

NOT MEASUREMENT
SENSITIVE

MIL-STD-31000B

31 October 2018

SUPERSEDING

MIL-STD-31000A

26 February 2013

DEPARTMENT OF DEFENSE
STANDARD PRACTICE
TECHNICAL DATA PACKAGES

This standard is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE.

1.1 This standard defines the requirements for a technical data package (TDP) and its related TDP data management products. The purpose of the TDP is to provide an authoritative technical description of an item which is clear, complete and accurate, and in a form and format adequate for its intended use. A TDP contains elements, is described by a level and type, and may have associated metadata and supplementary technical data. A TDP is a sub-set of product and technical data as shown in the hierarchical breakdown in Figure 1.

1.2 TDP levels, types, elements and TDP data management products will be identified in accordance with this standard and applicable Data Item Descriptions (DID), as tailored and imposed through the TDP Option Selection Worksheet (Figure 5) or as defined in block 16 of the DD1423, Contract Data Requirements Lists (CDRL) in contracts, purchase orders, and Military Interdepartmental Procurement Requests (MIPRs) (hereafter referred to collectively as “the contract”).

Comments, suggestions, or questions on this document should be addressed to: Commander, US Army ARDEC, ATTN: RDAR-EIQ-SA, Picatinny Arsenal, New Jersey 07806-5000 or email to usarmy.picatinny.ardec.list.ardec-stdzn-branch@mail.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST online database at <https://assist.dla.mil>.

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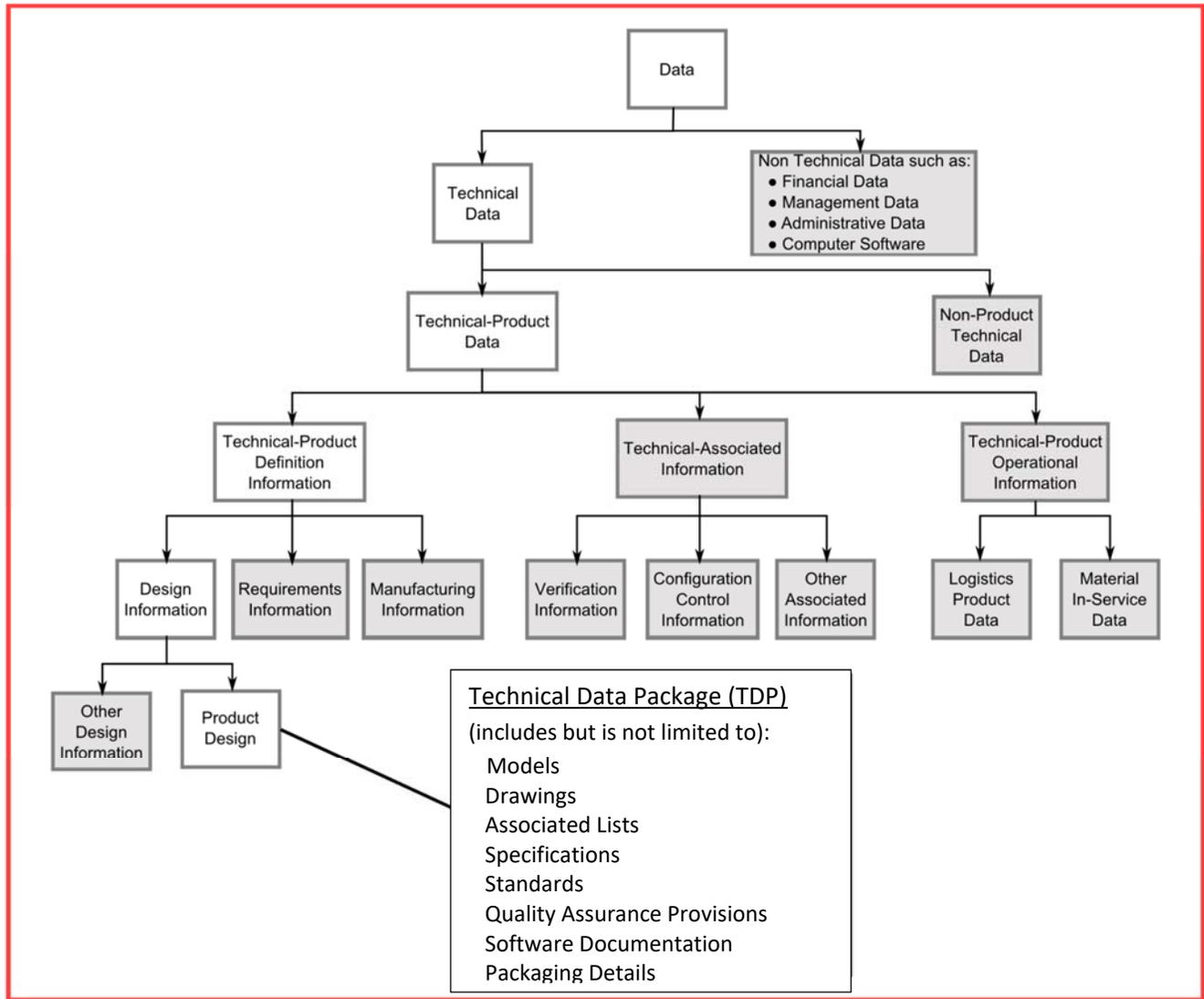


FIGURE 1. TDP relationships

2. APPLICABLE DOCUMENTS.

2.1 General. The documents listed in this section are specified in sections 3, 4 and 5 of this standard. This section does not include documents listed in other sections or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

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DEPARTMENT OF DEFENSE STANDARDS.

MIL-STD-961	Defense and Program-unique Specifications Format and Content
MIL-STD-963	Data Item Descriptions (DIDs)
MIL-STD-2073-1	Standard Practice for Military Packaging
DOD-STD-2101	Classification of Characteristics

Copies of these documents are available online at <http://quicksearch.dla.mil>.

2.2.2 Other Government documents and publications. The following other Government documents and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE MANUALS

DoD Manual 4100.39-M	Federal Logistics Information System (FLIS) Procedures
DoD Manual 5220.22-M	DoD Industrial Security Manual for Safeguarding Classified Information.
DoD Instruction 5230.24	Distribution Statements on Technical Documents
DoD Directive 5230.25	Withholding of Unclassified Technical Data From Public Disclosure
DFARS Part 252	DFAR Supplement for Solicitations, Provisions and Contract Clauses
DFARS 252.227-7013	Rights in Technical Data--Noncommercial Items.
DFARS 252.227-7014	Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation.

(Applications for copies of DoD Manual 5520.22-M and DoD Instruction 5230.24 are available from the Defense Technical Information Center (DTIC), <http://www.dtic.mil>. Copies of DFARS documents are available online at <http://www.acq.osd.mil/dpap/dars/dfarspgi/current/index.html>. The federal documents can be found at <http://www.dtic.mil/whs/directives/>.)

FEDERAL PUBLICATION

Federal Standardization Manual

(Copies of Federal Standardization Manual are available from the General Service Administration, Centralized Mailing List Service (7CAFL), P.O. Box 6477, Ft. Worth, TX 76115 and https://www.gsa.gov/portal/mediaId/215947/fileName/Federal_Standardization_Manual.action.)

2.3 Non-Government publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise specified, the issues of the documents are those cited in the solicitation.

MIL-STD-31000B

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- ASME Y14.1 Decimal Inch Drawing Sheet Size and Format
- ASME Y14.1M Metric 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 and Associated Documents
- ASME Y14.41 Digital Product Definition Data Practices
- ASME Y14.5 Dimensioning and Tolerancing
- ASME Y14.100 Engineering Drawing Practices

(Copies of these documents are available from <https://www.asme.org/> or ASME information Central Orders/Inquiries, P.O. Box 2300, Fairfield, NJ 07007-2300)

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

- ISO/IEC 12207 System and Software Engineering - Software Lifecycle Processes
- ISO 32000-1 Document Management - Portable Document Format.

(Copies of this document are available from <http://www.ieee.org/index.html>, or IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08854-1331.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- ISO 10303 Standard for the Exchange of Product model data (STEP)

(Copies of free and purchased parts of the standard are available at: <https://www.iso.org/>.)

NATIONAL AEROSPACE STANDARDS (NAS)

- NAS 3500 Technical Data Package: Composition, Communication, and Application

(Copies of this document are available from the Aerospace Industries Association of America, inc. 1000 WILSON BLVD, ARLINGTON, VA 22209 and <http://www.aia-aerospace.org>.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS.

3.1 For the purposes of this standard, the following definitions apply:

3.1.1 3-Dimensional Intelligent (3Di) technical data. A 3-dimensional viewable representation of an item provided in a widely available software format (e.g. ISO 32000-1 Portable Document Format (PDF)). This representation details the complete technical description of the required design configuration to include but not limited to geometry, topology, relationships, tolerances, attributes, metadata and other features necessary to define a component or assembly.

3.1.2 3Di format. The standard arrangement and organization of information within a 3Di viewable representation of an item. This includes such features as the size and arrangement of information blocks (e.g. title blocks), notes, lists, revision information, view states, restriction notices and the use of optional or supplemental blocks (see related term Drawing Format).

3.1.3 Commercial And Government Entity (CAGE) code. A five character alpha-numeric identifier, assigned to commercial and Government activities that manufacture or develop items, or provide services or supplies for the Government. When used with a document number or part number, the CAGE code designates the design activity from whose series the document or part number is assigned.

3.1.4 Commercial engineering design data. Engineering design data prepared by a commercial design activity, in accordance with that activity's documentation standards and practices, to support the development and manufacture of a commercially developed product.

3.1.5 Commercial item. An item that is customarily used by or sold to the general public or by non-governmental entities for purposes other than governmental purposes.

3.1.6 Company standard. A company document, which establishes engineering and technical limitations and applications for items, materials, processes, methods, designs and engineering practices unique to that company. (NOTE: Company standards are not considered to be non-Government standards.)

3.1.7 Competent manufacturer. A manufacturer that has demonstrated the capability to produce similar products at the same state of the art in the same or similar lines of technology.

3.1.8 Computer software. Computer programs, source code, source code listings, object code listings, design details, algorithms, processes, flow charts, formulae and related material that would enable the software to be reproduced, recreated, or recompiled. Computer software does not include computer data bases or computer software documentation. (DFARS Clause 252.227-7014)

3.1.9 Computer software documentation. Owner's manuals, user's manuals, installation instructions, operating instructions, and other similar items, regardless of storage medium, that explain the capabilities of the computer software or provide instructions for using the software. (DFARS Clause 252.227-7014) ISO/IEC Standard 12207 uses the term "software life cycle data" to address software documentation.

3.1.10 Configuration Item (CI). A product or an aggregation of products that accomplishes an end-use function and is deemed to require separate configuration management documentation and control. Configuration items are end items or major components of end items, which typically have performance requirements allocated to them and documented in their own specification.

3.1.11 Critical manufacturing process. A process that is the only known manufacturing method that will result in the production of an acceptable item.

3.1.12 Data Item Description (DID). A completed document defining the data deliverables required of a DOD contractor. A DID specifically defines the data content, format and intended use of the data with a primary objective of achieving standardization of data deliverables by the DOD. (MIL-STD-963)

3.1.13 Design activity. An organization that has, or has had, responsibility for the design of an item. The two types of design activity are:

3.1.13.1 Current Design Activity (CDA). The design activity currently responsible for the design of an item. This may be the original design activity or a design activity to which the design responsibility has been transferred.

3.1.13.2 Original Design Activity (ODA). The design activity originally responsible for the design of an item, and whose design activity identification (CAGE Code) is associated with the part or identifying number (PIN) and are typically shown in the title block of the engineering design data.

3.1.14 Detail specification. A specification that specifies design requirements, such as materials to be used, how a requirement is to be achieved, or how an item is to be fabricated or constructed. (MIL-STD-961)

3.1.15 Drawing. An engineering document or digital data file(s) that discloses (directly or by reference), by means of graphic or textual presentations, or by combinations of both, the physical or functional requirements of an item. (ASME Y14.100) A drawing is a type of engineering design data.

3.1.16 Drawing format. The arrangement and organization of information within a drawing. This includes such features as the size and arrangement of blocks, notes, lists, revision information, and the use of optional or supplemental blocks. (ASME Y14.1/Y14.1M) (See related term 3Di format)

3.1.17 End product. An end product is an item, such as an individual part or assembly, in its final or completed state. (ASME Y14.24). An end product is also known as an end item.

3.1.18 Engineering design data. Engineering drawings, 3Di viewables, native CAD models, neutral CAD models or a combination of these, which define an item by means of graphic and textual presentations, the physical and/or functional requirements of an item, sufficient to fulfill its TDP element and level requirements. Engineering design data comes in three levels corresponding to its TDP level requirements as defined below:

3.1.18.1 Conceptual design data. Engineering design data which describe the engineering concepts on which a proposed technology or design approach is based.

3.1.18.2 Developmental design data. Engineering design data which describe the physical and/or performance characteristics of a specific design approach to the extent necessary to permit the analytical evaluation of the ability of the design approach to meet specified requirements and enable the development, manufacture and testing of prototype or experimental materiel.

3.1.18.3 Product design data. Engineering design data which describes the complete physical and/or performance characteristics of an item or component in sufficient detail to ensure that an item or

component produced in accordance with this data will be essentially identical to the original item or component.

3.1.19 Fully annotated model. A 3D CAD dataset, in which all necessary features to fully define the item (i.e. full design disclosure to include dimensions, tolerances, materials, notes, surface finishes, etc.) are included in a readily viewable form. (See ASME Y14.41)

3.1.20 Limited design disclosure model. A 3D CAD dataset sufficiently defined to provide a visual understanding of the item, but which does not contain full design disclosure. Generally external interface characteristics and features such as weight and center of gravity will be sufficiently defined for the intended purpose. Sometimes referred to as an envelope model, shrink-wrap model or cosmetic model.

3.1.21 Metadata. Data that provides information about other data. For the purpose of this standard, metadata is defined to be data about a design and/or engineering design documents. (Part number, drawing number, nomenclature, revision, date approved, approved by, used on, etc., are examples of metadata). Metadata is used by the design and procuring activities to store, manage, and provide access to TDP elements.

3.1.22 Model Based Definition (MBD). The practice of using 3D datasets containing the exact solid representation, associated 3D geometry and 3D annotations of a product's dimensions, tolerances, materials, finishes and other notes to specify a complete product definition. (See ASME Y14.41)

3.1.23 Non-Government standardization document (a.k.a. Industry Standards). A standardization document developed by a private sector association, organization or technical society which plans, develops, establishes or coordinates standards, specifications, handbooks or related documents. These documents are available for purchase or free of charge to the general public. Company standards are not considered as non-Government standardization documents.

3.1.24 Performance specification. A specification that states requirements in terms of the required results with criteria for verifying compliance, but without stating the methods for achieving the required results. A performance specification defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics. (MIL-STD-961)

3.1.25 Procuring activity. The Government or private organization which establishes the requirements for an end item, service or set of data, and is responsible for the issuance of a contract or solicitation for these goods or services.

3.1.26 Product Lifecycle Management (PLM). The process or system used for managing product-related design, production and maintenance information. PLM systems are typically software applications designed for the purpose of lifecycle management of a product.

3.1.27 Quality Assurance Provisions (QAP). Documented requirements, procedures and criteria necessary for demonstrating that products conform to design requirements.

3.1.28 Reference documents. Documents referred to in a TDP element, which contain information necessary to meet the information content requirements of that TDP element.

3.1.29 Software specification. A type of program-unique specification that describes the requirements and verification of requirements for the automatic acquisition, storage, manipulation,

management, movement, control, display, switching, interchange, transmission, or reception of data or information. (MIL-STD-961)”

3.1.30 Special Inspection Equipment (SIE). Either single or multi-purpose integrated test units engineered, designed, fabricated or modified to perform special purpose testing of an item in the manufacturing process. It consists of items or assemblies of equipment and associated software that are interconnected and interdependent so as to become a new functional entity for inspection or testing purposes. SIE is also known as special test equipment.

3.1.31 Special Packaging Instruction (SPI). Instructions which document military packaging requirements for an item, as distinct from commercial packaging. These instructions cover methods of preservation to protect materiel against environmentally induced corrosion and deterioration, physical and mechanical damage, and other forms of degradation during storage, multiple handling and shipment of materiel in the defense transportation system. SPI's will be required and prepared in accordance with Appendix E of MIL-STD-2073-1 and as specified in the contract and Contract Data Requirements List (CDRL).

3.1.32 Special tooling. Unique tooling which is mandatory for the manufacture of an acceptable item. It differs from tooling designed to increase manufacturing efficiency in that the use of the special tool imparts some characteristic to the item which is necessary for satisfactory performance and cannot be duplicated through other generally available manufacturing methods. Examples of special tooling would be jigs, dies, fixtures, molds, patterns and other equipment or manufacturing aids that absolutely must be used in order to produce a satisfactory item.

3.1.33 Specification. A document that describes essential technical requirements for materiel and the criteria for determining whether those requirements are met. (MIL-STD-961)

3.1.34 Standardization document. A document, such as a specification, standard or handbook, developed for the purpose of standardizing items, materials, processes or procedures.

3.1.35 Supplementary technical data. Data related to or in support of a TDP, but not an inherent part of the TDP, which is provided as reference material or is explanatory in nature. For example, supplementary technical data for a particular item could include manufacturing instructions, simulations, work flow data, inspection equipment or procedures (which are not required as an inherent part of the TDP or TDP element), manufacturing machine code, design studies, analysis studies, test results, safety data sheets, etc.

3.1.36 Technical data. Recorded information, regardless of the form or method of the recording, of a scientific or technical nature (including computer software documentation). The term does not include computer software or data incidental to contract administration, such as financial or management information. (DFARS Clause 252.227-7013).

3.1.37 Technical data CAD format:

3.1.37.1 Native CAD data. CAD data as created in its original authoring software format. In general, only the original authoring software format is capable of reading, editing and interpreting native CAD data. (Examples: CREO, CATIA, Autodesk, SolidWorks, etc.) Generally native CAD data is the only format suitable to serve as master technical data. Native CAD data may also serve as authoritative technical data.

3.1.37.2 Neutral CAD data. CAD data which is derived from the native format and converted into a format which can be imported into other CAD software. Neutral CAD data is created to a widely available national or international standard (e.g. STEP). In general, neutral CAD data cannot serve as master technical data but may serve as either reference or authoritative technical data.

3.1.37.3 Viewable CAD data. CAD data which is derived from the native format and converted into a format which can be displayed by a widely available software and for purposes of defining design intent in a human readable format (e.g. 3Di PDF). In general, viewable CAD data cannot serve as master technical data but may serve as either reference or authoritative technical data.

3.1.38 Technical data origin:

3.1.38.1 Master technical data. A set of technical data which is the controlling source for any subsequent technical data output. All changes to the technical data must originate on the master technical dataset. There can be only one instance of the master technical data which is typically in the native CAD format and maintained by the current design activity.

3.1.38.2 Derivative technical data. A set of technical data generated from master technical data. Typically derivative technical data is created to change its format to suit a different purpose. For example converting master, native format data to neutral or viewable data (e.g. STEP, PDF, etc.) so as to allow it to be read by a wider range of software applications. Changes to derivative technical data originate on the master technical dataset.

3.1.39 Technical data validation status:

3.1.39.1 Authoritative technical data. A set of technical data which has been released and validated as adequate and complete for its intended purpose.

3.1.39.2 Reference technical data. A set of technical data which is provided for information, but is not necessarily validated as accurate, adequate and complete.

3.1.40 Technical Data Package (TDP). The authoritative technical description of an item. This technical description supports the acquisition, production, inspection, engineering, and logistics support of the item. The description defines the required design configuration and/or performance requirements, and procedures required to ensure adequacy of item performance. It consists of applicable technical data such as models, engineering design data, associated lists, specifications, standards, performance requirements, quality assurance provisions, software documentation and packaging details.

3.1.41 Technical data package data management product. A data product that is used to monitor and control the development and maintenance of the TDP. A TDP data management product contains information about the TDP rather than the item being documented.

3.1.42 Technical data package element (a.k.a. component). A data product that is an actual component of the TDP. A TDP element provides all or part of the information necessary to define the item being documented by the TDP. All TDP elements taken collectively provide a complete Technical Data Package.

3.1.43 Technical Data Package List (TDPL). An index of all documents contained in a technical data package established at a point in time. TDPLs contain a list of all specifications, engineering design data, (i.e. drawings, models, 3Di viewables, etc.), QAPs, inspection documents, packaging documents, or other documents which comprise the TDP listed by nomenclature, document CAGE code, document number, distribution statement, revision, and date.

3.1.44 Verification. All examinations, tests and inspections necessary to verify that an item meets the physical and functional requirements for which it was designed, to verify that a component, part or subassembly will perform satisfactorily in its intended application, or that an item conforms to specified requirements.

4. GENERAL REQUIREMENTS.

4.1 General. The purpose of the TDP is to provide a technical description of an item which is clear, complete and accurate and in a form and format adequate for its intended use. TDPs define the physical and functional characteristics of the accepted configuration of the item and its subordinate assemblies, subassemblies, and parts. To accomplish this purpose, TDPs consist of a level and type and one or more elements as specified in the contract and TDP Option Selection Worksheet. In addition, TDP metadata, supplementary data and TDP data management products may be required to manage and control the TDP development process as specified in the contract and TDP Option Selection Worksheet (Figure 5).

4.2 TDP levels. TDP levels provide for a natural progression of a design from its inception to production. A particular TDP level may be ordered to define a conceptual design, a developmental prototype or limited production design, or full scale production of the item by the original design activity or any other capable manufacturer. TDPs consist of one of three Levels:

- (1) Conceptual Level
- (2) Developmental Level
- (3) Product Level

4.3 TDP types. TDP type describes the form and format of the technical data and shall consist of one or more of the following types:

4.3.1 Type 2D: 2-Dimensional (2D) Technical Data Package.

4.3.2 Type 3D: 3-Dimensional (3D) Technical Data Package. Type 3D will include one or more of the below as specified in the contract and TDP Option Selection Worksheet:

- (1) 3D native models.
- (2) 2D drawings derived from the 3D native models.
- (3) 3Di pdf viewable data derived from the 3D native models.
- (4) Neutral files derived from the 3D native models.

4.4 TDP elements. TDP elements describe the various components of the TDP. TDP elements shall consist of some or all the following as necessary to fulfill its intended purpose and as described in the contract and TDP Option Selection Worksheet.

4.4.1 Engineering design data. The form and format of the engineering design data, whether it be 2D drawings, 3Di viewables, native or neutral CAD data, will be as specified in the TDP Option Selection Worksheet and the contract. The engineering design data may consist of conceptual, developmental or product level engineering design data depending on the TDP level requirements and may be in government or commercial format as stated in the contract and TDP Option Selection Worksheet.

- a. Special Inspection Equipment (SIE) engineering design data and associated lists.
- b. Specifications.
- c. Software documentation.
- d. Special Packaging Instruction (SPI) documents, engineering design data and associated lists.
- e. Quality assurance provisions (QAP).
- f. Special Tooling engineering design data and associated lists.

4.5 TDP data management products. TDP data management products listed below are used by the procuring activity to control and manage the TDP development process and shall be delivered in accordance with the contract and TDP Option Selection Worksheet. Other TDP data management products in addition to those listed below may also be required as stated in the contract.

- a. Technical Data Package List (TDPL).
- b. Document number assignment report.
- c. Proposed critical manufacturing process description.
- d. Source control approval request.
- e. Engineering drawing tree

4.6 TDP metadata. Metadata consist of data from and about TDP elements and is used by the procuring activity to manage the TDP development process and to better acquire and support the end product defined by the TDP. When metadata is required, it shall be delivered in accordance with the contract.

4.7 Supplementary technical data. TDP supplementary technical data are deliverable data products used by the procuring activity to better acquire and support the end product defined by the TDP. When supplementary technical data is required, it shall be delivered in accordance with the contract.

5. DETAILED REQUIREMENTS.

5.1 General. TDPs define the physical and functional characteristics of the accepted configuration of the item and its subordinate assemblies, subassemblies, and parts. See Appendix A for guidance on selection of TDP elements and data management products.

5.2 TDP levels.

5.2.1 Conceptual level. A conceptual TDP shall consist of those TDP elements necessary to define design concepts, and include the appropriate information required for analysis and evaluation of those concepts. The data will generally consist of simple sketches/models, artist renderings and/or basic textual data. The data may consist of the system performance specification (see 5.4.4) and conceptual design data (see 5.4.1.1) as specified by the contract.

5.2.2 Developmental level. A developmental TDP shall consist of those TDP elements necessary to provide sufficient data to support the analysis of a specific design approach, the fabrication of prototype materiel for test or experimentation, and limited production by the original design activity or with assistance from the original design activity. The data may consist of the unique item specifications (see 5.4.4) for all system Configuration Items (CIs) and developmental design data and any required associated lists (see 5.4.1.2) as specified by the contract.

5.2.3 Product level. A product level TDP shall consist of those TDP elements necessary to provide the design, performance requirements, engineering, manufacturing, inspection, packaging and quality assurance provision information necessary to fully define the item and enable the procurement or manufacture of an item. The product shall be defined to the extent necessary for a competent manufacturer to produce an item, which duplicates the physical, interface, and functional characteristics of the original product, without additional design engineering effort or recourse to the original or current design activity. Product data shall reflect the approved, tested, and accepted configuration of the defined delivered item. The data may consist of product design data with all required associated lists (see 5.4.1.3); SIE design data with all required associated lists (see 5.4.2); special tooling design data

with all required associated lists (see 5.4.3); specifications (see 5.4.4); software documentation (see 5.4.5); SPI design data with all required associated lists (see 5.4.6); and QAPs (see 5.4.7) as specified by the contract.

5.3 TDP types. TDP Type describes the form and format of the data as imposed by the contract and TDP Option Selection Worksheet.

5.3.1 Type 2D: 2-Dimensional Technical Data Package (2D TDP). A 2D TDP is based on 2 dimensional engineering drawings in accordance with ASME Y14.100 series standards (e.g. figure 2).

5.3.2 Type 3D: 3-Dimensional Technical Data Package (3D TDP). A 3D TDP is based on product model data that is capable of generating derivative products including but not limited to 2D TDP, 3D lightweight graphical representations, and neutral data formats. Type 3D shall include one or more of the below as specified in the contract and TDP Option Selection Worksheet:

- (1) 3D native models.
- (2) 2D drawings derived from the 3D native models (e.g. figure 3).
- (3) 3Di pdf viewable data derived from the 3D native models (e.g. figure 4 and Appendix B).
- (4) Neutral files derived from the 3D native models.

5.3.2.3 Requirements for Type 3D TDPs. When 3-dimensional models are used in a product level TDP, the models shall be complete design disclosure models, except as stated in para 5.3.2.5. Complete design disclosure includes all necessary information to adequately define the item including, but not necessarily limited to, full design disclosure (via annotations or other means) of all features and geometry, dimensions, tolerances, materials, specifications, notes, or other information fully included in the 3D native CAD model. For product level TDPs, use of envelope models, un-annotated or un-defined features, and/or global profile tolerancing is not allowed unless specifically stated in the contract.

5.3.2.4 Derived data based on 3D models. Engineering design data including but not limited to 2D TDP, 3D lightweight graphical representation, and neutral data formats shall be based on, and derived from the master native 3D models. There shall be no conflict in data between the master 3D native model and its derived engineering design data.

5.3.2.5 Limited design disclosure models. When a 3D TDP is required and a subcomponent to the end item does not require complete design disclosure, (such as a commercial item, purchased item, item controlled by a standardization document, etc.) a 3D model of the subcomponent shall be provided. The subcomponent's 3D model need not be fully defined but shall be sufficient to visualize the shape, interface characteristics, and describe form, fit, and function as required.

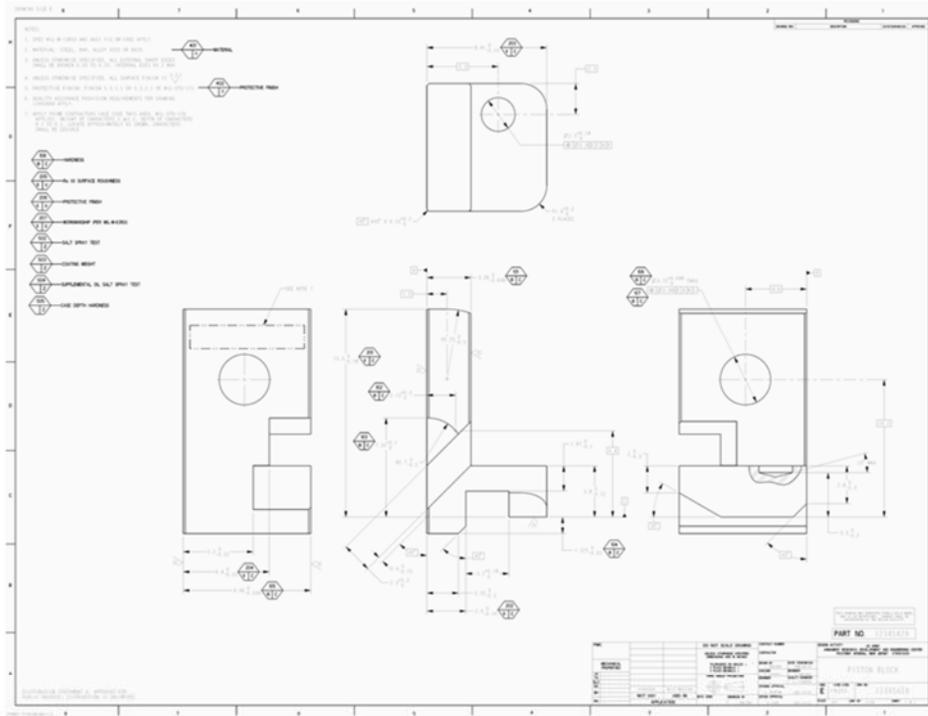


Figure 2.
Example Type 2D Drawing

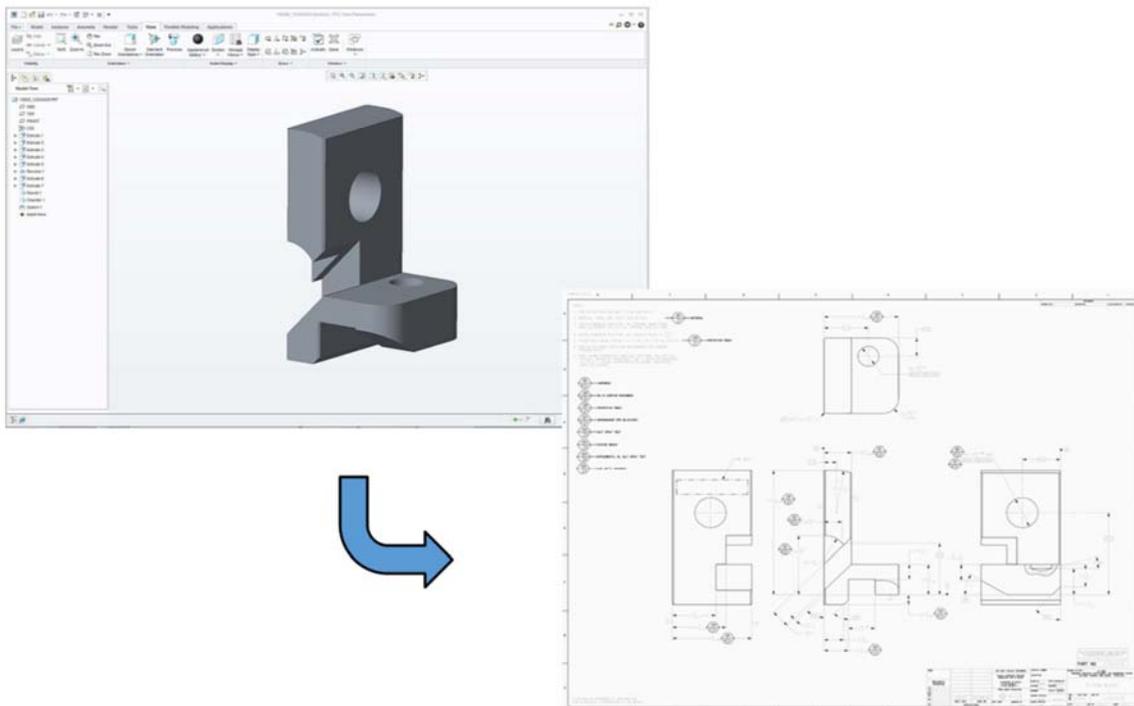


Figure 3.
Example Type 3D Native Model with Associated 2D Drawing

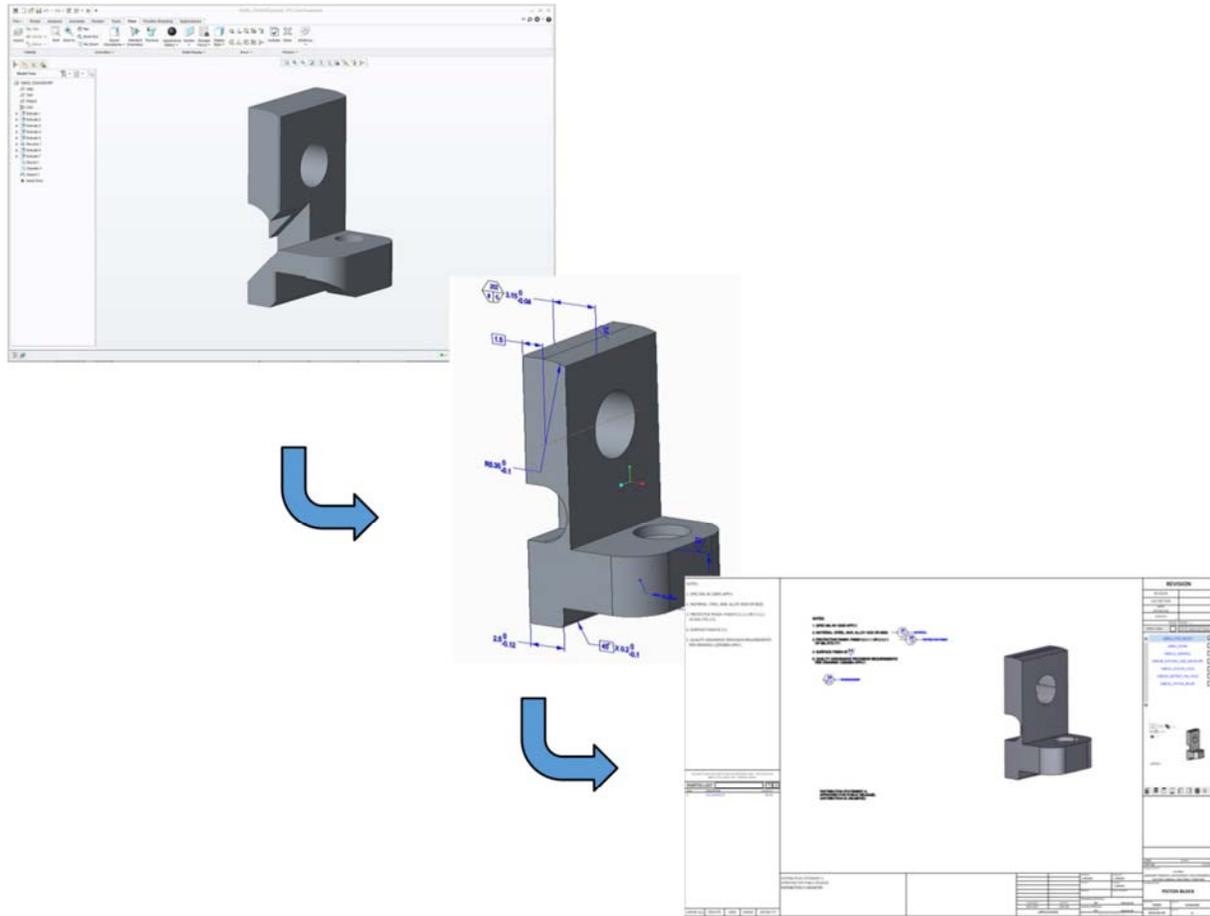


Figure 4.

Example Type 3D Fully Annotated Native Model with Associated 3Di Viewable

5.4 TDP elements. TDP elements describes the various component parts of the TDP and are defined as follows:

5.4.1 Engineering Design Data. Engineering design data may consist of one or more of the following, dependent on the TDP type and level selected and as defined in the contract: 2D drawings, 3D native CAD models, 3D neutral CAD models or 3Di pdf viewables. The amount of detail will vary based on the TDP level required in the contract and as described below:

5.4.1.1 Conceptual engineering design data. When a level (1) Conceptual TDP is required, conceptual engineering design data shall be prepared to define general design concepts in graphic form, and include appropriate textual information required for analysis and evaluation of those concepts to include:

- a. A geometric representation defining the physical shape of the product.
- b. Definition of dimensions defining the overall envelope or boundary size of the component.
- c. Sufficient metadata to establish ownership, identification and control, to include the

following as a minimum: Nomenclature, Document/Drawing Number, Part Number, Contract Number, Design Activity Identification (e.g. CAGE Code(s)), Approved By, Approved Date, Revision Level Identification, Revision Date, and if applicable Export Control/ITAR Statements, Distribution Statements, Destruction Notices, and/or Classification Requirements,.

5.4.1.2 Developmental engineering design data and associated lists. When a level (2) developmental TDP is required, developmental engineering design data and associated lists shall be prepared to provide sufficient data to support the analysis of a specific design approach and the fabrication of prototype material for test or experimentation. Data and lists required to present a design approach may vary from simple sketches to complex engineering design data, or may be a combination of both.

- a. A geometric representation defining the physical shape of the product.
- b. Definition of dimensions and tolerances defining the item in sufficient detail for engineering analysis and prototype fabrication.
- c. Materials, surface finishes, or other manufacturing detail sufficient for engineering analysis and prototype fabrication.
- d. Sufficient metadata to establish ownership, identification and control, to include the following as a minimum: Nomenclature, Document/Drawing Number, Part Number, Contract Number, Design Activity Identification (e.g. CAGE Code(s)), Approved By, Approved Date, Revision Level Identification, Revision Date, and if applicable Export Control/ITAR Statements, Distribution Statements, Destruction Notices, and/or Classification Requirements.

5.4.1.3 Product engineering design data and associated lists. When a level (3) Product Level TDP is required, product engineering design data and associated lists shall be prepared to provide the design, engineering, and manufacturing information necessary to enable the procurement or manufacture of an item essentially identical to the original item. The product shall be defined to the extent necessary for a competent manufacturer to produce an item, which duplicates the physical, interface, and functional characteristics of the original product, without additional design engineering effort or recourse to the design activity. This together with other TDP elements forms a Product Level TDP which will be used to manufacture and support the product throughout its lifecycle. Product engineering data shall reflect the approved, tested and accepted configuration of the defined delivered item and shall consists of the following:

- a. A geometric representation defining the physical shape of the product.
- b. Complete definition of dimensions and tolerances defining the item in detail for full rate manufacturing purposes to include appropriate global Geometric Dimensioning and Tolerancing (GD&T) (see ASME Y14.5).
- c. Materials, surface finishes, or other engineering and manufacturing detail sufficient for full rate manufacturing.
- d. All notes, references, or other identifying features necessary to fully define the engineering definition of the item and as necessary for full rate manufacturing.
- e. Quality assurance information necessary to ensure the item meets its intended performance.

f. Sufficient metadata to establish ownership, identification and control, to include the following as a minimum: Nomenclature, Document/Drawing Number, Part Number, Contract Number, Design Activity Identification (e.g. CAGE Code(s)), Approved By, Approved Date, Revision Level Identification, Revision Date, and if applicable Export Control/ITAR Statements, Distribution Statements, Destruction Notices, and/or Classification Requirements,.

g. Any non-graphical requirements that are needed to unambiguously define the part.

5.4.1.4 Commercial engineering design data and associated lists. Commercial engineering design data and associated lists provide engineering and technical information in support of end products, or designated portions thereof, which are commercially developed items, commercial off-the-shelf items (COTS), or items not developed at Government expense. These data and lists shall be in accordance with the commercial design documentation practices of the contractor or supplier of the item.

5.4.1.4.1 Design disclosure. The degree of design disclosure on commercial engineering design data and associated lists, whether full design disclosure or limited design disclosure, shall be as stated in the contract for each TDP element.

5.4.1.4.2 Data rights. Rights in data for commercial engineering design data and associated list shall be as stated in the contract for each TDP element.

5.4.2 Special Inspection Equipment (SIE) engineering design data and associated lists. SIE engineering design data and associated lists shall be prepared to provide the data required to manufacture or assemble SIE, which is mandatory to successfully produce the item. The SIE shall be defined in detail to the extent necessary for a competent manufacturer to manufacture or assemble SIE, which duplicates the performance characteristics of the original SIE. SIE is also known as special test equipment.

5.4.3 Special tooling engineering design data and associated lists. Special tooling engineering design data and associated lists shall be prepared to provide the data required to manufacture special tooling which is mandatory to successfully produce the item. The special tooling shall be defined in detail to the extent necessary for a competent manufacturer to produce tooling which duplicates the performance characteristics of the original tooling.

5.4.4 Specifications. Specifications shall be prepared as performance specifications or detail specifications as required in the contract.

5.4.4.1 Defense specifications. Defense specifications shall be prepared in accordance with MIL-STD-961 as coordinated, limited or interim specifications.

5.4.4.2 Program-unique specifications. Program-unique specifications shall be prepared in accordance with MIL-STD-961 as item, material, process, software, or system specifications.

5.4.4.3 Commercial Item Descriptions (CIDs). CIDs shall be prepared in accordance with the Federal Standardization Manual to describe, by functional, performance, or essential physical requirements, available commercial products or services.

5.4.5 Software documentation. Software / Firmware documentation

a. Documentation for software CIs defined in the TDP shall be prepared in accordance with

ISO/IEC 12207.

b. Documentation for firmware imbedded in the hardware defined in the TDP or SIE related to the hardware shall be prepared in accordance with ISO/IEC 12207.

5.4.6 Special Packaging Instructions (SPI) engineering design data and associated lists. Special packaging instructions, engineering design data and associated lists shall be prepared to provide the data required to manufacture special packaging which is mandatory to successfully protect, store and transport the item. The special packaging shall be defined in detail to the extent necessary for a competent manufacturer to produce packaging which duplicates the performance characteristics of the original packaging. Packaging requirements and data shall be required for the end item, and any other related item designated for separate storage or transportation (e.g. spare and repair components to the end item) or as specified in the contract.

5.4.7 Quality Assurance Provisions (QAPs). QAPs shall be prepared to identify any special test, inspections, measurements or certifications required to ensure the item being defined meets its intended performance. Form and format of the quality assurance provision shall be as required in the contract.

5.5 Preparation and management.

5.5.1 Use of Government and non-Government standardization documents. TDP documents shall not be prepared or submitted that contain requirements already defined by existing standardization documents, if these standardization documents are available in the Acquisition Streamlining and Standardization Information System (ASSIST) (<https://assist.dla.mil/online/start/>) or from the independent societies governing the documents. Reference these documents instead. When the requirements in such standardization documents do not completely fulfill the requirements of an item, the standardization document shall be referenced, and the TDP element shall describe the variations necessary to fulfill the requirements.

5.5.1.1 Use of international and foreign standardization documents. International Standardization Organization/International Electro-technical Commission (ISO/IEC) standardization documents adopted by the American National Standards Institute (ANSI) for use in the United States may be used to define requirements on TDP documents. Other national standardization documents of foreign countries shall not be used without the approval of the procuring activity. The use of international and foreign standardization documents in multinational programs subject to a memorandum of understanding between governments shall be governed by the terms of that agreement.

5.5.2 Reference documents. Documents referenced in a TDP element shall be furnished as part of that element, with the exception of those specified in 5.5.2.1. The following types of documents shall not be referenced in a TDP element: technical manuals, procedural manuals, maintenance manuals, company drafting or process manuals, management plans, uncontrolled documents or unreleased documents. When information essential to meeting the content of a TDP element (such as default surface texture values, test procedures, assembly requirements, etc.) is contained within such prohibited documents, that information shall be extracted from the reference document and included in the TDP.

5.5.2.1 ASSIST and non-Government standardization documents. Referenced documents such as Government and non-Government standardization documents which are available in ASSIST or from the issuing non-Government standards body (such as the American Society of Mechanical Engineers (ASME)) do not need to be submitted as part of a TDP element.

5.5.3 Existing data. Existing data shall be used when possible, provided this existing data meets the

requirements listed below. For example, existing data may be engineering design data, specifications, standards, or other data already created for other purposes. Use this existing data when:

- a. The rights-in-data are consistent with the contract stipulations.
- b. It is furnished at a cost equal to or less than creating new data.
- c. It is identified by a CAGE code, document number, title, and applicable contract number(s).
- d. Any nonstandard symbols, drawing or documentation practices used are explained in the document or in a referenced document.
- e. It contains a revision scheme which is compatible with the TDP element of which it will be submitted or can be modified to a compatible revision scheme.

5.5.3.1 Company standards. When the use of company standards is permitted by the contract, company standards shall meet the requirements of 5.5.3 for existing data plus the following:

- a. If the company standard defines a vendor item, the standard shall provide the same information as a vendor item control document (or specification control document) for the identification and procurement of an interchangeable item, and

- b. All documents referenced in the standard shall also be supplied as required by 5.5.1 and 5.5.2.

5.5.4 Language and clarity. Unless otherwise specified, TDP documents shall be in the English language. Requirements, including explanations of non-standard practices or symbols, shall be delineated clearly, concisely, and without ambiguity so that their correct interpretation is understandable by people knowledgeable in the subject matter presented.

5.6 Protecting classified information. TDPs or parts thereof containing classified information shall be protected and marked in accordance with the Department of Defense Industrial Security Manual for Safeguarding Classified Information, DOD Manual 5220.22-M and FAR Clause 52.204-2. When 3D TDP data is used, the 3D models shall display the classification markings clearly visible when the 3D model is opened or be provided in a location or manner which is clearly identifiable to the user

5.7 Protecting controlled technical information. TDPs or parts thereof, containing unclassified controlled technical information shall be protected by the contractor in accordance with DFARS Clause 252.204-7012.

5.8 Marking of technical data. TDPs or parts thereof, containing information subject to restrictions shall be marked and protected in accordance with the appropriate guidance, contract, policy, regulation or agreement. Requirements for the restriction of access, availability, proprietary data, or use, of all TDP documents prepared by or for the DoD shall be marked by inclusion of the appropriate restriction statements. Examples of restriction statements include: the rights-in-data legends in accordance with DFARS Clauses 252.228-7013 and 7014 and Export Control Warning Label in DoDI 5230.24; a distribution statement and restrictive markings in accordance with DoD Instruction 5230.24 and Directive 5230.25. Care shall be exercised to match the appropriate distribution statement with the appropriate rights-in-data legend. When 3D TDP data is used, the 3D models shall display applicable restriction markings, legends, and statements clearly visible when the 3D model is opened or be provided in a location or manner which is clearly identifiable to the user.

5.9 Contract numbers and contractor identification. When required by the contract, purchase order or applicable data item description, TDP documents shall identify the contractor and contract number under which the document is prepared or delivered, or both. This requirement does not alter current DFARS requirements for identifying contractors and prime contract numbers in rights-in-data legends. Furthermore, contractor identifications and contract numbers in rights-in-data legends do not satisfy the requirements of this paragraph.

5.10 Inspection of TDP. TDP documents and TDP data management products and the components thereof, including documents prepared by subcontractors, shall be inspected for the following:

- a. Inclusion of all data, including sub-tier references, required to meet the information content requirements of the TDP element except those identified in 5.5.2.1.
- b. Accuracy of the assignment and identification of classification markings, marking and dissemination statements (for example distribution statements, export control notices, rights-in-data legends, and other special markings.)
- c. Completeness and accuracy of the TDP data in describing the design of the item, its subassemblies, and component parts. The design to be described by the TDP documents is that configuration of the item the procuring activity has approved, tested, or accepted.
- d. Digital submittals shall open in the appropriate software without regeneration errors.
- e. National Aerospace Standard NAS 3500 “Technical Data Package: Composition, Communication, and Application” may be used to facilitate the acceptance and inspection of the TDP if required in the contract or purchase order.

5.11 Legibility and reproducibility. All data prepared or submitted shall meet the legibility and reproducibility requirements of the specification or standard controlling the media in which the data is to be delivered. As a minimum, all lines, symbols, letters, and numerals shall be readable.

5.12 CAGE codes. When CAGE codes are to be applied to documents used in TDPs and TDP elements, only valid codes shall be used. CAGE code assignment and verification shall refer to <https://cage.dla.mil/>.

5.13 Digital approval systems. TDP elements subject to approval may use signature or approval indicators. Approval indicators may be applied by a digital approval system. Digital approval systems shall satisfy the contracting activity requirements for uniqueness, verifiability, and sole control.

5.14 TDP data management products. When specified in the contract, the following data management products related to the management and control of TDPs shall be prepared.

5.14.1 Technical Data Package List (TDPL). A TDPL shall be prepared as an index to identify all documents contained in the TDP. The TDPL format shall be as described in the contract (reference DID-SESS-82238), but as a minimum shall list all documents in the TDP by nomenclature, document number and CAGE code, document revision and date.

5.14.2 Source control document approval request. Source control document approval request shall be prepared and submitted to the procuring activity specified in the contract as having approval authority. Each potential source control item shall be approved by the procuring activity prior to inclusion of the

source control document in the TDP (reference DID DI-SESS-81010).

5.14.3 Engineering design document number assignment report. An engineering design document number assignment report shall be prepared to identify and describe the use of Government document numbers by the contractor (reference DID DI-SESS-81011).

5.14.4 Proposed critical manufacturing process description. Proposed critical manufacturing process descriptions shall be prepared to describe manufacturing processes, which are critical to meeting the design requirements of the item. The process shall be approved as critical by the procuring activity cited in the contract as having approval authority before it is designated as mandatory in TDP documents (reference DID DI-SESS-81012).

5.14.5 Engineering drawing tree. The engineering drawing tree shall be prepared to identify the interrelationships of engineering design data and associated lists that comprise the TDP. The drawing tree shall be in a block diagram format that identifies all system, subsystem, and component documents to be delivered as part of the TDP. The tree shall be structured in top down breakdown order, at the lowest level of assembly (lowest repairable unit) or the lowest component or piece part, as specified in contract.

5.15 TDP metadata. TDP metadata, when required, shall be submitted and delivered in accordance with the contract and TDP Option Selection worksheet.

5.16 Supplementary technical data. TDP supplementary technical data, when required shall be submitted and delivered in accordance with the contract and TDP Option Selection Worksheet.

TDP OPTION SELECTION WORKSHEET			
SYSTEM:		DATE PREPARED:	
A. CONTRACT NO.	B. EXHIBIT/ATTACHMENT NO.	C. CLIN	D. CDRL DATA ITEM NO.
1. TDP LEVEL (CHOOSE ONLY ONE PER WORKSHEET). Note: The level selected must coincide with the requirements of the elements selected in block 5.			
A. <input type="checkbox"/> CONCEPTUAL LEVEL <input type="checkbox"/> DEVELOPMENTAL LEVEL <input type="checkbox"/> PRODUCT LEVEL		B. REMARKS:	
2. TYPE AND FORMAT (X all that apply and complete as applicable.)			
A. <input type="checkbox"/> TYPE 2D: 2D DRAWINGS(describe in detail in remarks below or in block 11): <input type="checkbox"/> NATIVE 2D CAD (SPECIFY TYPE): _____ <input type="checkbox"/> ISO 32000 PDF <input type="checkbox"/> HARD COPY <input type="checkbox"/> OTHER FORMAT (SPECIFY TYPE): _____			
REMARKS :			
B. <input type="checkbox"/> TYPE 3D: 3D MODEL BASED (describe in detail in remarks below or in block 11): <input type="checkbox"/> NATIVE 3D CAD (SPECIFY TYPE): _____ <input type="checkbox"/> 3Di VIEWABLE* FORMAT DERIVED FROM 3D NATIVE MODELS (Specify type, i.e. ISO 32000 PDF etc.). <input type="checkbox"/> NEUTRAL FORMAT DERIVED FROM 3D NATIVE MODELS (Specify type, i.e. STEP AP203, AP 214 etc.). <input type="checkbox"/> 2D DRAWINGS DERIVED FROM 3D NATIVE MODELS (Specify type, i.e. ISO 32000 PDF etc.). <input type="checkbox"/> OTHER FORMAT (SPECIFY TYPE): _____			
<small>*NOTE: 3Di viewable will be in ISO 32000 pdf format unless otherwise specified.</small>			
REMARKS :			
3. CAGE CODE AND DOCUMENT NUMBERS		A. <input type="checkbox"/> CONTRACTOR CAGE & DOCUMENT NUMBERS <input type="checkbox"/> GOVERNMENT CAGE & DOCUMENT NO. (COMPLETE 3B, 3C, AND 3D)	
B. USE CAGE CODE:	C. USE DOCUMENT NUMBERS:	D. TO BE ASSIGNED BY:	
4. DRAWING FORMATS AND/OR 3Di PDF FORMAT (X one and complete as applicable)			
<input type="checkbox"/> CONTRACTOR FORMAT <input type="checkbox"/> GOVERNMENT FORMAT			
REMARKS:			
5. TDP ELEMENTS REQUIRED (X all that apply)			
<input type="checkbox"/> ELEMENTS REQUIRED TO BE DETERMINED BY CONTRACTOR			
OR THE FOLLOWING ARE REQUIRED:			
<input type="checkbox"/> CONCEPTUAL ENGINEERING DESIGN DATA <input type="checkbox"/> DEVELOPMENTAL ENGINEERING DESIGN DATA AND ASSOCIATED LISTS <input type="checkbox"/> PRODUCT ENGINEERING DESIGN DATA AND ASSOCIATED LISTS <input type="checkbox"/> COMMERCIAL ENGINEERING DESIGN DATA AND ASSOCIATED LISTS <input type="checkbox"/> SPECIAL INSPECTION EQUIPMENT (SIE) ENGINEERING DESIGN DATA AND ASSOCIATED LISTS <input type="checkbox"/> SPECIAL TOOLING ENGINEERING DESIGN DATA AND ASSOCIATED LISTS <input type="checkbox"/> SPECIFICATIONS <input type="checkbox"/> SOFTWARE DOCUMENTATION <input type="checkbox"/> SPECIAL PACKAGING INSTRUCTIONS (SPI) ENGINEERING DESIGN DATA AND ASSOCIATED LISTS <input type="checkbox"/> QUALITY ASSURANCE PROVISIONS (QAPs)			
6. APPLICABILITY OF STANDARDS. The following Standards apply: (X as applicable)			
<input type="checkbox"/> ASME Y14.100 ENGINEERING DRAWING PRACTICES WITH APPENDICES: <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E Company stds permitted? Y/N	<input type="checkbox"/> ASME Y14.24 TYPES AND APPLICATIONS OF ENGINEERING DRAWINGS <input type="checkbox"/> ASME Y14.34 ASSOCIATED LISTS <input type="checkbox"/> ASME Y14.35 REVISION OF ENGINEERING DRAWINGS AND ASSOCIATED DOCUMENTS <input type="checkbox"/> ASME Y14.41 DIGITAL PRODUCT DEFINITION DATA PRACTICES <input type="checkbox"/> ASME Y14.5 DIMENSIONING AND TOLERANCING	<input type="checkbox"/> OTHER STANDARDS APPLY AS DESCRIBED:	

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TDP OPTION SELECTION WORKSHEET PAGE 2			
A. CONTRACT NO.	B. EXHIBIT/ATTACHMENT NO.	C. CLIN	D. CDRL DATA ITEM NO.
7. ASSOCIATED LISTS (X all that apply and complete as applicable.)			
A. <input type="checkbox"/> PARTS LISTS (X ONE)*	<input type="checkbox"/> (1) INTEGRAL	<input type="checkbox"/> (2) SEPARATE	<input type="checkbox"/> (3) CONTRACTOR SELECT
B. <input type="checkbox"/> DATA LISTS	<input type="checkbox"/> REQUIRED (Specify Levels of ASSY) _____		
C. <input type="checkbox"/> INDEX LISTS	<input type="checkbox"/> REQUIRED (Specify Levels of ASSY) _____		
D. <input type="checkbox"/> WIRING LISTS	<input type="checkbox"/> (1) INTEGRAL	<input type="checkbox"/> (2) SEPARATE	<input type="checkbox"/> (3) CONTRACTOR SELECT
E. <input type="checkbox"/> APPLICATION LISTS	<input type="checkbox"/> (1) INTEGRAL	<input type="checkbox"/> (2) SEPARATE	<input type="checkbox"/> (3) PLM MAINTAINED <input type="checkbox"/> (4) CONTRACTOR SELECT
F. <input type="checkbox"/> OTHER	<input type="checkbox"/> REQUIRED (Specify Levels of ASSY) _____		
<small>*NOTE: USE OF SEPARATE PARTS OR WIRING LISTS ARE NOT RECOMMENDED ESPECIALLY WITH TYPE 3D TDPS.</small>			
8. TDP DATA MANAGEMENT PRODUCTS			
A. <input type="checkbox"/> TECHNICAL DATA PACKAGE LIST (TDPL) <input type="checkbox"/> SOURCE CONTROL APPROVAL REQUEST <input type="checkbox"/> DOCUMENT NUMBER ASSIGNMENT REPORT <input type="checkbox"/> PROPOSED CRITICAL MANUFACTURING PROCESS DESCRIPTION <input type="checkbox"/> ENGINEERING DRAWING TREE <input type="checkbox"/> TO LOWEST REPAIRABLE UNIT (LRU) LEVEL <input type="checkbox"/> TO LOWEST COMPONENT LEVEL <input type="checkbox"/> OTHER (DESCRIBE):	B. REMARKS:		
9. TDP METADATA			
<input type="checkbox"/> TDP METADATA REQUIRED (describe requirements):			
10. TDP SUPPLEMENTARY DATA			
<input type="checkbox"/> TDP SUPPLEMENTARY DATA REQUIRED (describe requirements):			
11. OTHER TAILORING (Attach additional sheets as necessary)			
12. PROCURING ACTIVITY TITLE, SIGNATURE AND DATE			
TITLE:	SIGNATURE:	DATE:	

FIGURE 5 (reference Para A.3)

6. NOTES.

(This section contains information of a general or explanatory nature, which may be helpful, but is not mandatory.)

6.1 Intended use. TDP elements procurable under this standard are intended for use in a wide variety of functions in the life cycle of materiel developed for the Department of Defense. Some examples of these functions are design evaluation, design development, provisioning, procurement (competitive and non-competitive), manufacture, transportation, installation, maintenance, modification, and engineering and logistics support. TDP data management products are intended for use by the procuring activity in ensuring that TDP elements acquired under this standard conform to contractual requirements.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this standard.
- b. If required, the specific issue of individual documents referenced.
- c. The TDP level, deliverable data products and elements to be supplied.
- d. The TDP data management products to be supplied.
- e. Whether company standards are permitted. (See 5.5.3.1)

f. Completed TDP Option Selection Worksheet(s). The TDP Option Selection Worksheet(s) are used to specify options and tailoring for models, engineering design data and specifications being acquired as TDP elements. The TDP Option Selection Worksheet should be supported by additional tailoring, details and instructions in the statement of work.

6.3 Data requirements. This standard has been assigned an Acquisition Management Systems Control number authorizing it as the source document for the DIDs listed in TABLE I. When it is necessary to obtain the data, the applicable DIDs should be listed on the Contract Data Requirements List (DD Form 1423).

TABLE I. TDP and TDP Data Management Product DID's.

<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>	<u>Reference Paragraph</u>
DI-SESS-80776	Technical Data Package	Appendix A	A.2.4.3
DI-SESS-81001	Conceptual Design Data	Appendix A	A.2.3.1
DI-SESS-81002	Developmental Design Data and Associated Lists	Appendix A	A.2.3.2
DI-SESS-81000	Product Design Data and Associated Lists	Appendix A	A.2.3.3
DI-SESS-81003	Commercial Design Data and Associated Lists	Appendix A	A.2.3.4
DI-SESS-81004	Special Inspection Equipment Design Data	Appendix A	A.2.3.5
DI-SESS-81008	Special Tooling Design Data and Associated Lists	Appendix A	A.2.3.6
DI-PACK-80121	Special Packaging Instructions	Appendix A	A.2.3.7
DI-IPSC-81756	Software Documentation	Appendix A	A.2.3.9
DI-SESS-82238	Technical Data Package List	Appendix A	A.2.4.1
DI-SESS-81010	Source Control Approval Request	Appendix A	A.2.4.2
DI-SESS-81011	Document Number Assignment Report	Appendix A	A.2.4.3
DI-SESS-81012	Proposed Critical Manufacturing Process Description	Appendix A	A.2.4.4
DI-DRPR-81961	Engineering Drawing Tree	Appendix A	A.2.4.5

The above DID's were current as of the date of this standard. The ASSIST database should be researched at <https://quicksearch.dla.mil/> to ensure that only current and approved DID's are cited on DD Form 1423.

6.3.1 DIDs for specifications. Applicable DIDs and tailoring instructions for acquiring performance, detailed, and program-unique specifications are specified in MIL-STD-961.

6.3.2 DIDs for software documentation. Applicable "Information items" (a commercial equivalent to a DID) for acquiring software documentation (also known as software lifecycle data) are specified in ISO/IEC 12207.

6.3.3 DIDs for packaging data. Applicable DIDs and tailoring instructions for acquiring packaging data are specified in MIL-STD-2073-1.

6.3.4 DID for Metadata and supplementary technical data. Since the specific data content and format for metadata and supplementary technical data are program specific, the procuring activity should specify what they require.

6.4 Supersession history. MIL-STD-31000, dated 5 November 2009 replaced MIL-DTL-31000C, dated 9 July 2004; MIL-T-47500(MI) dated 24 March 1989; MIL-T-47500/1(MI) dated 24 March 1989; MIL-T-47500/2(MI) dated 24 March 1989; MIL-T-47500/3(MI) dated 24 March 1989; MIL-T-47500/4(MI) dated 24 March 1989; MIL-T-47500/5(MI) dated 24 March 1989; and MIL-T-47500/6(MI) dated 24 March 1989.

6.5 Basic engineering documentation practices. Basic engineering documentation practices for commercial applications are invoked through reference to ASME Y14.100. For other than strictly commercial applications (for example DOD design activities) reference should be made to ASME Y14.100, with or without Appendices. ASME Y14.100 will require extensive tailoring to exclude unnecessary requirements. Such tailoring should consider the contractual objectives and the logistic intent. A tailoring guide, Appendix A, is included in ASME Y14.100 to facilitate the tailoring process.

6.5.1 Interdependent standards. ASME Y14.100 is not a stand-alone document for the purpose of addressing basic engineering documentation practices. For the purpose of addressing basic engineering documentation practices, ASME Y14.100, ASME Y14.24, ASME Y14.34, ASME Y14.35 and ASME Y14.41 should be regarded as a closely interdependent set of ASME standards.

6.6 Digital product definition data. ISO 10303 provides content and format for the exchange of digital TDPs and 3-dimension product model data in a neutral file format. The procuring activity should specify the required STEP Application Protocol(s) (AP) and/or a specific native CAD format as a minimum in the TDP Option Selection Worksheet based on the intended uses. Product data specification (Air Force Drawing: 9579776 CAGE: 98752), is available for use in defining three options for the METADATA delivery. This Product Data Specification, when invoked on contract is accessible via the procuring activity and the most current revision can be located using the Military Engineering Data Asset Locator System (MEDALS).

6.7 Commercial engineering design data. The acquisition of commercial engineering design data almost always involves rights in data and intellectual property issues. These issues should be clearly defined in the contract in accordance with DFARS Parts 211 and 227. This standard and its related data item descriptions will not be used to circumvent the DFARS requirements.

6.8 Special Inspection Equipment (SIE). To be considered mandatory to the manufacture of an item, the SIE should be the only known inspection equipment that can be used to test or inspect parameters that cannot be inspected effectively with commercially available equipment. (See 5.4.2)

6.9 Contractors specifications. A contractor's specifications for items such as materials or processes are considered company standards.

6.10 Subject term (keyword) listing.

Drawings/Models and associated lists
Drawing number assignment report
Document number assignment report
Proposed critical manufacturing process description
(SIE) descriptive documentation
Source control approval request
Special tooling
Specifications
Test requirements document
3Di
2D TDP
3D TDP
TDP elements
TDP level
TDPL

6.11 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

APPENDIX A
SELECTION AND ORDERING GUIDANCE

A.1 SCOPE.

A.1.1 Scope. This Appendix provides guidance for procuring activity personnel on the acquisition of the various types of technical data and the completion of the TDP Option Selection Worksheet, Figure 5. This appendix is not a mandatory part of this standard; however, the TDP Option Selection worksheet is mandatory if it forms part of a contract.

A.2 REQUIREMENTS.

A.2.1 General. Procuring activities acquiring technical data are required to carefully review their respective needs for technical data and TDP data management products.

A.2.1.1 Tailoring. Procuring activities will evaluate the cost of data items in relation to their value in the design, production, management, re-procurement, maintenance, logistics support and use of the product. (The DD Form 1423, Block 18, Estimated Total Price, is the means to establish the cost of each data item.) In addition, activities acquiring data will tailor the requirements for each data product to ensure that the essential data necessary to meet the acquisition programs' long term needs is acquired. Tailoring decisions will take into consideration the commercial or military nature of the materiel being procured and its developmental status. Procuring activities should carefully assess tailoring of data to ensure the necessary level of form, fit and function or detail data is obtained to maximize availability of competitive acquisition and product support alternatives.

A.2.2. Selecting and ordering TDP levels. The determination as to the level of TDP should be made based on the nature of the item being procured, the lifecycle phase of the product, and the level of data required by the procuring activity.

A.2.3 Selecting and ordering TDP elements. When ordering TDP elements and associated data below, require the generation of a TDP containing the required elements and associated data in the contract. Cite the appropriate DID and reference a TDP Option Selection Work Sheet in the CDRL. Complete a TDP Option Selection Work Sheet (including tailoring) and include it in the solicitation, contract or purchase order.

A.2.3.1 Conceptual design data. Conceptual design data (DI-SESS-81001) are used when there is a need to verify preliminary design and engineering and confirm that the technology is feasible and that the design concept has the potential to be useful in meeting a specific requirement. Conceptual design data should only be ordered under contracts containing concept exploration and research tasks.

A.2.3.2 Developmental design data and associated lists. Developmental design data and associated lists (DI-SESS-81002) are used to describe a specific design approach. They provide the information to produce materiel for test or experimentation, and for the analytical evaluation of the inherent ability of the design approach to attain the required performance. Developmental design data should only be ordered under contracts when a limited set of data is sufficient for the intended purpose.

A.2.3.3 Product design data and associated lists. Product design data and associated lists (DI-SESS-81000 or DI-CMAN-80776) should be selected when there is a current or future need for the Government to procure or manufacture the equipment, components, or spares and repair parts from either the original manufacturer or an alternate source, or for other reasons in which a complete design description is needed in support of the item. When product design data are ordered for large, complex items such as major weapons systems, tailoring decisions should include consideration of ordering commercial design data for selected commercial items used as subassemblies. It should also be noted that where there are fully justified DoD peculiar documentation practice requirements, such as the DoD system for Numbering, Coding and Identification, ASME Y14.100 and applicable appendices should be invoked. The use of the appendices to ASME Y14.100 will usually be associated with

product engineering design data indicating a DoD activity as design activity and an end item requiring Government logistics support.

A.2.3.4 Commercial design data and associated lists. Commercial design data and associated lists (DI-SESS-81003) are used to obtain existing information regarding commercial items acquired by the Government and used as end items or as selected subassemblies of Government developed items. They are not to be used for documenting vendor items in a product level TDP. Furthermore, the acquisition of technical data should conform to the requirements of DFARS 252.227-7015, Technical Data – Commercial Items. Prior to contracting for commercial design data, the procuring activity should review the design data for their adequacy for the Government's intended uses for the design data. Commercial design data and associated lists should not be acquired as a substitute for product design data and associated lists when the item is developed at Government expense. Commercial design data will most often be ordered under contracts for engineering and manufacturing development or production (including commercial item acquisition).

A.2.3.5 Special Inspection Equipment (SIE) design data and associated lists. SIE design data and associated lists (DI-SESS-81004) are used for the limited production of SIE required to inspect and test a specific hardware system. SIE design data are not adequate to procure and maintain logistic support of standard military inspection systems and test equipment, which are deployed throughout the maintenance and user communities. This data is intended for use in alternate manufacturing or inspection environments only. If SIE is required for the maintenance and logistics support of the item when deployed, the same types of design data should be ordered for that SIE as is ordered for the item the SIE supports. SIE design data should only be ordered when a Product Level TDP is required.

A.2.3.6 Special tooling design data and associated lists. Special tooling design data (DI-SESS-81008) are used to permit the procuring activity or an alternate source to duplicate the functional requirements of tooling that are mandatory for the manufacture of the item. These design data are intended for limited production of tooling used in a manufacturing environment. Special tooling design data may not be adequate to procure and maintain logistic support of tooling which is deployed throughout the maintenance and user communities. If special tooling is required for the maintenance and logistics support of the item when deployed, the same types of design data should be ordered for that special tooling as is ordered for the item the special tooling supports. Special tooling design data should only be ordered when a Product Level TDP is required.

A.2.3.7 Special Packaging Instructions (SPI). Special packaging instructions are used to permit the procuring activity or an alternate source to duplicate the packaging, shipment and storage requirements that are mandatory for the end item, or any separately packaged, shipped or stored items which are a part of the end item (to include identified spare and repair components of the end item). SPI design data should only be ordered when a Product Level TDP is required. Use of DID DI-PACK-80120 may be needed in lieu of or in addition to DID DI-PACK-80121. Also if product engineering data is necessary to describe the appropriate configuration of the packaging, use of DI-SESS-81000 may also be necessary. SPI data is not required when best commercial packaging practices for the item are adequate. Prior to ordering packaging data, an engineering task to develop packaging requirements should be included in the contract or purchase order. For additional information on the use and selection of packaging data products refer to MIL-STD-2073-1. Require the generation of a TDP containing packaging data in the contract. Cite the appropriate DID as listed in MIL-STD-2073-1 in the CDRL and enter the tailoring in Block 16 of the CDRL.

A.2.3.8 Specifications. Refer to MIL-STD-961 for guidance in determining the types of specifications to be acquired, or the Federal Standardization Manual for guidance on composing Commercial Item Descriptions. For specifications related to software documentation see A.2.3.9. Require the generation of a TDP containing specifications in the contract. Cite the appropriate DID as listed in MIL-STD-961 in the CDRL. Reference the completed TDP Option Selection Worksheets in the CDRL. Complete a TDP Option Selection Worksheet (including tailoring) and include it in the contract. Additional documentation associated with specifications should be ordered as separate data items on the CDRL.

A.2.3.9 Software documentation. Software documentation (DI-IPSC-81756) is acquired to support software products imbedded in the end item, component systems thereof, or SIE cover by the TDP. Refer to ISO/IEC 12207 for information on selecting and tailoring software documentation for inclusion in TDPs. Require the generation of software documentation in the TDP for each software product in the contract.

A.2.3.10 Quality Assurance Provisions (QAP). QAPs are acquired to permit the procuring activity or an alternate source to test and inspect the item being defined to ensure acceptability and product conformance. QAPs should be ordered only when a Product Level TDP is required. Product design data containing characteristics which are classified as critical, major or minor in accordance with DOD-STD-2101 should have QAPs. Additionally any end item or component to an end item which requires special testing or inspections should have QAPs. Require the generation of a TDP containing QAPs in the contract. The form and format of the QAP should be clearly delineated in the contract. Complete a TDP Option Selection Worksheet (including tailoring) and include it in the contract.

A.2.3.11 Metadata

a. Selection. Metadata is ordered by the procuring activity to store, manage, manipulate and provide access to TDP elements. The metadata required is the data needed by the information management system used by the procuring activity to perform these functions. The metadata needs to be delivered in a format that the information management system can process. The procuring activity needs to specify the data and its format as part of the selection.

b. Ordering. In the Scope of Work, require the generation of metadata in accordance with the TDP Option Selection Worksheet. Identify the content and format of the metadata on the worksheet.

A.2.3.12 Supplementary technical data.

a. Selection. Supplementary technical data is data that is in addition to the TDP and that the procuring activity has determined to be of benefit to supporting the product throughout its life. The procuring activity needs to specify the data and its format as part of the selection process.

b. Ordering. In the Scope of Work, require the activity that generates the required data and require the data to be formatted as stated on the TDP Option Selection Worksheet.

A.2.4 TDP data management products and their uses.

A.2.4.1 Technical Data Package List (TDPL). The TDPL is used to establish a baseline of all documents in a TDP at a given point in time. It establishes, in essence, a packing list of all items in the TDP. Requirements for the TDPL will be in the Contract and TDP Option Selection Worksheet. Cite DI-SESS-82238 in the CDRL and any tailoring in Block 16 of the CDRL.

A.2.4.2 Source control approval request. Source control approval requests are used to ensure that only valid source qualification requirements are included in the TDP. Under Public Law, the Government will actively seek multiple sources for any item for which source qualification is a requirement. This obligation applies to source control items as well as Qualified Products List (QPL) and Qualified Manufacturers List (QML) items. However, Government personnel should take into consideration the adverse impacts of such approval processes on contract costs and schedules, especially when such approval processes are extended throughout the subcontract chain. Requirements for the generation of source control approval requests will be described in the Contract. Cite DI-SESS-81010 in the CDRL. Identify the Government activity having source control approval authority and any tailoring in Block 16 of the CDRL.

A.2.4.3 Document number assignment report. An engineering design document number assignment report provides the information on the use of specific Government engineering design document numbers. This report should be acquired only when engineering design data and associated lists are to be identified with Government CAGE codes and document numbers. Requirement for the generation of engineering design document number

assignment reports will be described in the Contract. Cite DI-SESS-81011 in the CDRL and enter the tailoring in Block 16 of the CDRL.

A.2.4.4 Proposed critical manufacturing process description. The proposed critical manufacturing process description is used to allow the procuring activity to approve or disapprove the documentation of a manufacturing process as critical in the TDP. However, procuring activity personnel should take into consideration the adverse impacts of such approval processes on competitive procurement, contract costs and schedules, especially when such approval processes are extended throughout the subcontract chain. Requirement for the generation of proposed critical manufacturing process descriptions will be described in the Contract. Cite DI-SESS-81012 in the CDRL. Identify the procuring activity having critical manufacturing process approval authority and any tailoring in Block 16 of the CDRL.

A.2.4.5 Engineering drawing tree. The engineering drawing tree is used to identify the structure of all documents in a TDP at a given point in time. It is a top-down breakdown block diagram which is either broken down to the LRU level or down to the component or piece part level. Requirements for the engineering drawing tree will be in the Contract and TDP Option Selection Worksheet. Cite DI-DRPR-81961 in the CDRL and any tailoring in Block 16 of the CDRL.

A.3 TDP OPTION SELECTION WORKSHEET GUIDANCE FOR FIGURE 5.

The TDP Option Selection Worksheets should be used to identify selected options and tailoring requirements. Additional sheets may be attached to the form as necessary. The following paragraphs provide more detailed guidance on completing the TDP Option Selection Worksheet Figure 5.

A.3.1. Headings. Enter the System and Date Prepared.

A.3.1.1 Contract No. Enter the number of the acquisition document shown in Block E, Contract/PR No., of the DD Form 1423.

A.3.1.2 Exhibit/Attachment No. Enter the number or letter, which appears in Block B, Exhibit, of the DD Form 1423.

A.3.1.3 CLIN. Enter the contract line item number from Block A, Contract Line Item No. (CLIN), of the DD Form 1423.

A.3.1.4 CDRL data item No(s). Enter the data item number(s) from Block 1, Data Item No., of the DD Form 1423 entry for which the TDP Option Selection Worksheet being prepared. If the form applies to more than one CDRL data item, enter all applicable data item numbers.

A.3.2 Completing the TDP option selection worksheet. The following is required to complete the TDP Option Selection Worksheet.

A.3.2.1 Block 1. TDP Level. Check the level of TDP required. The level selected should coincide with the requirements of the elements to be selected in Section 5 of the form. Add any remarks necessary for clarification.

A.3.2.2 Block 2. Type and Format. The options in this block determine the TDP type and format(s). The first determination is the type TDP to be procured, 2D or 3D. This will be based on the type of items being procured, the complexity of the item(s), the capabilities of the contractors involved, and the government's ability to use the data. Determination on type and format should be made based on the government's need for a particular type and format of TDP. In general, during the production phase of the lifecycle, 3D fully annotated models with derived 3Di viewables are preferred. During the conceptual development and prototype phase, minimally annotated 3D models alone may be sufficient. The TDP format will be clearly stated in the contract with an understanding of how lifecycle maintenance of the TDP will be performed. When specifying the TDP format, it is important to provide sufficient technical detail—for example, type of native CAD with version number (e.g. Creo

4.0), STEP AP 203 E2, 3D PDF with PRC (ISO 14739), or other unambiguous digital format specifications. Other format details should be provided as required in Block 6. Applicability of Standards—for example, specifying ASME Y14.5 and ASME Y14.41, for fully annotated 3D models.

A.3.2.3 Block 3. CAGE code and document numbers. When contractor CAGE code and document numbers are specified, the documents will be identified with the CAGE code and document numbers of the contractor or subcontractor having design activity responsibility. Usually the Government will not be able to assume control of the engineering design data originals (masters), except through a subsequent data acquisition action. If the Government intends to take delivery of the engineering design data originals and to assume design activity responsibility at some time in the future, then the documents should be identified with a Government CAGE code and Government document numbers. If the procuring activity has already determined the CAGE code and Government document numbers to be used, the CAGE code should be entered in the “USE CAGE CODE” block and the range of document numbers entered in the “USE DOCUMENT NUMBERS” block. If the procuring activity has not determined the Government CAGE code and Government document numbers which are to be used, then the Government activity that will specify this information should be identified in the “TO BE ASSIGNED BY:” block.

A.3.2.4 Block 4. Drawing formats and/or 3Di viewable format. These options specify the drawing or 3Di viewable format to be used.

A.3.2.5 Block 5. TDP elements required. This option determines the elements of the TDP used to fulfill the design disclosure requirements of the TDP element to be delivered and gives the procuring activity the authority to direct the contractor as to which types of element(s) to use by the individual selection of each element. This may be further tailored for each component, subassembly or part.

A.3.2.6 Block 6. Applicability of Standards. This block is used to indicate the applicability of ASME standards.

A.3.2.7 Block 7. Associated list. This block is used to define the Government’s requirements for associated lists as defined in ASME Y14.34.

A.3.2.7.1 Parts lists. Either “INTEGRAL” or “SEPARATE” or “CONTRACTOR SELECT” should be selected. This option requires the contractor to use either an integral or separate parts list for the specific item or part being documented. Use of separate parts lists is not recommended, especially with type 3D TDPs.

A.3.2.7.2 Data lists. Select “REQUIRED” if applicable. Data lists aid in assembling larger sets of design data. Therefore, data lists should be required on most acquisitions of complex items. When data lists are required, the contractor will be given guidance as to the levels of assembly at which they are required. For example, an electronic system composed of input and output sections made up of equipment racks containing replaceable drawers may require data lists at the drawer, rack, section and system (or end-item) level. Other terms for the required levels may be used.

A.3.2.7.3 Index lists. Select “REQUIRED” if applicable. The assembly level at which index lists are required should be specified.

A.3.2.7.4 Wiring lists. A wiring list is prepared to provide information necessary for making wire connections. A wire list may be prepared for one or more related assemblies. Either “INTEGRAL”, “SEPARATE” or “CONTRACTOR SELECT” should be selected. This option identifies the type wiring lists for the specific item or part being documented. Use of separate wiring lists is not recommended, especially with type 3D TDPs.

A.3.2.7.5 Application lists. Select either “INTEGRAL”, “SEPARATE”, “PLM MAINTAINED” or “CONTRACTOR SELECT” if applicable. This option identifies the type application lists for the specific item or part being documented, or that the application will be maintained is a PLM system.

A.3.2.7.6 Other. This block is used to identify other Associated Lists that are required, but, not identified in A through E on the Worksheet. Specify the requirement clearly in the block provided or in Block 9, Other Tailoring.

A.3.2.8 Block 8. TDP data management products. This option determines the management products of the TDP used to fulfill the design disclosure requirements to be delivered.

A.3.2.9 Block 9. TDP Metadata. This option determines if metadata required for delivery. Specify what format is required for the delivery of the metadata.

A.3.2.10 Block 10. TDP supplementary data. This option determines if supplementary technical data products are required for delivery. Specify what format is required for the delivery of the supplementary technical data products. Specify the type of supplementary technical data here or in Block 11 (Other Tailoring). Types of supplementary data could include, but is not limited to, manufacturing instructions, simulations, work flow data, inspection equipment or procedures (which are not required as an inherent part of the TDP or TDP element), manufacturing machine code, design studies, analysis studies, test results, and safety data sheets.

A.3.2.11 Block 11. Other tailoring. This block may be used to tailor any requirement of MIL-STD-31000, ASME Y14.100 with appropriate appendices, a DID, or any other document affecting the content, format, or media of the data product.

APPENDIX B
SAMPLE 3Di PDF FORMAT

B.1 The below sample 3Di pdf is provided for information and demonstration purposes.

CONCLUDING MATERIAL

Custodians:

Army - AR

Navy - OS

Air Force -16

DLA - DH

Preparing Activity:

Army - AR

(Project: SESS-2018-035)

Review Activities:

Army – AC, AV, CR, EA, MI, MR, PT, SM, TM

Navy – AS, CG, CH, EC, MC, ND, SA, SH

Air Force – 01, 08, 10, 11, 13, 19, 33, 94, 184

DLA – CC

Other – DI, MA, MP, NS, SE, SO

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.