.

20.1.2. High quality pixel resolution. When high quality presentations are required, the procuring activity may specify resolution of 300 x 300, 400 x 400, or 600 x 600 pixels per inch, each with a permissible tolerance of plus or minus 1 percent; however, the procuring activity is responsible for translating to the standard 200 x 200 pixels per inch resolution for interchange of raster data with other activities that are using the default standard 200 x 200 pixels per inch resolution. The pixel resolution must be specified in the file headers.

20.1.3. Scanlines for engineering drawings. The drawing sizes, A through K, specified by ANSI Y14.1 and their respective scanline length and number of scanlines per page are summarized in table VII. There are allowances in the scanline length for extra white space on the margins and for byte alignment of the pixels.

20.1.4. Orientation. The orientation of raster data to illustrate a portrait page or a landscape page is specified by a pixel path and line progression expressed by means of an orthogonal coordinate system. The origin of this co-ordinate system is at the top left corner of the page. The horizontal axis (x axis) corresponds to the top edge and the vertical axis (y axis) corresponds to the left edge of the page. All relative

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TABLE VII. Drawing size requirements.

Dimensions		@ 200 x 200 Pixels/inch		@ 300 x 300 Pixels/inch		@ 400 x 400 Pixels/inch		@ 600 x 600 Pixels/inch	
Drwg Size	WxL(max) (inches)	Pixels/ Line	Lines/ Page	Pixels/ Line	Lines/ Page	Pixels/ Line	Lines/ Page	Pixels/ Line	Lines/ Page
A	8.5 x 11	1728	2200	2560	3300	3456	4400	5120	6600
B	11 x 17	2240	3400	3328	5100	4480	6800	6656	10200
C	17 x 22	3456	4400	5120	6600	6912	8800	10240	13200
D	22 x 34	4416	6800	6656	10200	8832	13600	13248	20400
E	34 x 44	6848	8800	10240	13200	13696	17600	20416	26400
F	28 x 40	5632	8000	8448	12000	11264	16000	16832	24000
G	11 x 90	2240	18000	3328	27000	4480	36000	6656	54000
H	28 x 143	5632	26000	8448	39000	11264	52000	16832	78000
J	34 x 176	6848	35200	10240	52800	13696	70400	20416	105600
K	40 x 143	8064	28600	12032	42900	16128	57200	24064	85800

directions are expressed as counter clockwise angles of rotation with respect to some specified reference direction. Figure 4 illustrates the pixel path, line progression, and initial point for pages with portrait and landscape orientation.

20.1.4.1. Pixel path. Pixel path is the direction of progression of successive pixels along a line and is expressed as a direction relative to the horizontal axis of the coordinate system.

20.1.4.2. Line progression. Line progression is the direction of progression of successive lines and is expressed as a direction relative to the pixel path.

20.1.4.3. Initial point. The initial point is the point relative to which all image pixels are positioned within the page. The

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APPENDIX A

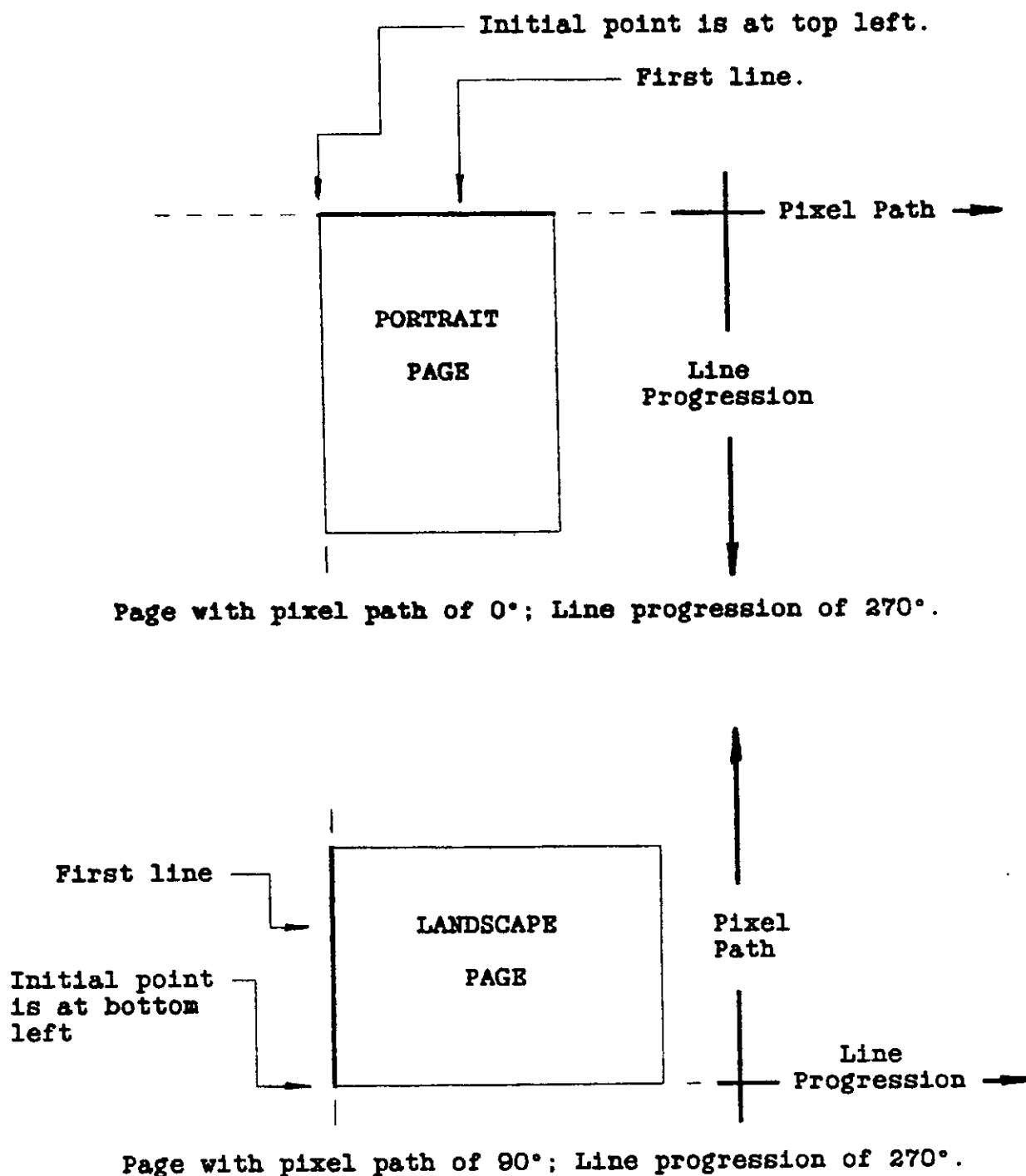
first pixel on the first line of the pixel array is positioned at the initial point. Subsequent lines are positioned such that the first pixel on each line falls in the direction of the line progression.

20.2. Generation of raster data by scanning. The generation of raster data, for either technical publication or product definition materials, by scanning source document sheets (or pages) shall be in accordance with the provisions of FED-STD-1064. Scanning is performed in line-by-line sequence from left to right, beginning at the leading edge of a page as it is fed into the scanner, and at a standard density selected to faithfully preserve the smallest detail (minimum line pair spacing) represented in the source material. Note that the image orientation may be such that the top of the page does not correspond to the leading edge. This scan produced raster data is initially stored in intermediate, digital form as a binary bit map, such that respective one's and zero's reflect the black and white physical picture elements (pixels) of the scanned image. In this intermediate (or expanded) form, raster scan data may be processed for enhancement or editing, or directly reproduced by an appropriate display or printing device.

20.3. Compression of raster data. Raster data transferred to any other external or remote system, by means of either interchangeable computer media (e.g. magnetic tape) data communications shall be compressed by the sending system according to the provisions of FED-STD-1065.

20.4. Data interchange requirements. All raster data submitted to any Department of Defense (DOD) engineering data repository by an industry (contractor) source, or interchanged among DOD repositories shall be in compressed form. Raster data compression shall be accomplished according to the facsimile coding schemes and control functions specified by FED-STD-1065 for Group 4 facsimile apparatus except for the extension provided in table VII for A to K size engineering drawings. The source system shall be responsible for ensuring that the provisions of this requirement are met.

APPENDIX A

FIGURE 4. Position of pixels.

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APPENDIX A

Custodians:

Army - CR
Navy - SH
Air Force - 24
DLA - DH

Preparing Activity

OSD-CL
(Project ILSS - 0023)

Review activities:

Army - AM
Air Force - 01, 02
NSA - NS
DCA - DC
NSA - NA
Other- NBS, DOE, GPO, NCS

User activities:

Army - AL,AT,AV,CR,EA,ER,GL,ME,MI,MR,SM,TE,TM
Navy - AS,EC,OS,SA,YD
Air Force - 11,13,14,17,18,19,68,79,99

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

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1. DOCUMENT NUMBER MIL-STD-1840A		2. DOCUMENT TITLE MILITARY STANDARD - AUTOMATED INTERCHANGE OF TECHNICAL INFO.	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR	
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		<input type="checkbox"/> OTHER (Specify): _____	
5. PROBLEM AREAS			
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b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	