

MILITARY SPECIFICATION

DRAWINGS, ENGINEERING AND ASSOCIATED LISTS

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 This specification covers engineering drawings and associated lists prepared by the Department of Defense and by contractors.

1.2 Classes of drawings. All drawings shall be design activity drawings (See 6.3.1) in accordance with the following:

1.2.1 Class 1—Government Design Activity Drawings.

1.2.2 Class 2—Contractor Design Activity Drawings.

1.3 Types.

1.3.1 *Drawings.* Drawings covered by this specification are defined by MIL-STD-7.

1.3.2 *Associated lists.* Lists covered by this specification are defined by MIL-STD-30.

2. APPLICABLE DOCUMENTS

2.1 The following specifications, standards, and publications of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

FEDERAL

L-P-517 — Plastic Sheet, Scribe-Coated.

L-P-518 — Plastic Sheet, Sensitized, Dimensionally Stable.

L-P-519 — Plastic Sheet, Tracing, Matte Finish.

NN-P-515 — Plywood, Container Grade.

TT-I-528 — Ink, Drawing, Waterproof, Black.

UU-P-226 — Paper, Drawing.

UU-P-271 — Paper, Wrapping, Waterproofed Kraft.

UU-P-561 — Paper, Tracing.

CCC-C-531 — Cloth, Tracing.

PPP-B-601 — Boxes, Wood, Cleated-Plywood.

PPP-B-621 — Boxes, Wood, Nailed and Lock-Corner.

PPP-B-636 — Boxes, Fiber.

MILITARY

MIL-D-5480 — Data; Engineering and Technical (Reproduction Thereof).

MIL-D-8510 — Drawing Negative; Reproducible Photographic, Preparation of (for Production Aircraft and Guided Missiles).

MIL-L-10547 — Liners, Case, Waterproof.

STANDARDS

- MIL-STD-1 — General Drawing Practice.
- MIL-STD-2 — Drawing Sizes.
- MIL-STD-3 — Format for Production Drawings.
- MIL-STD-4 — Format for Construction Drawings.
- MIL-STD-7 — Types and Definitions of Engineering Drawings.
- MIL-STD-8 — Dimensioning and Tolerancing.
- MIL-STD-9 — Screw Thread Conventions and Methods of Specifying.
- MIL-STD-10 — Surface Roughness, Waviness and Lay.
- MIL-STD-12 — Abbreviations for Use on Drawings.
- MIL-STD-14 — Architectural Symbols.
- MIL-STD-15 — Electrical and Electronic Symbols.
- MIL-STD-16 — Electrical and Electronic Reference Designations.
- MIL-STD-17 — Mechanical Symbols.
- MIL-STD-18 — Structural Symbols.
- JAN-STD-19 — Welding Symbols.
- MIL-STD-20 — Welding Terms and Definitions.
- MIL-STD-23 — Nondestructive Testing Symbols.
- MIL-STD-24 — Revision of Drawings.
- MIL-STD-25 — Nomenclature and Symbols for Ship-structure.
- MIL-STD-28 — Drawing Titles, Approved Method for Assignment of.
- MIL-STD-30 — Associated Lists (Data List, Index List, and List of Material).
- MIL-STD-31 — Numbering and Coding of Engineering Drawings, Associated Lists and Documents.

MIL-STD-103 — Abbreviations (For Electrical and Electronic Use).

MIL-STD-106 — Mathematical Symbols.

MIL-STD-129 — Marking for Shipment and Storage.

(Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

PUBLICATIONS

Armed Services Procurement Regulations.

Cataloguing Handbook, H4-1 (Name to Code). Federal Supply Code for Manufacturers.

Index of Specifications and Standards (Used by) Department of the Army, Military Index, Volume II.

Index of Specifications and Standards (Used by) Department of the Navy, Military Index, Volume III.

Index of Specifications and Related Publications (Used by) Department of the Air Force, Military Index, Volume IV.

NAVAER 00-25-544, List of Military Specifications and Standards, (Used by) the Bureau of Aeronautics.

(Applications for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.).

NAVAER 00-25-543, List of Aeronautical Standard Drawings (Used by) the Bureau of Aeronautics.

(Applications for copies should be addressed to the Commanding Officer, Naval Aviation Supply Depot, 700 Robbins Avenue, Philadelphia 11, Pennsylvania, Attn: Code ODPT).

Numerical List of U. S. Air Force, Air Force-Navy Aeronautical and Military (MS) Standards Sheet Form.

Alphabetical List of U. S. Air Force, Air Force-Navy Aeronautical and Military (MS) Standards Sheet Form.

(Applications for copies should be addressed to the Commander, Headquarters, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio).

Index of Specifications (Used in) Contracts for Public Works.

(Applications for copies should be addressed to the Chief, Civil Engineer, Bureau of Yards and Docks, Department of the Navy, Washington 25, D. C., Attn: D-230).

2.2 Definitions. For definitions of terms used in this specification (see 6.3).

3. REQUIREMENTS

3.1 General requirements. Engineering drawings and associated lists shall be design activity documents and shall comply with the following:

3.1.1 Symbols, reference designations, codes, and abbreviations. Any symbols, reference designations, codes, and abbreviations used on engineering drawings shall be in accordance with applicable military standards. Where symbols, reference designations, codes, and abbreviations are not covered by military standards, they may be used providing they are explained on each drawing or referenced to an explanatory document. The referenced explanatory documents shall be furnished with the drawings. When nonstandard symbols, reference designations, codes, and abbreviations are used repeatedly, they shall be forwarded to a custodian of this specification for possible inclusion in these standards.

3.1.2 Drawing practices. General drawing practices shall be in accordance with MIL-STD-1.

3.1.3 Drawing sizes. Drawing sizes shall be in accordance with MIL-STD-2.

3.1.4 Drawing format. Drawing format shall be in accordance with MIL-STD-3 for all drawings which shall conform to MIL-STD-4. This format is not required for Government, industry, or contractor design activity sheet form standards. (See 6.3.6.4).

3.1.4.1 Title block. The title block shall contain the design activity's name, address, and

code identification number in accordance with Handbook, H4-1.

3.1.5 Drawing titles. Titles on drawings shall be developed in accordance with MIL-STD-28.

3.1.6 Numbering of engineering drawings. Drawings shall be numbered in accordance with MIL-STD-31.

3.1.6.1 Class 1 drawings. Class 1 drawings are assigned Government drawing numbers.

3.1.6.2 Class 2 drawings. Class 2 drawings are assigned contractors design activity drawing numbers.

3.1.7 Types of drawings. Types of drawings shall conform to MIL-STD-7, as appropriate, and shall be suitable for the intended use. (See 6.2).

3.1.8 Dimensioning and tolerancing. Dimensioning and tolerancing shall be in accordance with MIL-STD-8.

3.1.9 Screw thread conventions. Screw thread conventions and methods of specifying shall be in accordance with MIL-STD-9.

3.1.10 Surface roughness, waviness, and lay. Surface roughness, waviness, and lay shall be shown in accordance with MIL-STD-10.

3.1.11 Abbreviations. Abbreviations shall be in accordance with MIL-STD-12.

3.1.12 Architectural symbols. Architectural symbols shall be in accordance with MIL-STD-14.

3.1.13 Electrical and electronic symbols. Electrical and electronic symbols shall be in accordance with MIL-STD-15.

3.1.14 Electrical and electronic reference designations. Reference designations for electrical and electronic items shall be in accordance with MIL-STD-16.

3.1.15 Mechanical symbols. Mechanical symbols shall be in accordance with MIL-STD-17.

3.1.16 Structural symbols. Structural symbols shall be in accordance with MIL-STD-18.

3.1.17 Welding symbols. Welding symbols shall be in accordance with JAN-STD-19.

3.1.18 Welding terms and definitions. Welding terms and definitions shall be in accordance with MIL-STD-20.

3.1.19 Nondestructive testing symbols. Non-destructive testing symbols shall be in accordance with MIL-STD-23.

3.1.20 Drawing revisions. Drawings shall be revised in accordance with MIL-STD-24.

3.1.21 Nomenclature and symbols for ship-structure. Nomenclature and symbols for ship-structure shall be in accordance with MIL-STD-25.

3.1.22 Abbreviations for electrical and electronic use. Abbreviations for electrical and electronic use shall be in accordance with MIL-STD-103.

3.1.23 Mathematical symbols. Mathematical symbols shall be in accordance with MIL-STD-106.

3.1.24 Types of associated lists.

3.1.24.1 Data and index lists. When data and index lists are required by the contract or order, they shall be in accordance with MIL-STD-30, numbered in accordance with MIL-STD-31, and furnished as part of the set of drawings. (See 6.2).

3.1.24.2 List of materials (parts lists). A list of materials (parts lists) shall be prepared either integral in accordance with MIL-STD-3 or as a separate list. When a procuring activity has need for a separate list, the requirements shall be stated in the contract or order. When a separate list is required, it

shall be optional with the design activity to prepare the drawings with the integral list and prepare a separate list in addition to that on the drawings. When separate lists are prepared, they shall be in accordance with MIL-STD-30, numbered in accordance with MIL-STD-31, referenced on applicable drawings, and furnished as part of the set of drawings.

3.1.25 Legibility and reproducibility. Drawings and lists shall meet legibility, contrast, and reproductive quality requirements of MIL-D-5480.

3.2 Drawing materials. Materials used for the preparation of engineering drawings shall conform to the following:

3.2.1 Paper, tracing. This material shall be in conformance with UU-P-561, Type III.

3.2.2 Cloth, tracing. Drawing cloth used in the preparation of drawings and lists shall be in accordance with the following:

- a. Specification CCC-C-531, Type II, Class A, shall be used when drawings are prepared with pencil.
- b. Specification CCC-C-531, Type I, shall be used when drawings are prepared with ink.
- c. Specification CCC-C-531, Type III, shall be used when drawings are prepared on moisture-resistant tracing cloth, suitable for both ink and pencil.

3.2.3 Plastic sheet, tracing and scribing.

3.2.3.1 Translucent film on which drawings are rendered in ink or pencil shall comply with L-P-519.

3.2.3.2 Opaque surface film on which drawings are rendered in an engraving layer utilizing a scribe shall comply with L-P-517.

3.2.4 Paper, drawing. Drawings, illustrations, sketches, maps, patent drawings, and similar type of drawings requiring fine detail,

shall be produced on paper conforming to UU-P-226. The grade shall be selected by the design activity, but shall be entirely suitable for the application.

3.2.5 Ink, drawing, waterproof, black. When ink is used in the preparation of drawings or lists by a manual method, it shall be in accordance with TT-I-528.

3.2.6 Plastic sheet, sensitized, dimensionally stable. Dimensionally stable materials used to prepare undimensioned drawings shall be in accordance with L-P-518.

3.2.7 Duplicates which become drawing media. Materials in this category shall conform to the drawing requirement for "duplicate originals" specified in MIL-D-5480.

3.2.8 Drawing negative; reproducible, photographic. When specified in the contract or order photographic reproducible drawing negatives used to record and reproduce undimensioned drawings shall be in accordance with MIL-D-8510. (See 6.2).

3.3 Delineation on engineering drawings. Unless otherwise specified in procurement documents or orders engineering drawings and lists including those for vendor items shall contain the following engineering data as applicable:

3.3.1 Reference to specifications and standards for requirements, materials, processes, treatments, test methods, and procedures. Applicable type, grade, class or conditions shall be shown.

3.3.2 Delineate directly or by reference sufficient engineering requirements and characteristics for the item such as material, dimensions, tolerances, form, finish, functional and interchangeability characteristics (electrical, mechanical, and other performance characteristics) necessary to enable the Government or contractors to procure or reproduce the item or obtain an adequate interchangeable substitute. Sufficient information to permit engineering evaluation and testing, complete serv-

ice, maintenance, repair, adjustment, and setting shall be included!

3.3.3 Special inspection and test requirements necessary to determine compliance with requirements for the item shall be defined on the drawings or reference made to an approved document that contains those requirements.

3.3.4 For altered or selected items, drawings shall delineate complete details of the alterations, selections, or special requirements. These drawings shall include necessary information to identify the item prior to its alteration or selection, including the original identifying part number and the name and the address of the source of original part. The name and address of the source need not be furnished if the original part is a Government or industry standard item.

3.3.5 Except for construction drawings, drawings for repairable items shall disclose as a minimum applicable data listed in 3.3.1 through 3.3.4.

3.3.6 Nonrepairable items shall be described by drawings or by reference to specifications, standards or other data including applicable type, grade, class or condition. When drawings are provided they shall disclose the applicable data of 3.3.1 through 3.3.4.

3.3.7 When contractor design activity standards are prepared in the form of engineering drawings, they shall disclose the engineering design requirements for the item, including features required by applicable specifications and comply insofar as practicable with other requirements of this specification (see paragraph 3.1.4 and paragraph 3.6.3).

3.3.8 When items (detail parts, assemblies, etc.) are required to be marked with part number identification, the drawing of such items shall specify the requirements. In addition, when required by engineering considerations, the design activity shall indicate on the drawing the method of marking and approximate location of the part number.

3.4 Order of precedence of specifications and standards. Where identical items of equal quality are identified by more than one document, the item shall be referenced on drawings in the following order:

3.4.1 Group I. Government specifications and standards approved for use by the Government requiring activity:

Specifications and standards are contained in the publications listed in 3.4.6. The following precedence in identification shall be observed:

- a. Federal specifications and standards.
- b. Coordinated military specifications (including JAN's) and standards.
- c. Limited coordination military and interim federal specifications and standards (including AN's and AND's) issued by the Government requiring activity.

3.4.2 Group II. Industry specifications and standards approved for use by the Government requiring activity.

In the absence of a suitable specification or standard in Group I, the design activity may reference a document from Group II. Specifications and standards which previously have been approved for use by the Government requiring activity and which are promulgated by nationally recognized associations, committees and technical societies, are considered a part of Group II.

3.4.3 Group III. Limited coordinated military and interim federal specifications and standards (including AN's and AND's) not issued by the Government requiring activity.

When a suitable specification or standard is not available in Group I or II the design activity shall reference such document from any of the publications listed in 3.4.6 prior to taking action required under 3.4.4 and 3.4.5 herein.

3.4.4 Group IV. Industry specifications and standards not previously approved for use by

the Government requiring activity. In the absence of a suitable specification or standard in Group I, II, or III, the design activity may reference a document from Group IV after approval by the military procuring activity. Specifications and standards promulgated by nationally recognized industrial associations, committees and technical societies, are considered a part of Group IV. Company specifications and standards are not to be considered as a part of this group. Copies of industry specifications and standards are not available from the Government.

3.4.5 Group V. Company specifications and standards — When no suitable specification or standards exist among those in Groups I, II, III, and IV, a company specification or standard, approved by the military procuring activity may be referenced. The use of a company specification or standard shall be discontinued upon the issuance of a specification or standard in Group I, II, III, or IV covering the same item. It is essential that the number of company specifications and standards referenced be restricted to the minimum consistent with specific needs. When company specifications or standards are referenced on drawings they shall be furnished with the set of drawings.

3.4.6 Publications listing applicable Government specifications and standards.

3.4.6.1 Army. Specifications and standards adopted by the Department of the Army are listed in the "Index of Specifications and Standards (Used by) Department of the Army, Military Index, Volume II", issued by the Department of the Army.

3.4.6.2 Navy. Specifications and standards used by the Navy as a whole are listed in the "Index of Specifications and Standards (Used by) Department of the Navy, Military Index, Volume III" issued by the Department of the Navy.

3.4.6.2.1 Specifications and standards (book form only) approved for Bureau of Aeronautics use are listed in Publication NAVAER

00-25-544, "List of Military Specifications and Standards (Used by) the Bureau of Aeronautics". Standard drawings approved for Bureau of Aeronautics use are listed in Publication NAVAER 00-25-543, "List of Aeronautical Standard Drawings (Used by) the Bureau of Aeronautics".

3.4.6.2.2 Specifications approved by the Bureau of Yards and Docks for use in contracts for public works are listed in the "Index of Specifications (Used in) Contracts for Public Works".

3.4.6.3 *Air Force*. Government specifications and standards (book form only) are listed in the "Index of Specifications and Related Publications (Used by) Department of the Air Force, Military Index, Volume IV" issued by the Department of the Air Force.

3.4.6.3.1 Government standards in drawing form, approved for Air Force use, are listed in Publications "Numerical List of U. S. Air Force, Air Force-Navy Aeronautical and Military (MS) Standards Sheet Form" and "Alphabetical List of U. S. Air Force, Air Force-Navy Aeronautical and Military (MS) Standards Sheet Form".

3.5 Item identification and part numbering. Each item, e.g., detail part, subassembly, etc., shall be identified by one part number as follows:

- a. An item covered by an approved standard (see 3.4) and used without alteration or selection shall be identified by the proper standard number (such as, MS number for military standard) which shall include any dash number or code necessary for complete identity.
- b. Each item, other than standard, shall be identified by one part number which shall be or shall include the design activity drawing number.
- c. Design activities using items other than their own design without alteration or selection, shall identify

such items by the original design activity part number. The Government or vendor design activity's name and address shall be provided on the drawing to identify the item and source.

- (1) When specification control or source control drawings are used, and it is necessary to refer to the articles depicted thereon on next assembly or other applicable drawings or lists, it shall be necessary to make such reference(s) using the specification control or source control drawing numbers. Such numbers shall be accompanied by the following notes:

"Vendor Item — See source control or specification control drawing"

- d. Using design activity identifying numbers may be used parenthetically with standard or vendor part numbers (3.5.a and 3.5.c).
- e. Any items which are altered or selected shall be assigned an identifying number by the design activity responsible for the alteration or selection. In addition, the following information shall be provided on the drawing to identify the original item and source:
 - (1) Standard part number if applicable.
 - (2) Name, address, and part number of the manufacturer of the part from which the item was made.

3.5.1 Identification on drawings. In accordance with 3.5 items shall be identified on the field of drawings either by showing the identifying part numbers or item (find) numbers cross-referenced to the identifying part numbers appearing on the list of material (parts list). Only one method shall be used on the field of a drawing.

3.5.1.1 When several items are detailed on a single drawing, such as a tabulated or multi-detail drawing, the identifying part number for each item delineated shall be the drawing number suffixed with a different dash number or letter or letter and number.

3.5.1.2 When an item or items are detailed on detail assembly or installation drawings, the identifying part number for each item detailed thereon shall be the detail assembly or installation drawing number suffixed with a different dashed number or letter, or letter and number.

3.5.1.3 When 3.5.1.1 or 3.5.1.2 applies, the complete part number shall be shown on drawings and lists. However, on drawings or lists bearing the same drawing number as the number for parts so identified, only the suffix need be shown. That is, the basic drawing number is not repeated in such cases.

3.5.1.4 On construction drawings (see MIL-STD-7) each item shall be identified to permit construction as designed. The identification need not include an identifying part number or an item (find) number as specified in 3.5.1.

3.5.1.5 After an item has been identified as specified herein, this identifying number shall be used on all applicable drawings or lists. See also 3.5.4 and 3.5.5.

3.5.2 *Code identification and part numbering.* Part numbers identifying items shall be preceded by the code identification numbers of the design activity assigned in accordance with Handbook H4-1, except that repetition of the code on the field of a drawing is not required under the following conditions:

- a. When code for the item identified (detail call-out) is common to the code of the containing drawing.
- b. When the item (find) numbers system is used.
- c. When the list of materials is integral with the drawing.

- d. When list of materials is prepared as an additional sheet identified by the same drawing number and shows the common code (3.5.2.a above) or uses item (find) number system (3.5.2.b above). See 3.1.24.2.

3.5.3 *Numbering of related parts.* Numbers to identify special relationships between parts shall be assigned as follows:

3.5.3.1 *Matched pair designation.* Parts which must be mated and for which replacement as a matched set or pair is essential, shall be assigned a single number to designate each matched set or pair. Component parts detailed on matched set drawings, in lieu of separate detail drawings, shall be identified as explained in 3.5.1.

3.5.3.2 *Symmetrically opposite parts.* Symmetrically opposite parts, when feasible, may be described by showing one of the parts, in which case they shall be identified by adding a dash number after the drawing number. For example: "016821-1 shown and 016821-2 opposite" shall appear on the drawing, 016821 being the basic drawing number. The use of odd dash numbers for the parts shown and even dash numbers for the opposite parts is preferred. As an alternate method, consecutive whole part numbers may be used and so indicated in the title block. Truly identical parts which can be reversed in any position shall carry only one part number.

3.5.3.3 *Inseparable assembly.* When two or more pieces are permanently fastened together to form an inseparable assembly, the assembly shall be assigned an identifying number. The individual pieces may be assigned part numbers as described in 3.5.

3.5.4 *Changes requiring new identification.* Items shall be assigned design activity numbers different from the original identifying number under the following conditions:

- a. Except when no drawings or items have been submitted, a new drawing under a new drawing number

shall be prepared, or a new part number, as described in 3.5 shall be assigned, when a part of assembly is changed in such manner that any of the following conditions occur:

Condition 1. Performance or durability is affected to such an extent that superseded items must be discarded for reasons of safety or malfunctioning.

Condition 2. Parts, subassemblies, or complete articles are changed to such an extent that the superseded and superseding items are not directly and completely interchangeable with respect to installation and performance.

Condition 3. When superseded parts are limited to use in specific articles or models of articles and the superseding parts are not so limited to use.

- b. When item has been altered or selected (See 3.5.e).
- c. When interchangeable repairable assemblies contain noninterchangeable items, both the noninterchangeable items and their parent assemblies change identification.

3.5.5 Changes not requiring new identification. When a part or assembly is changed in such a manner that none of the conditions in 3.5.4 occurs, the part number shall not be changed. Under no condition shall the number be changed when new usage is found for an existing part. When an item has been furnished to the Government, the applicable part number shall not be changed unless conditions in 3.5.4 apply. However, when a design activity wishes to create a standard because of multiple application of an item, the foregoing need not apply.

3.5.6 Identification of materials, processes, and protective treatment. Materials, processes, and protective treatment necessary to meet the design requirements of an item shall be identified on the drawing or list of material by reference to applicable specification(s) or standard(s). The applicable type, grade, class,

condition, etc., shall be indicated. The revision or amendment symbol of the specification or standard shall not be shown. Additional reference to other equivalent specifications is permitted.

3.5.6.1 Group identifications. Where necessary identification involves several different specifications or standards, these specifications and standards may be grouped into a single document which shall be referenced on the applicable drawings or lists of material. This document shall be part of the set of drawings. Where several processes or protective treatments are involved and a sequence is necessary to meet design requirements, they shall be shown in the order of sequence.

3.5.6.2 Other identification. When materials, processes, and protective treatments are used which cannot be identified adequately in accordance with 3.5.6 the drawing or list of material shall provide additional information for complete identification including the following:

- a. Trade name(s) or commercial designations.
- b. Name and address of the producer of the materials.
- c. Chemical composition (where applicable).
- d. Physical and mechanical properties in sufficient detail to disclose strength and safety characteristics where required by the design.
- e. Dielectric properties for electrical insulating materials.

3.5.6.3 Bulk materials identification. Bulk materials (see 6.3.15) shall be identified on the field of the drawing by reference where applicable or by complete description and noted in the list of material. Where practicable, the quantity of the material shall also be included. Separate drawings shall not be prepared for bulk materials covered by specifications.

3.6 Submittal of design activity drawings, lists, standards and related documents. In

addition to the requirements of the contract or order for classes and types of drawings to be submitted (see 6.2), it shall be the responsibility of the prime contractor to include the requirements of this specification in contracts or orders with subcontractors and to insure compliance therewith.

3.6.1 *Prior submittal.*

3.6.1.1 *To the military procuring activity.* Design activity drawings, lists, standards, etc., prepared in compliance with this specification and which have previously been submitted to the same military procuring activity shall not be included with the set of drawings furnished. Evidence shall be submitted that these drawings have been previously furnished and have not been changed since such submittal.

3.6.1.2 *To other Department of Defense activities.* Design activity drawings, lists, standards etc., prepared in compliance with this specification and have previously been accepted by a Department of Defense activity other than the Military Procuring Activity may be submitted for approval in lieu of new drawings. Evidence shall be submitted that these drawings have been previously accepted by the Department of Defense activity and have not been changed.

3.6.1.3 *Existent drawings, lists, standards, etc.* Existing drawings, lists, standards, etc. which do not entirely comply with the requirements of this document may be acceptable if they contain the essential technical data required by the procuring activity, and are identified by addition of a code identification in accordance with MIL-STD-31.

3.6.2 *Special submissions.* Design activity drawings, or revisions of existing drawings as necessary, shall be submitted under the following conditions:

3.6.2.1 *Altered or selected items.* When any standard or design activity (including vendor) item is altered or selected, the design activity responsible for alteration or selection shall

submit new drawings to provide required data (see 3.3.4) and change in identification (see 3.5.4).

3.6.2.2 *Design activity procurement.*

3.6.2.2.1 Specification control or source control drawings. When procurement by a using design activity necessitates preparation of specification control or source control drawings (see MIL-STD-7), such drawings shall be submitted with the set of drawings.

3.6.2.2.2 *Vendors drawings.* Originating design activity drawings necessary to provide information on items or articles referenced on contractor design activity drawings shall be submitted through the contractor design activity or with the approval of the procuring activity directly to the destination by the originating design activity (with adequate reference to equipment on which used).

3.6.2.3 *Drawings reflecting identification changes.* New drawings shall be furnished when necessary to reflect changes in identification required by 3.5.4.

3.6.2.4 *Drawings of standards.* Submission of design activity drawings is not required for any approved standards listed in Groups I through IV inclusive, unless altered or selected in use. Submission of copies of these standards is not required.

3.6.3 *Lists.* Special requirements for submission of lists (see 3.1.24) shall be in accordance with the contract or order (see 6.2). However, when the contractor design activity has the option to prepare lists of materials (parts lists) separate from the drawings, all such lists shall be furnished with the set of drawings.

3.6.4 *Contractor design activity documents referenced in drawings.* All contractor design activity documents referenced on drawings (including design activity standards) shall be furnished as part of the set of drawings and shall show the appropriate code identification in accordance with MIL-STD-31. Duplication

of a prior submission of these documents to the Military Procuring Activity is not required. (see 3.6.1.1).

3.7 Care and maintenance of original drawings, lists, and referenced documents. The design activity shall care for and maintain original engineering drawings, lists, and referenced documents in such manner to assure satisfactory reproduces in accordance with MIL-D-5480. Original drawings and reproduces which become originals shall not be crumpled, torn, creased, folded or otherwise mutilated.

3.8 Proprietary data. Proprietary data shall be furnished in accordance with the terms of the contract or order. (See 6.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 General requirements. To insure satisfactory quality, the design activity shall establish and maintain an adequate procedure for checking, review, and maintenance of drawings, associated lists, and documents prepared or furnished under this specification.

4.2 Review and checking. The design activity responsible for the preparation of the drawings and associated lists shall review and check the drawings, lists, and referenced documents for completeness, technical and engineering accuracy, legibility, reproducibility, and for conformance to the requirements specified in the contract prior to the submission of this data to the procuring activity.

4.3 Reservation of Government right to review or audit. The Government reserves the right to review or audit drawings and associated lists, prior to acceptance, to be furnished under the terms of the contract.

5. PREPARATION FOR DELIVERY

5.1 General requirements. The following requirements apply to shipments to the Government and to shipments made at the request of the Government:

5.2 Reproduces and nonreproducible copies. When delivery of reproducible and nonreproducible copies of drawings, or associated lists, is a contractual requirement, preparation for delivery shall conform to MIL-D-5480.

5.3 Originals of drawings and associated lists.

5.3.1 Packaging.

5.3.1.1 Separation of drawings and data referenced on drawings. Shipments incorporating more than one set of drawings and data, or sets of drawings and data for more than one model of aircraft, engine, tank, etc., shall be separated by sets or models. Shipment of miscellaneous data shall be separated similarly.

5.3.1.2 Arrangement. Shipment of drawings and data shall be arranged numerically by size and shall not be folded, crumpled, or torn.

5.3.1.2.1 Flat drawings. All drawings of the same size, in sizes A, B, C, and D, may be packed and packaged in flat packs. In lieu of flat packs, drawings of the same size may be rolled on a rigid core which shall extend sufficiently beyond the ends of the drawings to prevent crumpling, tearing, or folding in transit. Diameter of the roll shall not exceed eight (8) inches.

5.3.1.2.2 Rolled drawings. Drawings rolled for shipment individually shall be tightly rolled and secured with a plastic clip, a noncorrosive metal clip, paper string tie, or other method of a type which will not damage the drawings or lists. Suitable protection against damage shall be provided by the shipping container.

5.3.1.3 Waterproof inner-pack material. Each package shall be wrapped in waterproof material conforming to UU-P-271.

5.3.1.4 Separation of classified data. Classified data shall comprise a separate shipment and shall not be interfiled with unclassified data.

5.3.2 *Packing.*

5.3.2.1 *Level A.* The unit packages shall be packed in shipping containers in accordance with PPP-B-636 (corrugated or solid fiberboard cartons); PPP-B-601 (cleated plywood box), except that the plywood shall conform to NN-P-515, Type II, Class 2; or PPP-B-621 (nailed wood box). Each shipping container shall be provided with a sealed waterproof case liner in accordance with MIL-L-10547, unless waterproof sealed containers in accordance with PPP-B-636 are used.

5.3.2.2 *Level C.* Unless otherwise specified, unit packages shall be packed in substantial commercial shipping containers constructed to insure acceptance by common or other carrier for safe transportation to the point of delivery.

5.3.2.3 *Shipping lists.* A shipping list consisting of one reproducible or original shall be included with each shipment of drawings. One (1) copy of the shipping list shall be forwarded with the letter of transmittal. Separate shipping lists shall be prepared for each model or type of missile, rocket motor, engine, etc.

5.3.2.3.1 The shipping list shall contain the following information:

- a. Name and address of shipping activity.
- b. Contract number.
- c. Model or type and name.
- d. Document number arranged alpha-numerically. For each drawing shown, drawing size, revision letter, and code identification.
- e. Number of each sheet identified to total set (e.g., 1 of 50, 10 of 50, etc.).

5.3.2.3.2 *Use of data list.* A data list conforming to MIL-STD-30 may be used as a shipping document provided it is identified as "SHIPPING LIST" and contains the information required by 5.3.2.3.1. All items not in-

cluded in the shipment shall be deleted from the list.

5.4 **Marking of shipments.** Interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129. Each interior package shall be marked in such manner that the markings will not become damaged when the packages are opened. The nomenclature for interior packages and exterior shipping containers shall be as follows: Drawings (or Data Lists) for name of item), Specification

* (as applicable);

Name of manufacturer _____ * _____;

Name of contractor _____ * _____ (if
different from design activity), Contract or
Order No. _____ * _____.

6. NOTES

6.1 **Intended use.** Subject to rights in data acquired under the contract, engineering drawings and lists provided and revised under this specification may be used by the Department of Defense activities for design, procurement, manufacture, testing, evaluation, production, production and receiving inspection, overhaul, shipping, storage, identification of stock, ordering and storage of replacement parts, inspection of items at overhaul, general maintenance of equipment, construction, survey, and wherever engineering drawings are needed.

6.2 **Ordering data.** Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Classes of drawings to be provided (see 1.2). When Class I drawings are required, include the applicable code identification and drawing numbers.

*Information to be entered by the design activity.

- c. Types of drawings to be provided or intended use. (see 3.1.7).

- d. Whether the list of materials shall be prepared in accordance with MIL-STD-3 and as separate lists. (See 3.1.24).
- e. Whether data and index lists are required (see 3.1.24.1).
- f. Kinds of materials for originals, if they are to be provided. (see 3.2).
- g. Whether photographic reproducible drawing negatives of undimensioned drawings are to be provided (see 3.2.8).
- h. Proprietary data to be acquired (see 3.8).
- i. Level of packing (see 5.3.2).
- j. Quantity and types of reproducibles and nonreproducible copies of drawings and lists to be provided (see MIL-D-5480).
- k. Any applicable instructions and procedures pertaining to control and approval of drawings, associated lists, and revisions thereto.
- l. Delivery date and destination for drawings, lists, and other documents.

6.3 Definitions.

6.3.1 Design activity. A "design activity" is an activity having responsibility for the design and preparation and maintenance of engineering drawings for a given item of supply. The activity may be a Government activity or a contractor, vendor or others.

6.3.2 Contractor. A "contractor" is any individual, partnership, company, corporation, or association having a contract with the procuring activity for the design delineations, or manufacture of an item or items under the terms of a contract.

6.3.3 Manufacturer. "Manufacturer" is a person or firm (a), who owns, operates or maintains a factory or establishment that produces on the premises the materials, supplies,

articles, or equipment required under the contract or of the general character described by the specifications, standards, and publications: or (b) who, if newly entering into a manufacturing activity of the type described in 6.3.3.a above, has made all necessary prior agreements for manufacture space, equipment, and personnel, to perform the manufacturing operations required for contract performance.

6.3.4 Vendor. "Vendor" is a design activity, manufacturer, wholesaler, or agent from whom are acquired items used in the performance of the contract.

6.3.5 Document. "Document" applies to the specifications, drawings, sketches, lists, standards, pamphlets, reports, and printed, type-written, or other information, relating to the design, procurement, manufacture, test, or inspection of items or services under the contract.

6.3.6 Standards. "Standards" are documents that establish engineering and technical limitations and applications for items, materials, processes, methods, designs and engineering practices.

They will:

- a. Limit the selection of materials, items, services, etc., in order to provide for:
 - (1) Functional and physical interchangeability of parts, components, subassemblies and equipments.
 - (2) Compatibility of items and equipments in their own or related systems.
- b. Establish basic engineering terminology and codes.
- c. Limit the variety of end-use items which can be procured for stock and issue.

6.3.6.1 Government standard. "Government standard" is a standard developed by or for a Government activity.

6.3.6.2 Industry standard. "Industry standard" is a standard developed and promulgated by a technical society, trade association, or federation thereof.

6.3.6.3 Design activity standard. "Design activity standard" is a standard developed by a design activity.

6.3.6.4 Sheet form standard. "Sheet form standard" is a standard prepared in format similar to MS sheet format or MIL-STD unit page format.

6.3.7 Data and index lists. For the definitions, see MIL-STD-30.

6.3.8 Item. "Item" is a document, material, process, part, subassembly, assembly, unit, set, system, accessory, attachment, etc.

6.3.9 Inseparable assembly. For definition, see MIL-STD-7.

6.3.10 Matched parts. "Matched parts" are those parts, such as special application parts, which are machine matched, or otherwise mated, and for which replacement as a matched set or pair is essential.

6.3.11 Altered parts. "Altered parts" is a part or parts that are altered to meet the requirements of a design activity.

6.3.12 Selected parts. "Selected part" is a part or parts selected for special requirements or required to conform to special inspection or qualification requirements by a design activity.

6.3.13 Symmetrically opposite parts. "Symmetrically opposite parts" are those parts which are mirror images of each other.

6.3.14 Interchangeable items. "Interchangeable items," are items which when interchanged or substituted, any one for another, without modification or selection, will provide the same design, engineering, and physical and functional characteristics required of the original

items and will require no modification of any system or assembly in which either may be used.

6.3.15 Bulk materials. "Bulk materials" are those necessary constituents of an assembly or subassembly such as oil, wax, solder, cement, ink, damping fluid, grease, powdered graphite, flux, welding rod, thread, twine and chain for which the quantity required is not readily pre-determinable; or if knowing the quantity, the physical nature of the material is such that it is not adaptable to depiction on a drawing; or which can be cut to finished size by the use of such hand or bench tools as shears, pliers, knives, etc., without any further machining operations and the configuration is such that it can be fully described in writing without the necessity of pictorial presentation.

6.3.16 Commercial items. "Commercial items" means supplies or services which normally are or have been sold or offered to the public commercially by any supplier.

6.3.17 Engineering drawings. For definition, see MIL-STD-7.

6.3.18 Class 1 — Government design activity drawings. "Government design activity drawings" are drawings furnished or prepared in accordance with this specification as Government agency drawings by a Government design activity or a contractor and for which the Government agency retains or assigns responsibility for the preparation or maintenance. These drawings are assigned Government identification code and Government drawing numbers from a block of numbers issued by a Government activity.

6.3.19 Class 2 — Contractor design activity drawings. "Contractor design activity drawings" are drawings which are furnished or prepared in accordance with this specification as contractor design activity drawings by or for a contractor design activity and for which the contractor design activity has responsibility for the preparation and maintenance. These drawings shall be assigned contractor design

activity identification code and drawing numbers.

6.3.20 *Item (find) number.* "Item (find) number" is a number assigned on an assembly drawing to a part, subassembly, etc., for purposes of identification.

6.3.21 *Original drawing.* For definition, see MIL-STD-24.

6.3.22 *Proprietary data.* For definition, see Armed Services Procurement Regulations, Section IX, Part 2.

Notice. When Government drawings, specifications, or other data are used for any purpose other than

in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Custodians:

Army—Ordnance Corps
Navy—Bureau of Ordnance
Air Force—AMC

Preparing activity:

Navy—Bureau of Ordnance

