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MILITARY STANDARD

SPECIFICATION PRACTICES



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DEPARTMENT OF DEFENSE
Washington, D.C. 20301

Specification Practices

1. This Military Standard has been approved by the Department of Defense and is mandatory for use by all Departments and Agencies of the Department of Defense.
2. Recommended corrections, additions, or deletions should be addressed to: Headquarters, Air Force Systems Command, HQ AFSC/SDXP, Andrews Air Force Base, Washington, D.C. 20331.

FOREWORD

This Military Standard sets forth practices for the preparation, interpretation, change, and revision of program-peculiar specifications prepared by or for the Departments and Agencies of the Department of Defense.

This Military Standard was prepared to establish uniform specification practices in response to the need for a document comparable to DOD-STD-100 covering engineering drawing practices and in recognition of the configuration identification concepts of the DOD Configuration Management Program established by DOD Directive 5010.19 and DOD Instruction 5010.21.

This Military Standard is arranged in six sections and 15 appendixes. Section 1 states the scope of the standard. Section 2 lists the referenced documents. Section 3 states broad requirements, concepts, and practices applicable to specifications in general. Section 4 states general requirements for each of the six sections of a specification. The second digit of the paragraph numbering of Section 4 corresponds with the numbering of the six specification sections. Section 5 invokes the detailed requirements of the appendixes which are outlines for various types of specifications. Section 6 contains a list of Data Item Descriptions (DIDs) applicable to this standard.

This Standard, although primarily intended for use in preparation of program-peculiar specifications, recognizes the probability that some items, processes, or materials covered by specifications prepared to this Standard will be subject to conversion by Government agencies to Federal or Military specifications for use as a Mandatory Specification as required by FAR 1-1202(a). Therefore, specifications prepared in accordance with this Standard, when subject to all pertinent conversion requirements of DOD 4120.3-M and assigned Federal or Military specification numbers, will be in full compliance with requirements for Federal and Military specifications.

Although this standard is specifically applicable to MIL-S-83490 Form 1a specifications only, its use as a guidance document for the preparation of other forms is encouraged.

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MILITARY STANDARD
SPECIFICATION PRACTICES

1. SCOPE

1.1 Scope. This standard establishes the format and contents of specifications for program-peculiar configuration items, processes, and materials.

1.2 Purpose. The purpose of this standard is to establish uniform practices for specification preparation, to ensure the inclusion of essential requirements, and to aid in the use and analysis of specification content.

1.3 Classification. Specifications covered by this standard may be prepared as military, Federal, contracting agency, or contractor specifications. The types of specifications are as follows:

Type A - System/Segment Specification

Type B - Development Specifications

- B1 Prime Item
- B2 Critical Item
- B3 Non-Complex Item
- B4 Facility or Ship
- B5 Software

Type C - Product Specifications

- C1a Prime Item Function
- C1b Prime Item Fabrication
- C2a Critical Item Function
- C2b Critical Item Fabrication
- C3 Non-Complex Item Fabrication
- C4 Inventory Item
- C5 Software

Type D - Process Specification

Type E - Material Specification

1.4 Definitions.

1.4.1 Program-peculiar. Configuration items, processes and materials as used in this standard, include all configuration items, processes and materials conceived, developed, reduced to practice or first documented for the development, procurement, production, assembly, installation, testing or support of the system/equipment/software/end product (including their components and supporting configuration items) developed or initially

procured under a specific program. For all Army applications of this standard, this paragraph shall read as follows:

"1.4.1 PROGRAM-PECULIAR items, processes and materials as used in this standard, include only those items, processes and materials conceived, developed, reduced to practice or first documented for the development, procurement, production, assembly, installation, testing and support of the system/equipment/end item (including their components and supporting items) developed or initially procured under a specific program for which there would be judged to be no potential for use by subsequently developed systems. In other words, program-peculiar items, processes and materials will be only those which are obviously only one-of-a-kind and, therefore, little or no potential exists for elimination through Item Reduction Studies or for any future use."

1.4.2 Configuration item. Hardware or software, or an aggregation of both, which is designated by the contracting agency for configuration management.

1.4.3 Hardware Configuration Item (HWCI). See Configuration item.

1.4.4 Computer Software Configuration Item (CSCI). See Configuration item.

1.4.5 Other definitions. For definitions of other terms used in this standard, see DOD-STD-480, Appendix E and DOD-STD-2167.

2. REFERENCED DOCUMENTS

2.1 Government documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

SPECIFICATIONS

Military DOD-D-1000	Drawings, Engineering and Associated Lists
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STANDARDS

Federal FED-STD-102	Preservation, Packaging, and Packing Levels
Military MIL-STD-12	Abbreviations for Use on Drawings, Specifications Standards and in Technical Documents
DOD-STD-100	Engineering Drawing Practices
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of US Military Property
MIL-STD-1472	Human Engineering Design Criteria for Military Systems, Equipment, and Facilities
DOD-STD-480	Configuration Control - Engineering Changes, Deviations and Waivers

OTHER PUBLICATIONS

Cataloging Handbook H2	Federal Supply Classification
Cataloging Handbook H4	Federal Supply, Code for Manufacturers
Cataloging Handbook H6	Federal Item Identification Guides for Supply Cataloging
DOD 4120.3-M	Standardization Policies

Procedures and Instructions

DOD 5220.22-M

Industrial Security Manual for
Safeguarding Classified
Information

GPO Style Manual

2.2 Non-Government document. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

Merriam-Webster's New International Dictionary

Copies of listed federal and military standards, specifications and handbooks are available through the DOD Single Stock Point, Commanding Officer, U.S. Naval Publications and Forms Center (Attn: NPFC 1032), 5801 Tabor Avenue Philadelphia, Pennsylvania 19120. Applications for copies of DOD Manuals 4120.3-M and 5220.22-M and the GPO Style Manual should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

3. REQUIREMENTS

3.1 Introduction. Specifications prepared in accordance with this standard are intended for use in design and procurement of configuration items and for services required for program-peculiar application.

3.1.1 Configuration identification. Current configuration identification is established by baseline configuration identification documents and all effected changes. Configuration identification documents include all those necessary to provide a full technical description of the characteristics of the configuration item that require control at the time that the baseline is established (see 6.2).

3.1.1.1 Functional Configuration Identification (FCI). Functional configuration identification (functional baseline and approved changes) will normally include a Type A specification or a Type B specification supplemented by other specification types as necessary to specify: (1) all essential system functional characteristics; (2) necessary interface characteristics; (3) specific designation of the functional characteristics of key configuration items; and (4) all of the tests required to demonstrate achievement of each specified characteristic (see 6.2).

3.1.1.2 Allocated Configuration Identification (ACI). Allocated configuration identification (allocated baseline and approved changes) normally consists of a series of Type B specifications defining the requirements including functional, for each major configuration item. These may be supplemented by other types of specifications, engineering drawings and related data, as necessary, to specify: (1) all of the essential configuration item characteristics including delineation of interfaces; (2) physical characteristics necessary to assure compatibility with associated systems, configuration items and inventory items; and (3) all of the tests required to demonstrate achievement of each specified functional characteristic (see 6.2).

3.1.1.3 Product Configuration Identification (PCI). The product configuration identification (product baseline and approved changes) will normally include specification Types C, D, and E, engineering drawings and related data, as necessary, to provide a set of documents adequate for the procurement, production, test, evaluation, and acceptance of a configuration item without requiring further development work. This set of documents provides that technical description which describes the required physical characteristics of a configuration item; the functional characteristics designated for production acceptance testing; and required acceptance tests.

3.1.2 Coverage of specifications. Specifications may be prepared to cover a group of products, services or materials, or

a single product, service or material, and are general or detail specifications, respectively, and either may be prepared as any of the types specified herein.

3.1.2.1 General specification. A general specification covers requirements common to two or more types, classes, grades, or styles of products, services, or materials; this avoids repetition of common requirements in detail specifications. It also permits changes to common requirements to be readily effected. General specifications may also be used to cover common requirements for weapon systems and subsystems.

3.1.2.2 Detail specification. A detail specification covers all requirements for one or more types of configuration items or services so as not to require preparation and reference to a general specification for the common requirements. A detail specification may also take the form of a specification sheet, which is incomplete without reference to a general specification. The detail and referenced general specification (which contains the requirements common to the family configuration items) then constitute the total requirements. In either instance, detail specifications shall be prepared in six-section format described in Section 3 and 4 of this standard.

3.1.3 Types. General Requirements for specification types are as follows:

3.1.3.1 Type A - System/segment specification. This type of specification states the technical and mission requirements for a system/segment as an entity, allocates requirements to functional areas, documents design constraints, and defines the interfaces between or among the functional areas. Normally, the initial version of a system/segment specification is based on parameters developed during the Concept Exploration phase. This specification (initial version) is used to establish the general nature of the system that is to be further defined and finalized during the Demonstration and Validation phase. The system/segment specification is maintained current during the Demonstration and Validation phase, culminating in a revision that forms the future performance base for the development and production of the prime items and configuration items. The System/Segment Specification shall be prepared by the contractor and shall be in accordance with the format and content of the System/Segment Specification Data Item Description (see 6.2).

3.1.3.2 Type B - Development specifications. Development specifications state the requirements for the design or engineering development of a product during the development period. Each development specification shall be in sufficient detail to describe effectively the performance characteristics that each configuration item is to achieve when a developed configuration item is to evolve into a detail design for

production. The development specification should be maintained current during production when it is desired to retain a complete statement of performance requirements. Since the breakdown of a system into its elements involves configuration items of various degrees of complexity which are subject to different engineering disciplines or specification content, it is desirable to classify development specifications by sub-types. The characteristics and some general statements regarding each sub-type are given in the following paragraphs (see 6.2).

3.1.3.2.1 Type B1 - Prime item development specification. (See Appendix II for outline of form.) A prime item development specification is applicable to a complex item such as an aircraft, missile, launcher equipment, fire control equipment, radar set, training equipment, etc. A prime item development specification may be used as the functional baseline for a single configuration item development program or as part of the allocated baseline where the configuration item covered is part of a larger system development program. Normally configuration items requiring a Type B1 specification meet the following criteria:

- a. The prime item will be received or formally accepted by the contracting agency on a DD Form 250, sometimes subject to limitations prescribed thereon.
- b. Provisioning action will be required.
- c. Technical manuals or other instructional material covering operation and maintenance of the prime item will be required.
- d. Quality conformance inspection of each prime item, as opposed to sampling, will be required.

3.1.3.2.2 Type B2 - Critical item development specification. (See Appendix III for outline of form.) A Type B2 specification is applicable to a configuration item which is below the level of complexity of a prime item but which is engineering critical or logistics critical.

- a. A critical item is engineering critical where one or more of the following applies:
 - (1) The technical complexity warrants an individual specification.
 - (2) Reliability of the critical item significantly affects the ability of the system or prime item to perform its overall function, or safety is a consideration.
 - (3) The prime item cannot be adequately evaluated without

separate evaluation and application suitability testing of the critical item.

b. A critical item is logistics critical where the following apply:

(1) Repair parts will be provisioned for the item.

(2) The contracting agency has designated the item for multiple source reprourement.

3.1.3.2.3 Type B3 - Non-complex item development specification. (See Appendix IV for outline of form.) This type of specification is applicable to configuration items of relatively simple design which meet all of the following criteria:

a. During development of the system or configuration item, the non-complex item can be shown to be suitable for its intended application by inspection or demonstration.

b. Acceptance testing to verify performance is not required.

c. Acceptance can be based on verification that the item, as fabricated, conforms to the drawings.

d. The end product is not software.

Examples of configuration items which normally meet the above criteria are: special tools, work stands, fixtures, dollies, and brackets. Many such simple configuration items can be defined adequately during the development phase by a sketch and during production by a drawing or set of drawings. If drawings will suffice to cover all requirements, and unless a specification is required by the Government contracting agency, a specification for a particular non-complex item need not be prepared. However, when it is necessary to specify several performance requirements in a formal manner to ensure development of a satisfactory configuration item or when it is desirable to specify detailed verification procedures, the use of a specification of this type is appropriate.

3.1.3.2.4 Type B4 - Facility or ship development specification. (See Appendix V for outline of form.) A facility or ship development specification is applicable to each HWCI which is both a fixed (or floating) installation and an integral part of a system. Examples of facility/ship requirements are: basic structural, architectural or operational features designed specifically to accommodate the requirements unique to the system and which must be developed in close coordination with the system; the facility or ship services which form complex interfaces with the system; facility or ship hardening to decrease the total system's vulnerability; and ship speed, maneuverability, etc. A development specification for a facility or ship establishes the

requirements and basic restraints/constraints imposed on the development of an architectural and engineering design for such facility or ship. The product specifications for the facility or ship are prepared by the architectural/engineering activity, and their type and format are not prescribed by this standard.

3.1.3.2.5 Type B5 - Software development specification (see 6.2). Software development specifications are applicable to the development of computer software and consist of a Software Requirements Specification and Interface Requirements Specification(s).

3.1.3.2.5.1 Software Requirements Specification. This type of specification describes in detail the functional, interface, quality factor, special, and qualification requirements necessary to design, develop, test, evaluate and deliver the required Computer Software Configuration Item (CSCI). The Software Requirements Specification shall be prepared by the contractor and shall be in accordance with the format and content of the Software Requirements Specification Data Item Description (See 6.1).

3.1.3.2.5.2 Interface Requirements Specification. This type of specification describes in detail the requirements for one or more CSCI interfaces in the system, segment, or prime item. The specified requirements are those necessary to design, develop, test, evaluate, and deliver the required CSCI. The interface requirements may be included in the associated Software Requirements Specifications under the following conditions: (1) there are few interfaces, (2) few development groups are involved in implementing the interface requirements, (3) the interfaces are simple, or (4) there is one contractor developing the software. The Interface Requirements Specification shall be prepared by the contractor(s) and shall be in accordance with the format and content of the Interface Requirements Specification Data Item Description (see 6.2).

3.1.3.3 Type C - Product Specifications. Product specifications are applicable to any configuration item below the system level, and may be oriented toward procurement of a product through specification of primarily functional (performance) requirements or primarily fabrication (detailed design) requirements. Sub-types of product specifications to cover equipments of various complexities or requiring different outlines of form are covered in paragraphs 3.1.3.3.1 through 3.1.3.3.5.

- a. A product function specification states (1) the complete performance requirements of the product for the intended use, and (2) necessary interface and interchangeability characteristics. It covers form, fit, and function. Complete performance requirements include all essential functional requirements under service environmental conditions or under conditions simulating the service environment. Quality assurance provisions for hardware

include one or more of the following inspections: qualification evaluation, preproduction, periodic production, and quality conformance.

- b. A product fabrication specification will normally be prepared when both development and production of the HWCI are procured. In those cases where a development specification (Type B) has been prepared, specific reference to the document containing the performance requirements for the HWCI shall be made in the product fabrication specification. These specifications shall state: (1) a detailed description of the parts and assemblies of the product, usually by prescribing compliance with a set of drawings, and (2) those performance requirements and corresponding tests and inspections necessary to assure proper fabrication, adjustment, and assembly techniques. Tests normally are limited to acceptance tests in the shop environment. Selected performance requirements in the normal shop or test area environment and verifying tests therefore may be included. Preproduction or periodic tests to be performed on a sampling basis and requiring service, or other, environment may reference the associated development specification. Product fabrication specifications may be prepared as Part II of a two-part specification (See 3.1.4) when the contracting agency desires close relationships between the performance and fabrication requirements.

3.1.3.3.1 Type C1 - Prime item product specifications. Prime item product specifications are applicable to configuration items meeting the criteria for prime item development specifications (Type B1) as stated in paragraph 3.1.3.2.1. They may be prepared as function or fabrication specifications as determined by the procurement conditions.

3.1.3.3.1.1 Type Cla - Prime item product function specification. (See Appendix VII for outline of form.) A type Cla specification is applicable to the procurement of prime items when a "form, fit and function" description is acceptable. Normally, this type of specification would be prepared only when a single procurement is anticipated and training and logistic considerations are unimportant.

3.1.3.3.1.2 Type Clb - Prime item product fabrication specification. (See Appendix VIII for outline of form.) Type Clb specifications are normally prepared for procurement of prime items when: a detailed design disclosure package needs to be made available; it is desired to control the interchangeability of lower level components and parts; and service maintenance and training are significant factors.

3.1.3.3.2 Type C2 - Critical item product specifications. Type C2 specifications are applicable to engineering or logistic critical

items as specified in paragraph 3.1.3.2.2, and may be prepared as function or fabrication specifications.

3.1.3.3.2.1 Type C2a - Critical item product function specification. (See Appendix IX for outline of form.) A type C2a specification is applicable to a critical item where the critical item performance characteristics are of greater concern than part interchangeability or control over the details of design, and a "form, fit and function" description is adequate.

3.1.3.3.2.2. Type C2b - Critical item product fabrication specification. (See Appendix X for outline of form.) A C2b specification is applicable to a critical item when a detailed design disclosure needs to be made available or where it is considered that adequate performance can be achieved by adherence to a set of detail drawings and required processes.

3.1.3.3.3 Type C3 - Non-complex item product fabrication specification. (See Appendix XI for outline of form.) A non-complex item product fabrication specification is applicable to non-complex items as specified in paragraph 3.1.3.2.3. Where acquisition of a non-complex item to a detailed design is desired, a set of detail drawings may be prepared in lieu of a specification.

3.1.3.3.4 Type C4 - Inventory item specification. (See Appendix XII for outline of form.) This type of specification identifies applicable inventory items (including their pertinent characteristics) that exist in the DOD inventory and which will be incorporated in a prime item or in a system being developed. The purpose of the inventory specification is to stabilize the configuration of inventory items in the DOD inventory on the basis of both current capabilities of each inventory item and the requirements of the specific application, or to achieve equipment/component item standardization between or within a system or prime item. This puts the Government on notice as to the performance and interface characteristics that are required, so that when ECP's for an inventory item are evaluated the needs of the various applications may be kept in mind. If this is not done, design changes may make an inventory item unsuitable for the system. A separate inventory item specification should be prepared, as required, for each system, subsystem, prime item or critical item in which inventory items are to be installed or which require the support of inventory items.

3.1.3.3.5 Type C5 - Software Product Specification (see 6.2). The Software Product Specification is applicable to the delivered CSCI and is sometimes referred to as the "as built" software specification. This specification consists of the final updated version of the Software Top-Level Design Document, the Software Detailed Design Document, the Data Base Design Document(s), the Interface Design Document(s), and the source and object listings of the software. The Software Product Specification shall be

prepared by the contractor and shall be in accordance with the format and content of the Software Product Specification Data Item Description (see 6.2).

3.1.3.3.5.1 Software Top Level Design Document. The Software Top Level Design Document describes how the top-level computer software components (TLCSCs) implement requirements allocated from the Software Requirements Specification and, if applicable, Interface Requirements Specification(s). The Software Top Level Design Document shall be prepared by the contractor and shall be in accordance with the format and content of the Software Top Level Design Document Data Item Description (see 6.2).

3.1.3.3.5.2 Software Detailed Design Document. The Software Detailed Design Document describes the detailed decomposition of TLCSCs to lower level computer software components (LLCSCs) and units. The Software Detailed Design Document shall be prepared by the contractor and shall be in accordance with the format and content of the Software Detailed Design Document Data Item Description (see 6.2).

3.1.3.3.5.3 Data Base Design Document. The Data Base Design Document describes one or more data base(s) used by the CSCI. If there is more than one data base, each data base may be described in a separate Data Base Design Document. The Data Base Design Document(s) shall be prepared by the contractor and shall be in accordance with the format and content of the Data Base Design Document Data Item Description (see 6.2).

3.1.3.3.5.4 Interface Design Document. The Interface Design Document provides the detailed design of one or more CSCI interfaces. When Interface Requirements Specifications have been prepared, associated Interface Design Documents shall be prepared as well. The Interface Design Document shall be prepared by the contractor and shall be in accordance with the format and content of the Interface Design Document Data Item Description (see 6.2).

3.1.3.4 Type D - Process specifications. (See Appendix XIV for outline of form.) This type of specification is applicable to a service which is performed on a product or material. Examples of processes are: heat treatment, welding, plating, packing, microfilming, marking etc. Process specifications cover manufacturing techniques which require a specific procedure in order that a satisfactory result may be achieved. Where specific processes are essential to fabrication or procurement of a product or material, a process specification is the means of defining such specific processes. Normally, a process specification applies to production but may be prepared to control the development of a process.

3.1.3.5 Type E - Material specifications. (See Appendix XV for outline of form.) This type of specification is applicable to a raw material (chemical compound), mixtures (cleaning agents,

paints), or semi-fabricated material (electrical cable, copper tubing) which are used in the fabrication of a product. Normally, a material specification applies to production but may be prepared to control the development of a material.

3.1.4 Two-part specifications. Two-part specifications, which combine both development (performance) and product fabrication (detail design) specifications under a single specification number as Part I and Part II respectively, may be selected as a contracting agency option. This practice requires both parts for a complete definition of both performance requirements and detailed design requirements governing fabrication. Under this practice, the development specification remains alive during the life of the HWCI as the complete statement of performance requirements. Proposed design changes must be evaluated against both the product fabrication and the development parts of the specification. To emphasize the fact that two parts exist, both parts shall be identified by the same specification number and each part shall be further identified as Part I or Part II, as appropriate. Two-part specifications are not applicable when the product specification is a product function specification or when it is a computer software specification.

3.2 Style, format and identification of specifications.

3.2.1 General. This section covers style, format, and general instructions for preparing a specification. This includes material arrangement, paragraphing, numbering, heading, and concluding material.

3.2.2 Sectional arrangement of specifications. Specifications shall contain six numbered sections, and appendixes as required, titled and numbered as shown below.

1. SCOPE
2. APPLICABLE DOCUMENTS
3. REQUIREMENTS
4. QUALIFICATION REQUIREMENTS (for software) or
QUALITY ASSURANCE PROVISIONS (for hardware)
5. PREPARATION FOR DELIVERY
6. NOTES
10. APPENDIX

Subject matter shall be kept within the scope of the sections so that the same kind of requirements or information will always appear in the same section of every specification. Except for appendixes, if there is no information pertinent to a section, the following shall appear below the section heading:

"This section is not applicable to this specification."

3.2.3 Language style. The paramount consideration in a specification is its technical essence, and this should be

presented in language free of vague and ambiguous terms and using the simplest words and phrases that will convey the intended meaning. Inclusion of essential information shall be complete, whether by direct statements or reference to other documents (See 3.1.4). Consistency in terminology and organization of material will contribute to the specification's clarity and usefulness. Sentences shall be as short and concise as possible. Punctuation should aid in reading and prevent misreading. Well-planned word order requires a minimum of punctuation. When extensive punctuation is necessary for clarity, the sentence(s) shall be rewritten. Sentences with compound clauses shall be converted into short and concise sentences.

3.2.3.1 Capitalization, spelling, etc. Except where DOD requirements differ, the United States Government Printing Office Style Manual shall be used as a guide for capitalization, spelling, punctuation, syllabification, etc. Merriam-Webster's New International dictionary (latest revision) will be consulted when the Style Manual does not provide the guidance needed.

3.2.3.2 Abbreviations. The applicable standard abbreviations listed in MIL-STD-12 shall be used, except that abbreviations in titles of specifications shall be in accordance with Cataloging Handbook H6-1. The only other abbreviations employed shall be those in common usage and not subject to misinterpretation. The first time an abbreviation is used in text, it shall be placed in parentheses following the word or term spelled out in full; e.g., pounds per square inch (psi). This rule does not apply to abbreviations used for the first time in tables and equations; uncommon abbreviations so used shall be explained in the text or footnotes.

3.2.3.3 Symbols. Symbols shall not be used in text, but may be used in equations and tables. Graphic symbols, when used in figures shall be in accordance with military standards. (Any symbol formed by a single character should be avoided if practicable, since an error destroys the intended meaning.)

3.2.3.4 Proprietary names. Trade names, copyrighted names, or other proprietary names applying exclusively to the product of one company shall not be used unless the configuration item(s) require source control or cannot be adequately described because of the technicality involved, construction, or composition. In such instances, one, and if all pertinent requirements are specified, several, commercial products may be included by inserting the words "or equal" after the trade name to assure wider competition and that bidding will not be limited to a particular make specified. The same applies to manufacturer's part numbers or drawing numbers for minor parts when it is impractical to specify all detail requirements in the specification. In all instances where "or equal" is permitted, the particular characteristics required shall be included to define "or equal".

3.2.3.5 Commonly used words and phrasing. Certain words and phrases are frequently used in a specification. The following rules shall be followed:

- a. Referenced documents shall be cited thus

"conforming to ..."
"as specified in ..." or
"in accordance with ...".

- b. "Unless otherwise specified" shall be used to indicate an alternative course of action. The phrase shall always come at the beginning of the sentence, and if possible, at the beginning of the paragraph. This phrase shall be used only when it is possible to clarify its meaning by providing a reference such as to Section 6 of the specification for further clarification in the contract or order or otherwise.

- c. When making reference to a requirement in the specification and the requirement referenced is rather obvious or not difficult to locate, the simple phrase "as specified herein" is sufficient and should be used.

- d. The phrase "... to determine compliance with ..." or "... to determine conformance to ..." should be used in place of "... to determine compliance to ...". In any case use the same wording throughout.

- e. In stating positive limitations, the phrase shall be stated thus: "The diameter shall be no greater than ...".

- f. The emphatic form of verb shall be used throughout the specification; i.e., state in the requirements section that "The indicator shall be designated to indicate ...", and in the section containing test provisions "The indicator shall be turned to zero and 230 volts alternating current applied." For specific test procedures, the imperative form may be used provided the entire method is preceded by "the following tests shall be performed," or related wording. Thus, "Turn the indicator to zero and apply 230 volts alternating current."

- g. Capitalize the words "drawing," "bulletin," etc., only when they are used immediately preceding the number of a document. However, Federal and military standards, and handbooks shall be identified in the text only by their symbol and number; thus "MIL-E-000," not, "specification MIL-E-000."

3.2.3.6 Use of "shall," "will," "should," and "may". Use "shall" whenever a specification expresses a provision that is binding. Use "should" and "may" wherever it is necessary to express non-mandatory provisions. "Will" may be used to express a

declaration of purpose on the part of the contracting agency. It may be necessary to use "will" in cases where the simple future tense is required, i.e., power for the motor will be supplied by the ship.

3.2.3.7 Use of "flammable" and "nonflammable". The terms "flammable" and "nonflammable" shall be used in specifications in lieu of the terms "inflammable", "uninflammable", and "noninflammable".

3.2.4 Paragraph numbering. Each paragraph and subparagraph shall be numbered consecutively within each section of the specification, using a period to separate the number representing each breakdown.

Example for Section 3 of specification:

3. REQUIREMENTS

3.1 First Paragraph

3.1.1 First Subparagraph

3.2 Second Paragraph

3.2.1 First Subparagraph

3.2.2 Second Subparagraph

Or:

3. REQUIREMENTS

3.1 First Paragraph

3.1.1 First Subparagraph

3.2 Second Paragraph

3.2.1 First Subparagraph

3.2.2 Second Subparagraph

Itemization within a paragraph or subparagraph shall be identified by lowercase letters to avoid confusion with paragraph numerals. For clarity of text, paragraph numbering shall be limited to seven levels.

3.2.5 Paragraph identification. If practicable, each paragraph and subparagraph shall be given a subject identification. The first letter of the first word in the paragraph identification shall be capitalized. Paragraph identifications in any one section shall not be duplicated. Primary paragraphs

identifications shall be in boldfaced type and subparagraph identifications italicized when typeset. When typewritten, paragraph identification shall be underlined.

3.2.6 Underlining. Do not underline any portion of a paragraph or capitalize phrases or words for the sake of emphasis with the exceptions noted in 3.2.5. All of the requirements are important in obtaining the desired product or service.

3.2.7 Cross references. Cross references, that is references to parts within the specification, shall be held to a minimum. Cross references shall be used only to clarify the relationship of requirements within the specification and to avoid inconsistencies and unnecessary repetition. When the cross reference is to a paragraph, subparagraph, etc., within the specification, the cross reference shall be only to the specific paragraph number. The word paragraph shall not appear.

3.2.8 Figures. A figure is a picture or graph, and constitutes an integral part of the specification. It shall be clearly related to, and consistent with, the text of the associated paragraph. Figures should not be confused with numbered and dated drawings referenced in the text which shall be listed in Section 2 and not physically incorporated in the specification.

3.2.8.1 Location of figures in specification. Each figure shall be placed following, or within, the paragraph containing a reference to it. If figures are numerous and their location, as indicated above, would interfere with correct sequencing of paragraphs and cause difficulty in understanding or interpretation, they may be placed in numerical sequence at the end of the specification before any appendix or index.

3.2.8.2 Preparation of figures. All figures shall be titled, and they shall be numbered consecutively with Arabic numerals in the order in which they are initially referenced in the specification.

3.2.9 Tables. A table is an arrangement of data in lines and columns. It shall be used when data can thus be presented more clearly than text. Elaborate or complicated tables shall be avoided. References in the text shall be sufficiently detailed to make the purpose of the table clear, and the table shall be restricted to data pertinent to the associated text.

3.2.9.1 Location of tables in specifications. A table shall be placed following, or within, the paragraph containing a reference to it. If space does not permit, a table shall be placed at the beginning of the succeeding page, or if extensive, on a separate page. If tables are numerous and their location, as indicated above, would interfere with correct sequencing of paragraphs and cause difficulty in understanding or interpretation, they may be placed in numerical sequence at the end of the specification before any appendix or index.

3.2.9.2 Preparation of tables. The tables shall be numbered consecutively with Roman numerals in the order in which they are initially referenced in the specification. The number and title shall be placed above the table. The contents of a table shall be organized and arranged to show clearly the significance and relationship of the data. Data included in the text shall not be repeated in the table. Tables shall be boxed in and ruled. When a table is of such width as to make it impracticable to place it in normal position on the page, it shall be rotated counterclockwise 90 degrees.

3.2.10 Foldouts. Foldouts shall be avoided except where required for legibility. Large tables or figures may be broken out so that they may be printed on facing pages. Where foldouts are required, they should be grouped in one place, preferably at the end of the specification (in the same location as figures) and suitable reference to their location shall be included in the text.

3.2.11 Footnotes.

3.2.11.1 Footnotes to text. Footnotes to the text shall be avoided if possible. Their purpose is to convey additional information that is not properly a part of the text. A footnote to the text shall be placed at the bottom of the page containing the reference to it.

3.2.11.2 Footnotes to tables and figures. Footnotes to a table or figure shall be placed below the table or figure. The footnotes may contain mandatory information that cannot be presented as data within a table. Footnotes shall be numbered separately for each table. Where numerals will lead to ambiguity (for example in connection with a chemical formula), superior letters, asterisks, daggers, and other symbols may be used.

3.2.12 Contractual and administrative requirements. A specification shall not include contractual requirements which are properly a part of the contract; such as cost, time of delivery, instructions on reworking or resubmitting rejected items or lots method of payment, liquidated damages, provision for configuration items damaged or destroyed in tests, etc. Contractual, administrative, and warranty provisions such as those covered in general provisions of contracts, shall not be made part of the requirements in the specification. Contractual and administrative provisions not covered in the general provisions, but considered essential for procurement, may be indicated as "ordering data" or "features to be included in bids or in contract" in Section 6. This provision shall be exercised with caution and limited to essential matters.

3.2.13 Definitions in specifications. The inclusion of a definition can be avoided if requirements are properly stated. When the meaning of one or more terms must be established in the specification, definitions shall be placed in the text. However,

it is often clearer to list one or more definitions in Section 6, especially where the terms are used in many places throughout the specification. When this is done, a parenthetical reference to the applicable paragraph in Section 6 shall follow the terms to indicate the existence of a definition.

3.2.14 References to other documents. Referencing is the approved method for including requirements in specifications where this eliminates the repetition of requirements and tests that are adequately set forth elsewhere. However, chain referencing should be avoided. References shall be restricted to documents that are specifically and clearly applicable to the specification, and are current and available. Care shall be taken in writing the specification to indicate in a positive manner the extent to which a referenced document is applicable. The specification shall also include any special details called for by the referenced document. Reference to paragraph numbers in other documents shall not be made. The reference shall be to a title, method number, specifically identified requirement, or other definitive designation.

3.2.14.1 Limitation on references. A specification shall not contain anything in conflict with provisions in referenced documents unless it is desirable to make special exceptions to such provisions, in which case the specific provision to which exception is made shall be stipulated or the application of a specific portion of the referenced document shall be clearly defined. It is not intended that other documents be made a part of a specification by reference unless the items, materials, tests, or other services in the referenced documents are required in the quality and detail which these documents are designed to produce. The applicability of all referenced documents listed in Section 2 of a specification shall be defined in Section 3, 4, or 5, as appropriate. The extent of applicability of referenced documents shall also be specifically indicated. The whole of a referenced document shall not be made applicable by reference unless all of its provisions are clearly required.

3.2.15 Security marking of specifications. Specifications containing classified information shall be marked and handled in accordance with current security regulations as specified in the DOD 5220.22-M.

3.2.16 Identification of specifications. Each specification shall be numbered and dated on each page. The identification number, with the date below it shall always appear at the top of the page opposite the binding edge.

3.2.16.1 Identification of Government activity specifications. This series of specifications shall be identified by the code identification of the Government design agency as listed in Cataloging Handbook H4 and by a number assigned by the Government design agency. Such number may be either a number or a

combination of letters, numbers and dashes. The number shall not contain more than fifteen characters, excluding dashes and revision letter. Specifications for HWCIs, materials or processes intended for multiple application may be identified by a military specification number. In such instances, the number shall be applied in accordance with Defense Standardization Manual 4120.3-M and no design agency code identification is used.

3.2.16.2 Identification of contractor specifications. This series of specifications shall be identified by the manufacturer's code identification of the design contractor as listed in Cataloging Handbook H4 and by a number assigned by the contractor. The assigned number shall not contain more than fifteen characters, excluding dashes and revision letter.

3.2.16.3 Revision symbols. Revision letters, starting with "A" for the first revision, and assigned alphabetically for each succeeding revision, shall follow the specification number. Letters, such as I, O, Z, which can be confused with numerals shall not be used.

3.2.16.4 Identification of two-part specifications. When a two-part specification concept (See 3.1.4) is used, the parts shall be identified on the title page and both parts shall be assigned the same specification number (See figure 1). Revision status of each part shall be separately maintained.

3.2.16.5 Identification of specification sheet. The specification sheet is identified by the same number and code identification, as the associated applicable general specification followed by a virgule (slant) and a sequentially assigned Arabic numeral for the sheet. The sheet number shall be assigned by the contracting agency for the general specification and the total number of characters for the specification excluding specification sheet numbers shall not exceed fifteen.

Example: Code Ident 10001 WS 1967B/1A designates revision A of sheet 1 issued for the B revision of general specification, numbered WS 1967.

3.2.16.6 Designation of FSC Code. If applicable, Federal Supply Classification (FSC) code shall appear in the lower right-hand corner of the first page of the specification. FSC codes shall be as assigned in Cataloging Handbook H2.

3.2.16.7 Titling the specification. The approved basic name of the material, product or service covered by the specification shall be the first part of the title. Configuration item names in titles shall make maximum use of Cataloging Handbook H6. However, the basic noun in the title shall be in the singular form if the specification covers only one product, and in the plural form if the specification covers more than one product, i.e., various types, grades, classes, sizes or capacities, etc. except where

SPECIFICATION NUMBER 12345B
CODE IDENT XXXXX
PART I OF TWO PARTS
(Date)

**PRIME ITEM DEVELOPMENT SPECIFICATION
FOR
(APPROVED TITLE)
(TYPE DESIGNATOR, CONFIGURATION ITEM NUMBER, ETC.)**

Example of Identification for Part I

SPECIFICATION NUMBER 12345B
CODE IDENT XXXXX
PART II OF TWO PARTS
(Date)

**PRIME ITEM FABRICATION SPECIFICATION
FOR
(APPROVED TITLE)
(TYPE DESIGNATOR, CONFIGURATION ITEM NUMBER, ETC.)**

Example of Identification for Part II

FIGURE 1. Method of Identifying Two-Part Specifications

the only form is plural or where the nature of the product unavoidably requires the plural form. Where there is no approved configuration item name, the title shall be developed in accordance with DOD-STD-100. For general specifications the words "General Specifications For" shall be the closing phrase of the title.

3.2.16.7.1 Modifiers. The title of the specification shall include, where appropriate, and in addition to the approved basic name, the minimum number of modifiers, including Type Designators, as are necessary for distinction and ready identification of the coverage of the specification. Nondefinitive modifiers shall not be used. Modifiers shall be arranged in reverse order and separated from each other and the noun name by punctuation.

3.2.16.8 Type of specification. The type of specification shall be included above the specification title. As a minimum, the type shall be specified as "SYSTEM/SEGMENT," "DEVELOPMENT," "PRODUCT," "PROCESS," or "MATERIAL." Subtype may be specified when desired by the contracting agency.

3.3 CHANGES AND REVISIONS

3.3.1 General. Specifications shall be corrected or updated when necessary, by means of either a change or revision. A change is accomplished by the issue of a Specification Change Notice (SCN) and attached change pages. A revision consists of a complete reissue of the entire specification, all pages being identified by the same applicable revision letter. In general, corrections to only a small portion of a specification should be accomplished by a change, whereas extensive corrections requiring revision occur when: (a) over 50 percent of the pages have been, or will be involved in the intended correction plus outstanding SCNs; or (b) a revision is economically more practicable than issue of page changes by SCN. As a general rule, no more than five (5) SCNs shall be issued against a particular revision (or original issue); when the sixth modification or correction is required the outstanding changes should normally be incorporated in a revision of the specification (see 6.2).

3.3.2 Changes. Changes to specifications shall be proposed by SCN and issued by SCN. Specification sheets shall be changed by revision only. As required by DOD-STD-480, a separate SCN shall be submitted as an enclosure with an Engineering Change Proposal (ECP) for each specification to be changed. SCNs so submitted will be issued and incorporated only after approval of the ECP and the engineering change ordered. An SCN shall also be used to issue corrections to a specification unrelated to an ECP (see 6.2).

3.3.2.1 Specification change notice. The SCN is a document used to propose, transmit and record changes to a specification. The SCN form (figure 2) is used as a cover sheet and letter of

MIL-STD-490A
SPECIFICATION CHANGE NOTICE
 (SEE MIL-STD-490 FOR INSTRUCTIONS)

DATE PREPARED

1. ORIGINATOR NAME AND ADDRESS (SCN Preparing Activity)		2. <input checked="" type="checkbox"/> PROPOSED <input type="checkbox"/> APPROVED	3. CODE IDENT. (Design Actvty)	4. SPEC. NO.	5. CODE IDENT. (SCN Prep Actvty)	6. SCN NO. 3		
7. SYSTEM DESIGNATION (Type, Model, Series etc)	8. RELATED ECP NO. 4-R1	9. CONTRACT NO.		10. CONTRACTUAL ACTIVITY (Note 2) Authority				
11. CONFIGURATION ITEM NOMENCLATURE		12. EFFECTIVITY (Serial Numbers of all Configuration Items Affected by this SCN)						
<p>THIS NOTICE INFORMS RECIPIENTS THAT THE SPECIFICATION IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS SCN BEING THOSE FURNISHED HEREWITH AND CARRYING THE SAME DATE AS THIS SCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES. COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4. CONSTITUTE THE CURRENT VERSION OF THIS SPECIFICATION.</p>								
13. SCN NO.	14. PAGES CHANGED (INDICATE DELETIONS)				* S	* A	15. DATE	
3	PAGES CHANGED AND TRANSMITTED HEREWITH 6 7 7a 12 deleted				X X	X		
SCN No. 1 2 4 5 6	ECP No. 2-R1 3-R2 6 7-C1 8	SUMMARY OF PREVIOUSLY CHANGED PAGES 1, 2 2/9/67 11 4/24/67 Disapproved 4/10/67 9, 15, 21 4/12/67 4, 8, 12 4/15/67 Note 1. Blocks 2, 4, 6, 8, 9, 11, 13, and 16 are self-explanatory Note 2. Type of contractual action required for implementation of this SCN, e.g., Contract Change Order, Supplemental Agreement, etc				X X X X		3/12/67 5/8/67
16. TECHNICAL CONCURRENCE (Contracting Agency)						DATE (Approval Date)		

* "S" indicates supersedes earlier page. * "A" indicates added page

FORM
 DD 1 DEC 68 1696

This form attached as Figure 3, may be reproduced locally.

FIGURE 2. Specification Change Notice.

transmittal, the page changes associated with that SCN shall be attached and shall constitute an integral part of the SCN (see 6.2).

3.3.2.1.1 Proposed SCN. A proposed SCN shall be used to propose to the specification approving agency the exact change in specification paragraphs, figures or other content that will be distributed to users if the SCN is approved. Such modification in content in this proposed form of the SCN may be submitted in final specification change form or as an enclosure on which the proposed changes in sentences, paragraphs, figures, tables, etc., are described.

3.3.2.1.2 Approved SCN. An approved SCN, is used to transmit the change after approval by the contracting agency. It also provides a summary of pages affected by all approved changes. SCNs are not cumulative insofar as transmittal of previous changes is concerned, and changes distributed with previous SCNs remain in effect unless changed or cancelled by a SCN of later issue. However, the summary of current changes is a cumulative summary as of date of approval of the latest SCN.

3.3.2.2 Changed pages. Updated and reissued pages shall be complete reprints of pages suitable for incorporation by removal of old pages and insertion of new pages. All portions affected by the change shall be indicated by a symbol in the right hand margin adjacent to, and encompassing all changed portions. When change pages are issued for specifications with pages printed on both sides of a sheet, and only the page on one side of a sheet is affected by the change, both sides of the sheet shall be reissued. The unaffected page side shall be reprinted without change and shall not carry the date of the change or be included in the change summary as being affected by the change.

3.3.2.3 Change numbering. SCN numbers shall be assigned in sequence, beginning with 1, against the original issue or current revision of a specification. Thus, when a specification is revised, the SCN numbers begin again with 1. The proposed SCN, and approved SCN shall carry the same number. Once an SCN has been submitted to the contracting agency, its SCN sequence number shall not thereafter be changed or assigned to another SCN. However, SCNs may be approved by the contracting agency out of sequence. Hence, an SCN, proposed after a previously proposed but not yet approved SCN, may require revision if the later one is approved prior to the earlier one or an earlier SCN is not approved; in which case the numbers assigned will not change, however, the contents of the change pages may require a change (see 6.2).

3.3.2.4 Identification and numbering of changed pages.

3.3.2.4.1 Identification. Each changed page shall be identified by means of the specification number and the applicable revision

letter. Under such number shall be entered the date of issue of the SCN, which shall agree with the date entered in the upper right hand corner of the SCN form.

Example: Assume that the current revision of the specification is A, the date of issue of such revision is 20 June 1966, and two SCNs have been approved. If SCN-2 is issued on 5 June 1967, the pages changed by SCN-2 would carry the following identification on each page.

18D4739A

5 June 1967

3.3.2.4.2 Page numbers. The changed pages furnished with an SCN shall be numbered with the same page numbers as the pages they replace. If it is necessary to replace one page with more than one, the additional pages shall carry the same number as the affected page plus a suffix letter in alphabetical order beginning with "a". Thus, the numbers of changed pages to change page 5, would be 5, 5a, 5b, etc. If a page is deleted, that number shall be omitted in the current page sequence.

3.3.3 Revisions. A revision of a specification is a reissue of a complete specification and shall be prepared, issued, and identified in the same manner as the specification that it supersedes, except that the identification number shall be followed by an appropriate revision letter. Letters shall be assigned in alphabetical order for each succeeding revision. Revision letter "A" shall be assigned to the first revision. Each revision shall incorporate all outstanding approved changes against the previous issue as well as approved changes proposed by the SCN that creates the need for revision. Revisions of specification will include symbols in the right hand margins of the pages to indicate where changes have been made with respect to the prior issue, including changes. The following note will be included in the Notes, Section 6, of the specifications:

"The margins of this specification are marked with a _____ (symbol) to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notation and relationship to the last previous issue."

The following note may be used in lieu of the above, if applicable.

"Symbols are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the

changes."

Specification revisions shall be issued in the same manner as the original issue and do not require an SCN for promulgation (see 6.2).

4. GENERAL REQUIREMENTS FOR SECTIONS OF SPECIFICATIONS

4.1 Section 1 - SCOPE. General information pertaining to the extent of applicability of a configuration item, material or process covered by a given specification and, when necessary, specific detailed classification thereof, shall be placed in the appropriate subdivision of Section 1 of specifications. However, this section shall not contain requirements properly part of other sections of the specification.

4.1.1 Scope. A statement of the scope shall consist of a clear, concise abstract of the coverage of the specification and may include, where necessary, information as to the use of the configuration item other than specific detailed applications covered under "Intended use" in Section 6 of the specification. This brief statement shall be sufficiently complete and comprehensive to describe generally the configuration item, material or process covered by the specification in terms that may be easily interpreted by manufacturers, contractors, suppliers, or others familiar with applicable terminology and trade practices. As applicable, reference may be made to information contained in Section 6 of the specification.

4.1.2 Classification. Where a specification covers more than one category of a configuration item, designations of classification such as types, grades, classes, etc. shall be listed under this heading and shall be in accordance with accepted industry practice. The same designation shall be used throughout the specification. The name of the configuration item covered by the specification shall be followed by the words "shall be of the following types, grades, classes, etc., as specified", listing only the applicable designations. When more than one type, grade, class, etc., is listed, each shall be briefly defined. When only one (type, grade or other) is covered, a statement to this effect shall be included in the scope paragraph, and the classification paragraph omitted. The types, grades, classes, etc., shall not change when the specification is changed or revised except when industry practice changes, or for other good reason a change is required. Where the characteristics of a configuration item change enough to affect interchangeability, the original designation shall be deleted and a new type, grade, class, etc. shall be added. Whenever it becomes necessary to change the designation without changing the characteristics of the configuration item, a cross reference shall be included in Section 6 indicating the relationship between the new and old designations. Since such changes may require cataloging and other record changes, such changes shall be kept to a minimum.

4.1.2.1 Classification definitions. For the purpose of preparing specifications, "type," "class," "grade," "composition," and "style" are defined as indicated below. However, the actual classification used in a specific specification will be in accordance with accepted practice as indicated in 4.1.2.

4.1.2.1.1 Type. This term implies differences in like configuration items or processes as to design, model, shape, etc., and generally will be designated by Roman numerals, thus "type I," etc.

4.1.2.1.2 Class. This term provides additional categorization of differences in characteristics other than afforded by type classification that do not constitute a difference in quality or grade; but are for specific, equally important uses, and generally will be designated by Arabic numerals; thus; "class 1," "class 2," etc.

4.1.2.1.3 Grade. This term implies differences in quality of a configuration item and generally will be designated by capital letters; thus "grade A," "grade B," etc.

4.1.2.1.4 Composition. This term is used in classifying configuration items that are differentiated strictly by their respective chemical composition, and generally will be designated in accordance with accepted trade practice when satisfactory to the Government design agency.

4.1.2.1.5 Style. This term is used to denote differences in design or appearance.

4.1.2.1.6 Other classifications. If the terms 'types,' 'grades,' and 'classes' do not serve accurately to classify the differences as indicated above, other terms such as color, form, weight, size, power supply, temperature rating, condition, unit, enclosure, rating, duty, insulation, kind, variety, etc., suitable for reference, may be used.

4.1.2.2 Classification for reliability level identification. When a specification contains a multilevel reliability requirement, Section 1 of the specification shall identify the levels covered.

4.2 Section 2 - APPLICABLE DOCUMENTS. All and only those documents referenced in Section 3, 4, 5 and Appendixes of the specification shall be listed in Section 2 of the specification. If numerous, Section 2 may reference an appendix or other appropriate document containing a complete listing. References shall be confined to documents currently available at the time of issuance of the current revision of the specification. Figures bound integrally with the specification shall not be listed in Section 2.

4.2.1 Government documents. Federal and military specifications (as well as Government design agency specifications), standards, drawings, and other Government publications may be referenced in specifications. Government regulations or codes that are mandatory on the military services (such as: Federal Insecticide, Fungicide, and Rodenticide Act; Drug and Cosmetic Act; Federal Hazardous Substances Labeling Act; Atomic Energy Act; Department

of Transportation Regulations; and Screw-Thread Standards for Federal Services) shall be referenced in specifications, where applicable.

4.2.2 Non-Government documents. Reference may be made to non-Government specifications, standards, and publications promulgated by commercial organizations, technical societies and other non-Governmental agencies when such documents are accepted by the using Governmental agency. Care shall be taken in referencing non-Governmental publications so as to assure the availability of copies and prior approval of the copyright owner.

4.2.3 Listing of references. References shall be listed by document numbers and titles, and may include specific issue or revision where necessary to rigidly control the configuration or implementation of the configuration item, material or process. The title of each document shall be that appearing on the document itself rather than that shown in an index.

4.2.3.1 Government documents. Government SPECIFICATIONS, STANDARDS, DRAWINGS, and other PUBLICATIONS intended to be made available to bidders shall be listed under the appropriate preceding headings and in alphabetical-numerical order in individual groups, such as Federal, Military, and Departmental agency (such as Weapons Command, etc.). These listings shall be included under a paragraph similar to one of the following:

Example 1:

2.1 Government documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

Example 2:

2.1 Government documents. The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

Government documents shall be listed in the following order:

SPECIFICATIONS:

Federal
Military
Other Government Agency

STANDARDS:

Federal
Military
Other Government Agency

DRAWINGS:

(Where detailed drawings referred to in a specification are listed on an assembly drawing, it is only necessary to list the assembly drawing.)

OTHER PUBLICATIONS:

Manuals
Regulations
Handbooks
Bulletins
etc.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the contracting agency or as directed by the contracting officer).

4.2.3.2 Non-Government documents. Non-Government documents shall be listed in appropriate order under a paragraph similar to one of the following subparagraphs:

Example 1:

2.2 Non-Government documents. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated the issue in effect on date of invitation for bids or request for proposal shall apply.

Example 2:

2.2 Non-Government documents. The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of the specification shall be considered a superseding requirement.

Non-Government documents shall be listed in the following order:

SPECIFICATIONS:
STANDARDS:
DRAWINGS:
OTHER PUBLICATIONS:

(list source for all documents not available through normal Government stocking activities.)

The following source paragraph shall be placed at the bottom of the list when applicable.

"Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies."

4.3 Section 3 - REQUIREMENTS. The essential requirements and descriptions that apply to performance, design, reliability, personnel subsystems, etc. of the configuration item, material or process covered by the specification shall be stated in this section. These requirements and descriptions shall define as applicable, the character or quality of the materials, formula, design, construction, performance, reliability, transportability, and product characteristics, chemical, electrical, and physical requirements, dimensions, weight, color, nameplates, product marking, workmanship, etc. This section is intended to indicate, as definitively as practicable, the minimum requirements that a configuration item, material or process must meet to be acceptable. The Requirements section shall be so written that compliance with all requirements will assure the suitability of the configuration item, material or process for its intended purpose, and non-compliance with any requirement will indicate unsuitability for the intended purpose. Only those requirements shall be specified that are necessary and practicably attainable.

- a. Section 3 of a general specification shall contain all requirements that are common to a family of systems, configuration items, materials or processes. When detail specifications are to be prepared to supplement the general specification to fully define an individual configuration item, etc., the following paragraph shall be included in Section 3 of the general specification:

3.x.x Detail Specification. Requirements for individual (insert the proper term from among the following) parts, configuration items, materials, process, systems shall be as specified herein and in accordance with the applicable detail specification.

- b. Section 3 of a detail specification shall contain the requirements only for the particular system, configuration item, material or process covered by that specification. However, if the specification does cover more than one type, class, grade, etc., it should first specify the general requirements for all types, classes, grades, etc. The differentiating requirements may then be specified for the individual types, classes, grades, etc., in the proper sequence. In general, each requirement shall be covered in a separate paragraph; and where one requirement differs for the various types, classes, grades, etc., a separate paragraph immediately following the general requirements

shall be devoted to each type, class, grade, etc. The various detailed requirements shall be contained in appropriate subparagraphs. Where it is necessary to include additional data, descriptive and appropriate headings shall be used and assigned in logical order.

- c. Section 3 of system or development specifications (Type A or B) shall set forth requirements in terms of performance, reliability, design constraints, functional interfaces, etc., that are necessary to assure a practical and reasonable development effort. Development specifications may include design goals in addition to minimum requirements, but in such case, goals and requirements shall be clearly identified to avoid confusion. Only essential design constraints shall be included as requirements, such as restriction of use of certain materials due to toxicity, dimensional or functional restrictions to assure compatibility with associated equipments, etc.
- d. Section 3 of a product, process or material specification (Type C,D,E) shall contain all requirements necessary to assure delivery of an acceptable end product. Requirements in product function specifications shall include both physical (dimensional and interface characteristics) and performance requirements in sufficient detail to assure procurement of interchangeable, but not necessarily identical HWCIs. Requirements in a product fabrication specification shall include all requirements necessary to assure delivery of identical HWCIs from suppliers. This is normally accomplished by invoking a set of drawings (DOD-D-1000 Level 3) as a primary requirement. Product fabrication specification requirements may also set forth requirements for performance, reliability, workmanship, etc., when such features or characteristics are not completely controlled by detail drawings.

4.3.1 Definition. Where applicable, a definition of the system or configuration item shall be provided in the form of a brief description, and shall: identify major physical parts, functional areas and functional and physical interfaces; and shall include system logic diagrams, block diagrams, schematic diagrams, and pertinent operational, organizational and logistic considerations and concepts.

4.3.2 Characteristics. Development, product and material specifications, shall specify all required performance characteristics, physical characteristics, and requirements for reliability, maintainability, environmental consideration, and, as appropriate, relative priority of design disciplines or characteristics.

4.3.2.1 Performance characteristics. These characteristics shall include general and detail requirements, under appropriate

sub-headings, for all performance requirements, i.e., what is expected of the system, configuration item, or material.

4.3.2.2 Physical characteristics. These characteristics in a development, product, or material specification shall set forth requirements such as weight limits, dimensional limits, etc., necessary to assure physical compatibility with other elements and not determined by other design and construction features or referenced drawings. They shall also include considerations such as transportation and storage requirements, security criteria, durability factors, health and safety criteria, command control requirements, and vulnerability factors.

4.3.2.2.1 Protective coating. Where applicable, protective coating requirements shall be specified under this heading to assure protection from corrosion, abrasion, or other deleterious action. Where feasible, color and protective coating should be combined.

4.3.2.3 Reliability. Reliability requirements shall be stated numerically with confidence levels, if appropriate, in terms of mission success or hardware mean time between failures. Initially, reliability may be stated as a goal and a lower minimum acceptable requirement. During contract definition, or equivalent period, realistic requirements shall be determined and incorporated in the specification with requirements for demonstration. Reliability requirements shall never be stated as a goal in Type C (product) specifications.

4.3.2.4 Maintainability. Numerical maintainability requirements shall be stated in such terms as mean-time-to-repair (MTTR) or maintenance man-hours per flight/operational hour. Determination of realistic requirements shall be made as discussed in 4.3.2.3 for reliability. Qualitative requirements for accessibility, modular construction, test points, and other design requirements may be specified as required.

4.3.2.5 Environmental conditions. Environments that the system or equipment is expected to experience in shipment, storage, service, and use shall be specified. Where applicable, it shall be specified whether the equipment will be required to meet or be protected against specified environmental conditions. Subparagraphs shall be included as necessary to cover environmental conditions such as: climate, shock, vibration, noise, noxious gases, etc.

4.3.2.6 Transportability. Any special requirements for transportability and materials handling shall be specified under this heading.

4.3.3 Design and construction. Minimum or essential requirements that are not controlled by performance characteristics, interface requirements, or referenced documents shall be specified. They

shall include appropriate design standards, requirements governing the use or selection of materials, parts and processes, interchangeability requirements, safety requirements, and the like.

4.3.3.1 Materials. Requirements for materials to be used in the item or service covered by the specification shall be stated under this heading, except where it is more practicable to include the information in other paragraphs. Requirements of a general nature should be first, followed by specific requirements for the material. Definitive documents shall be referenced for the material when such documents cover materials of the required quality.

4.3.3.1.1 Toxic products and formulations. Specifications requiring or permitting toxic products and formulations shall demand compliance with the requirements of the applicable regulations promulgated by the appropriate Federal regulatory agency or the official compendia governing such products and formulations.

4.3.3.2 Electromagnetic radiation. Where applicable, requirements pertaining to electromagnetic radiation shall be stated in terms of the environment which the item must accept and the environment which it generates.

4.3.3.3 Nameplates or product markings. The nameplate or markings in some cases may be the only means of identification of a product after delivery. Such identification is important from the standpoint of stock, replacements, and repair parts. All requirements pertaining to nameplates or markings shall be placed under this, or other appropriate heading, referencing applicable specifications (e.g., MIL-STD-130), drawings, or standards.

4.3.3.4 Workmanship. Where applicable, reference to workmanship shall be stated and shall include the necessary requirements relative to the standard of workmanship desired, uniformity, freedom from defects, and general appearance of the finished product. This paragraph is intended to indicate as definitively as practicable the standard of workmanship quality that the product must meet to be acceptable. The requirements shall be so worded as to provide a logical basis for rejection in those cases where workmanship is such that the item is unsuitable for the purpose intended. Generally, no definite tests other than visual examination of workmanship will be applicable to the requirements of this paragraph.

4.3.3.5 Interchangeability. This paragraph shall specify the requirements for the level at which components shall be interchangeable or replaceable. Entries in this paragraph are for the purpose of establishing a condition of design, and are not to define the conditions of interchangeability that are required by the assignment of a part number.

4.3.3.6 Safety. This paragraph shall specify requirements to preclude or limit hazard to personnel, equipment, or both. To the extent practicable, these requirements shall be imposed by citing established and recognized standards. Limiting safety characteristics peculiar to the item due to hazards in assembly, disassembly, test, transport, storage, operation or maintenance shall be stated when covered neither by standard industrial or service practices nor the system specification. "Fail-safe" and emergency operating restrictions shall be included when applicable. These shall include interlocks and emergency and standby circuits required to either prevent injury or provide for recovery of the item in the event of failure.

4.3.3.7 Human engineering. Human engineering requirements for the system/configuration item should be specified herein and applicable documents (e.g., MIL-STD-1472) included by reference. This paragraph should also specify any special or unique requirements, e.g., constraints on allocation of functions to personnel, and communications and personnel/equipment interactions. Included, should be those specified areas, stations, or equipment that require concentrated human engineering attention due to the sensitivity of the operation or criticality of the task, i.e., those areas where the effects of human error would be particularly serious.

4.3.4 Documentation. Where applicable, requirements for documenting the design shall be specified in general terms in development specifications. Requirements shall specify types of documents required for design review and approval, manufacture or procurement, testing, inspection installation, operation, maintenance, and logistic support as appropriate. This paragraph is not intended as a requirement for procurement or delivery of data, which shall be accomplished by use of DD Form 1423.

4.3.5 Logistics. Where applicable, logistic considerations and conditions that will apply to the system or configuration item shall be specified in development specifications and, if applicable, in product specifications. Logistic conditions such as maintenance considerations, modes of transportation, supply system requirements, and impact on existing facilities and equipments shall be considered.

4.3.6 Personnel and training. Where applicable, requirements imposed by or limited by personnel or training considerations shall be specified in development specifications. Training considerations shall include existing facilities, equipment, special/emergency procedures (associated with hazardous tasks) and training simulators, as well as the need for additional facilities, equipment, and simulators.

4.3.7 Characteristics of subordinate elements. Subsequent paragraphs shall be added as necessary to system, development, or product specifications to specify requirements for subordinate

elements of the subject system or configuration item. Requirements for each selected subordinate element shall be grouped under a major heading titled with the name of the subordinate element and shall include all of the pertinent types of requirements discussed in previous paragraphs for the parent system or configuration item. Requirements imposed directly on the subelement by a requirement on the parent system or configuration item shall not be repeated. Allocation or apportionment of a parent system (or configuration item) requirement may be specified for the subelement. Subelements may be functionally or physically integrated portions of the parent system (or configuration item), but would not usually be both in a single specification.

4.3.8 Precedence. A paragraph shall specify the order or precedence of requirements; such as, specification over drawings, functional requirements over physical requirements, adherence to specified processes over other requirements, etc. The paragraph shall also require that the contractor notify the contracting agency of each instance of conflicting, or apparently conflicting, requirements.

Alternatively, this paragraph may specify that the requirements of the specification shall take precedence over referenced documents. In system or development specifications, this paragraph shall specify the relative importance of requirements (or goals) to be achieved by the design.

4.3.9 Qualification. Qualification, as used in this Standard, refers to the verification or validation of item performance in a specific application. This qualification results from design review, test data review, and configuration audits. Where performance qualification of a design or an end configuration item (including its components) is required, either on a one-time basis or a periodic basis, to achieve design approval, proof of producibility, assessment of production or other reason, provisions for such qualification testing shall be stated in this paragraph. Requirements shall be included which state the conditions for testing, the time (program phase) of testing, period of testing, number of units to be tested, and other requirements relating to qualification or requalification.

Qualification, as used in Defense Standardization Manual 4120.3-M, refers to the testing or review of test data to judge configuration items from various sources as being suitable for general application, and is intended to lead to the establishment of a Qualified Products List (QPL). Therefore, this type of qualification is subject to the provisions of Manual 4120.3-M and is not within the scope of this Standard.

4.3.10 Standard sample. A standard sample is one considered essential to supplement or illustrate certain requirements of the specification. Use of standard samples should be kept to a

minimum, since their use can create problems in determining the acceptability of HWCIs subsequently produced. Adequate inspection requires that all requirements be made available such as the approved tolerances of dimensions, performance, etc. A standard sample does not provide all this information but must be supported by specification requirements and drawings. The use of the standard sample shall be limited to the illustration of qualities and characteristics that cannot be readily described because detailed test procedures or design data are not available, or because certain qualities and characteristics cannot be definitely expressed, such as the texture of fur, the color of cloth, or the grain of wood. Further, the specification should state the specific characteristics and the degree to which these characteristics are to be observed in the standard sample. When a standard sample is to be furnished, it shall be so stated in Section 3. Means of obtaining or viewing standard samples shall be specified in Section 6.

4.3.11 Preproduction sample, periodic production sample, pilot, or pilot lot. Where it is essential that a preproduction or periodic production sample, a pilot model, or a pilot lot be tested for design approval prior to or during regular production on a contract or order, the requirements shall be specified in this section under the appropriate paragraph identification.

4.4 Section 4 - QUALITY ASSURANCE PROVISIONS. For software, this section shall be titled Qualification Requirements and shall specify the qualification requirements, including methods, levels of testing, tools, facilities, test formulas, algorithms, and acceptance tolerance limits required to show that the requirements stated in Sections 3 and 5 have been met. The Software Requirements and Interface Requirements Specification Data Item Descriptions contain further information for specifying qualification requirements (See 6.2). For software embedded in firmware devices, the application of quality assurance provisions or qualification requirements depends on whether the software is designated as a CSCI or part of an HWCI. When the software is designated as a CSCI, Qualification Requirements apply, but when designated as part of an HWCI, Quality Assurance Provisions apply. For hardware, this section shall include all of the examinations and tests (by reference where applicable) to be performed in order to ascertain that the product, material or process to be developed or offered for acceptance conforms to the requirements in Sections 3 and 5 of the specification. Section 4 shall be arranged in an orderly sequence which will indicate clearly which inspections (examinations and tests) apply directly to the process, material, HWCIs, or lots of HWCIs that were developed or produced and which apply to requirements such as evaluation, qualification (See 4.3.9), preproduction sample, pilot model, or pilot lot. The order of presentation of Section 4 material shall, insofar as practicable, follow the order of requirements as presented in Section 3 of the specification, or alternatively in the most logical order of conducting the examinations and tests listed.

4.4.1 General. Where applicable, the general test and inspection philosophy shall be described with a statement of responsibility for inspection, classification of examinations and tests, sampling, lot formation, and other information pertinent to the quality assurance provisions but not directly associated with a specific test or examination.

4.4.1.1 Responsibility for inspection. The DOD concept of quality assurance places primary responsibility for quality assurance of delivered products, materials or services on the supplier who is responsible for offering to the contracting agency only those products, materials or services that conform to all specified requirements. In system specifications, however, where assembly of the system/segment is at a Government facility or on a Government-owned vessel involving Government-furnished property and personnel, responsibility for the conduct of tests will probably be split between the contracting agency and the contractor. Accordingly, the supplier's responsibility for inspection shall be clearly stated and the contracting agency's role, either as a partner or monitor, shall be specified. A typical statement of responsibility is as follows:

4.1.1 Responsibility for inspection. Unless otherwise specified in the contract or order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the contracting agency. The contracting agency reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.4.1.2 Special tests and examinations. Any special tests and examinations or associated actions required for sampling, lot formation, qualification evaluation, etc., shall be covered under an appropriate heading, for example:

4.1.2 Preproduction sample, pilot model, or pilot run. When Section 3 specifies a requirement for preproduction sample, pilot model, or pilot run, Section 4 shall include under an appropriate identification, a description of the testing routine, sequence of tests, number of units to be tested, data required, and the criteria for determining conformance to specified requirements.

4.1.2 Qualification provisions. When the requirements for HWCIs covered in Section 3 contain a qualification provision, the applicable examinations and tests shall be listed under appropriate headings in Section 4.

These inspections shall be specified for initial and higher

levels (reliability levels) of qualification including the test methods for continuous testing, and periodic qualification re-evaluation as covered in Section 3 of the specification.

When a tabular form of presentation will provide a better understanding of the correlation between tests of Section 4 and requirements of Section 3, or would clarify the test requirements for acceptance, performance, qualification, preproduction, etc., a tabular presentation similar to that below shall be made.

Test Procedure

Requirement	Pre-Prod	Acceptance	Periodic Prod
3.3.1	4.2.1	4.2.1	4.2.1
3.3.2.1	4.2.2.1		
3.3.2.2	4.2.2.2	4.2.2.1	4.2.2.1
3.3.2.3	4.2.2.3		
3.3.2.4	4.2.2.3	4.2.2.3	4.2.2.3
3.3.3.1	4.2.3.1	4.2.3.1	4.2.3.1
3.3.3.2	4.2.3.2		4.2.3.2
5.2.1	4.2.5		

4.4.2 Quality conformance inspections. This section shall list all examinations and tests required to verify that all requirements of Section 3 and 5 have been achieved in the HWCI, material, or process offered for acceptance. These examinations and tests shall include, or reference as appropriate:

- a. Tests and checks of the performance and reliability requirements.
- b. A measurement of comparison of specified physical characteristics.
- c. Verification, with specific criteria, for workmanship.
- d. Test and inspection methods for assuring compliance, including environmental conditions for performance.
- e. Classification of characteristics as critical, major or minor, as defined in MIL-STD-109. When required for reference purposes in reporting inspection results, the characteristics may be numbered. When numbered, numbers shall be in accordance with the following:

1 through 99 - critical characteristics
 101 through 199 - major characteristics
 201 through 299 - minor characteristics

4.5 Section 5 - PREPARATION FOR DELIVERY. This section is generally applicable to product specifications only, and shall include applicable requirements for preservation, packaging, and packing the configuration item, and markings of packages and containers.

4.5.1 General. This section shall state the general requirements for preservation, packaging, packing, and package marking. If more than one level of preservation and packaging is included, the conditions for selection of levels shall be explained. See FED-STD-102.

4.5.2 Specific requirements. The specific requirements for materials to be used in preservation, packaging, and packing a product shall be covered in Section 5, either directly or by reference to other specifications, publications, or drawings.

4.5.3 Detailed preparation. Requirements may be included by reference to other specifications and applicable standards or, where these do not exist or are not applicable, by detailed instructions. The requirements shall be included with appropriate headings, as required, for disassembly, cleaning, drying, preservation, packaging, packing, and shipment marking. These requirements shall be specifically related to each required level of preparation in a manner which will leave no doubt regarding requirements applicable to such level. Detailed preparation for delivery requirements should be covered as far as practicable in four basic categories, as follows.

4.5.3.1 Preservation and packaging. The requirements for preservation and packaging shall cover cleaning, drying, and preservation methods adequate to prevent deterioration, appropriate protective wrapping, package cushioning, interior containers, and package identification-marking up to but not including, the shipping container. Where no suitable reference is available, step-by-step procedures for preservation and packaging shall be included.

4.5.3.2 Packing. The requirements for packing shall cover the exterior shipping container, the assembly of configuration items or packages therein, necessary blocking, bracing, cushioning, and weatherproofing.

4.5.3.3 Marking for Shipment. Normally, marking requirements shall be established by reference to MIL-STD-129. Markings essential to safety and to the protection or identification of the configuration item which are not required by MIL-STD-129, or are required on a "when specified" basis by that standard, shall be specified in detail under this heading. In any instance where reference to MIL-STD-129 is not applicable, requirements in detail or by reference to recognized documents shall include: appropriate identification of the product, both on packages and shipping containers; all markings necessary for delivery and for

storage, if applicable; all markings required by regulations, statutes, and common carriers; and all markings necessary for safety and safe delivery.

4.6 Section 6 - NOTES. Section 6 of specifications shall contain information of a general or explanatory nature, and no requirements shall appear therein. It shall contain information, not contractually binding, designed to assist in determining the applicability of the specification and the selection of appropriate type, grade, or class of the configuration item, such as additional supersession data, changes in product designations (grades, class, etc.), standard sample (if required), etc. This section should include the following, as applicable, in the order listed:

- Intended use
- Ordering data
- Preproduction sample, pilot model, or pilot lot, if any
- Standard sample, if any
- Definitions, if any
- Qualification provisions
- Cross reference of classifications
- Miscellaneous notes

4.6.1 Intended use. Information relative to the use of the configuration item covered by the specification should be included under this heading. The difference among types, grades, and classes in the specification shall be explained herein. If particular applications exist for which the material is not well adapted, this information also may be included.

4.6.2 Ordering data. Detailed information to be incorporated in invitations for bids, contracts, or other purchasing documents shall be stated in this paragraph. Reference shall be made to all parts of the specification where it is required that options be exercised, such as requirements for preproduction sample for qualification, selection of grade, type, class, level of preservation and packaging, etc. When helpful, further information shall be furnished.

4.6.3 Instructions for models and samples.

4.6.3.1 Instructions for preproduction sample, pilot model, etc. If Section 3 specifies a preproduction sample, a pilot model, or a pilot lot, the necessary instructions for the arranging for its examination, test, and approval shall be stated in this section under an appropriate paragraph identification.

4.6.3.2 Standard sample. If Section 3 specifies a standard sample, information for obtaining or examining the standard sample (source and address) shall be stated under this paragraph identification.

4.6.4 Qualification provisions. Where provisions for qualification of a product is a requirement of the specification, information concerning such qualification shall be stated in this section.

4.6.5 Cross-reference of classifications. A cross-reference of old to new classification (types, grades, classes, etc.) of configuration item, material or service shall be included if such changes are made by specification revision. If new classes, grades or types of configuration items or materials are being added to, and others are being removed from, the coverage of the specification, a cross-reference showing substitutability relationships shall be included.

4.7 APPENDIX AND INDEX

4.7.1 General. Where required, Appendixes and an Index may be included as an integral part of a specification.

4.7.2 Appendix. An appendix, identified by the heading 'APPENDIX', is a section of provisions added at the end of a specification. An appendix may be used to append large (multi-page) data tables, plans pertinent to the submittal of the configuration item, management plans pertinent to the subject of the specification, classified information or other information or requirement related to the subject configuration item, material or process that would normally be invoked by the specification but would, by its bulk or content, tend to degrade the usefulness of the specification. In all cases where an appendix is used, reference to the appendix shall be included in the body of the specification.

4.7.2.1 Numbering. Appendixes to a specification shall be numbered as Sections 10, 20, etc. in multiples of 10 for each succeeding appendix. Divisions and paragraphs within an appendix shall be numbered, such as 10.1, 10.1.1, etc. Page numbers for the appendixes normally will be consecutive and in sequential order with the page numbers used throughout the specification. Each page of the appendix shall be identified with the specification number as in the specification.

4.7.2.2 Scope. An appendix shall have a statement of scope to indicate the limitations of the appendix and to insure its proper application and use.

4.7.2.3 Headings. Headings should be used as necessary, but need not duplicate the structure of the specification of which the appendix is a part.

4.7.2.4 References. References which may be required and which relate to the appendix shall be listed in Section 2 of the basic specification and may also be listed in a section of applicable documents in the appendix itself.

4.7.3 Index. An alphabetical index may be placed at the end of a specification to permit ready reference to contents. Its use shall be limited to lengthy specifications.

5. DETAIL REQUIREMENTS

5.1 General. Detail requirements for the various types and subtypes of specifications are contained in Appendixes I through XV. Requirements for any configuration item, material, or process that do not properly fall under a paragraph number or title in the applicable appendix may be added as additional paragraphs in the appropriate section. If the outline of the applicable appendix is not made mandatory by contract provisions (Form 1a), the additional paragraphs may be inserted at any point in the proper section, and paragraph headings and numbers not applicable may be omitted. If the outline of the applicable appendix is made mandatory by contract provisions, additional necessary requirements headings shall be inserted at the end of the proper section, except for Types A and B1, where such requirements shall be inserted between 3.6 and 3.7 (3.7 and subsequent paragraphs being suitably renumbered), for requirements limited to a single functional area or major component. The notation "Not applicable" shall be entered after each paragraph number and title that is not applicable. Subordinate paragraph headings may be added under the most suitable major paragraph heading in the outline prescribed by any appendix.

6. NOTES

6.1 Intended use. This standard is to be used in the establishment of uniform practices for specification preparation, to ensure the inclusion of essential requirements, and to aid in the use and analysis of specification content.

6.2 Data requirements list and cross reference. When this standard is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of the DOD FAR clause on data requirements (currently DOD FAR Supplement 52.227-7031) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this standard is cited in the following paragraphs.

<u>Paragraph No.</u>	<u>Data Requirement Title</u>	<u>Applicable DID</u>
3.3.1, 3.3.2, 3.3.2.1, 3.3.2.3	Notice of Revision/ Specification Change Notice	DI-E-1126
3.1.1, 3.1.1.1, 3.1.1.2, 3.1.3.2	Configuration Item Development Specification	DI-E-3102
3.1.1.3, 3.1.3.3, 3.1.3.3.1, 3.1.3.3.1.2, 3.1.3.3.3	Configuration Item Product Fabrication Specification	DI-E-3103
3.1.3.3.4	Inventory Item Specification	DI-E-3105
3.3.2	Engineering Change Proposals	DI-E-3128
3.1.1.3, 3.1.3.4	Process Specification	DI-E-3130
3.1.1.3, 3.1.3.5	Material Specification	DI-E-3131
3.1.1.3, 3.1.3.3, 3.1.3.3.1, 3.1.3.3.1.1, 3.1.3.3.2, 3.1.3.3.2.1	Configuration Item Product Function Specification	DI-E-3132

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<u>Paragraph No.</u>	<u>Data Requirement Title</u>	<u>Applicable DID</u>
3.3.1, 3.3.3	Specification Revision Pages	DI-E-21430
3.3.1, 3.3.2, 3.3.3	Changes to General Specifications for Ships of the U.S. Navy	DI-E-23159
3.1.1.3, 3.1.3.3, 3.1.3.3.2, 3.1.3.3.2.2	Critical Item Product Fabrication Specification	DI-E-30132
3.1.1.1, 3.1.3.1, 50.3.1.2, 50.3.2	System/Segment Specification	DI-CMAN-80008
	Software Development Specification (consists of)	
3.1.3.2.5, 3.1.3.2.5.1, 3.1.3.2.5.2, 3.1.3.3.5.1, 4.4	Software Requirements Specification	DI-MCCR-80025
3.1.3.2.5, 3.1.3.2.5.2, 3.1.3.3.5.1, 3.1.3.3.5.4,	Interface Requirements Specification	DI-MCCR-80026
3.1.3.3.5,	Software Product Specification (includes)	DI-MCCR-80029
3.1.3.3.5, 3.1.3.3.5.1, 130.1	Software Top Level Design Document	DI-MCCR-80012
3.1.3.3.5, 3.1.3.3.5.2, 130.1	Software Detailed Design Document	DI-MCCR-80031
3.1.3.3.5, 3.1.3.3.5.4, 130.1	Interface Design Document	DI-MCCR-80027
3.1.3.3.5, 3.1.3.3.5.3, 130.1	Data Base Design Document	DI-MCCR-80028

(Data item descriptions related to this standard, and identified in section 6, will be approved and listed as such in DOD 5000.19-L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)"

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

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APPENDIX I

10. TYPE A, SYSTEM/SEGMENT SPECIFICATION

10.1 Scope. The System/Segment Specification shall be prepared in accordance with the System/Segment Specification Data Item Description (see 6.2).

20. TYPE B1, PRIME ITEM DEVELOPMENT SPECIFICATION

20.1 Section 1, Scope. The content of Section 1 of a prime item development specification shall be as defined in the following example:

Example:

1. SCOPE

1.1 This specification establishes the performance, design, development, and test requirements for the (insert nomenclature) prime item.

20.2 Section 2, Applicable documents. The content of Section 2 of the specification shall be in accordance with 4.2.

20.3 Section 3, Requirements. This section shall contain the following:

- a. The performance and design requirements for the prime item.
- b. The performance requirements related to manning, operating, maintaining, and logistically supporting the prime item to the extent these requirements define or constrain design of the prime item.
- c. The design constraints and standards necessary to assure compatibility of prime item components.
- d. The principal interfaces between the prime item being specified and other configuration items with which it must be compatible.
- e. The major components of the prime item and the principal interfaces between such major components. (Examples of major components are: (a) a unit of an electronic set, (b) an engine for a vehicle, (c) a power drive for a rocket or missile launcher.)
- f. The allocation of performance to, and the specific design constraints peculiar to, each major component.
- g. The identification and relationship of major components which comprise the prime item.
- h. The identification and use of Government-furnished property to be designed into and delivered with the prime item, or to be used with the prime item.

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Unless purely descriptive by nature, requirements shall be stated in quantitative physical terms with tolerances which can be verified by subsequent analytical test, demonstrative data, or inspection of the prime item and related supporting engineering data. Requirements stated herein shall be the basis for, and verifiable by the tests specified in Section 4 of the specification.

20.3.1 Paragraph 3.1, Prime item definition. This paragraph shall incorporate (directly or by reference) specific products of systems engineering and analysis which graphically portray the functions of the prime item and the relationship of the prime item to be developed to other configuration items in the system. It shall identify (a) the major components of this configuration item and (b) the individual components which must be developed. Essentially, this is a translation of operational requirements into item development tasks.

20.3.1.1 Paragraph 3.1.1, Prime item diagrams. This paragraph shall incorporate, where applicable, either directly or by reference, the prime item level functional schematics. This paragraph will cover the top-level functional flow diagrams of the configuration item and include diagrammatic presentations to the level required to identify all essential functions.

20.3.1.2 Paragraph 3.1.2, Interface definition. This paragraph shall cover the functional and physical interfaces between (a) this prime item and other configuration items, and (b) the major components within this prime item. The functional interfaces shall be specified in quantitative terms of input/output voltages, accelerations, temperature ranges, shock limitations, loads, speeds, pitch and roll rates, etc. Where interfaces differ due to a change in operational mode, the requirements shall be specified in a manner which identifies specific functional interface requirements for each different mode. Physical interface relationships shall be expressed in terms of dimensions with tolerances. This paragraph shall incorporate, either directly or by reference, interface control drawings, and other engineering data as necessary to define all functional and physical interfaces required to make the prime item compatible with other configuration items and to make its major components compatible within the prime item.

20.3.1.3 Paragraph 3.1.3, Major component list. This paragraph shall include a complete list of all major components, as they become known, which comprise the prime item with their identification documents arranged in an indentured relationship.

20.3.1.4 Paragraph 3.1.4, Government furnished property list. This paragraph shall list the Government furnished property which the prime item shall be designed to incorporate. This list shall identify the property by reference to its nomenclature,

specification number, and/or part number.

20.3.1.5 Paragraph 3.1.5, Government loaned property list. This paragraph shall list the Government property which will be loaned to the contractor.

20.3.2 Paragraph 3.2, Characteristics.

20.3.2.1 Paragraph 3.2.1, Performance. The performance characteristics paragraph shall state what the prime item shall do, including both upper and lower performance limits. As a general guide include such considerations as:

- a. Dynamic actions or changes that occur (rates, velocities, movements, and noise levels).
- b. Quantitative criteria covering endurance capabilities of the prime item required to meet user needs under stipulated environmental and other conditions, including minimum total life expectancy. Indicate required mission duration and planned utilization rate.

20.3.2.2 Paragraph 3.2.2, Physical characteristics. This paragraph shall include the following as applicable:

- a. Weight limits of the prime item.
- b. Dimensional and cube limitations, crew space, operator station layout, ingress, egress, and access for maintenance.
- c. Requirements for transport and storage, such as tiedowns, pallets, packaging, and containers.
- d. Durability factors to indicate degree of ruggedness.
- e. Health and safety criteria, including consideration of adverse explosive, mechanical, and biological effects. Included in these criteria are the toxicological effects of the prime item or components thereof on the user and the adverse effects of any electromagnetic radiation that might emanate therefrom. For prime items with nuclear warheads, include general requirements as to peacetime operations, troop safety in handling and firing, and other considerations as required.
- f. Security criteria.
- g. Command control requirements.
- h. Vulnerability factors including consideration of atomic, chemical, biological, and radiological operations, electromagnetic radiation, fire and impact.

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20.3.2.3 Paragraph 3.2.3, Reliability. Reliability shall be stated in quantitative terms, defining the conditions under which the requirements are to be met. This paragraph may include a reliability apportionment model to support apportionment of reliability values assigned to major components for their share in achieving desired prime item reliability.

20.3.2.4 Paragraph 3.2.4, Maintainability. This paragraph shall specify the quantitative maintainability requirements. The requirements shall apply to maintenance in the planned maintenance and support environment and shall be stated in quantitative terms.

Examples are:

- a. Time (e.g., mean and maximum downtime, reaction time, turnaround time, mean and maximum time to repair, mean time between maintenance actions).
- b. Rate (e.g., maintenance manhours per flying hour, maintenance manhours per specific maintenance action, operational ready rate, maintenance hours per operating hours, frequency of preventive maintenance).
- c. Maintenance complexity (e.g., number of people and skill levels, variety of support equipment).

20.3.2.5 Paragraph 3.2.5, Environmental conditions. This paragraph shall include both induced and natural environmental conditions expected to be encountered by this prime item during storage, shipment, and operation. It shall include factors such as climate, shock, vibration, noise, and noxious gases.

20.3.2.6 Paragraph 3.2.6, Transportability. This paragraph shall include requirements for transportability which are common to all components to permit employment and logistic support. All components that, due to operational characteristics, will be unsuitable for normal transportation methods shall be identified.

20.3.3 Paragraph 3.3, Design and construction. This paragraph shall specify minimum prime item design and construction standards which have general applicability and are applicable to major classes of equipment (e.g., aerospace vehicle equipment and support equipment) or are applicable to particular design standards. To the maximum extent possible, these requirements shall be specified by reference to the established military standards and specifications. In addition, this paragraph shall specify criteria for the selection and imposition of Federal, military, and contractor specifications and standards.

20.3.3.1 Paragraph 3.3.1, Materials, processes, and parts. This paragraph shall specify those prime item-peculiar requirements governing use of materials, parts, and processes to be used in the

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design of the prime item. It shall also contain specifications as necessary for particular materials and processes to be utilized in the design of the prime item. Special attention shall be directed to prevent unnecessary use of strategic or critical materials, or toxic products and formulation. A strategic and critical materials list can be obtained from the contracting agency. In addition, requirements for the use of standard and commercial parts for which qualified products lists have been established shall be specified in this paragraph.

20.3.3.2 Paragraph 3.3.2, Electromagnetic radiation. This paragraph shall contain requirements pertaining to electromagnetic radiation. It shall cover both the environment in which the prime item operates as well as that which it generates.

20.3.3.3 Paragraph 3.3.3, Nameplates and product marking. This paragraph shall contain requirements for nameplates, part marking, serial and lot number marking, and all other identifying markings required for the prime item and its component parts. Requirements shall usually be stated in general terms and reference made to existing standards on the content and application of such markings.

20.3.3.4 Paragraph 3.3.4, Workmanship. This paragraph shall contain workmanship requirements for development models of equipments to be produced during development, including requirements for manufacture by production techniques, if applicable.

20.3.3.5 Paragraph 3.3.5, Interchangeability. This paragraph shall identify those components to be interchangeable and replaceable. Entries in this paragraph are for the purpose of establishing a condition of design, and are not to define the conditions of interchangeability that are required by the assignment of a part number.

20.3.3.6 Paragraph 3.3.6, Safety. This paragraph shall specify requirements to preclude or limit hazards to personnel and equipment. To the extent practicable, these requirements shall be imposed by citing established and recognized standards. For prime items directly supporting a system, appropriate paragraphs of the system specification shall be cited, such paragraphs being amended on "add" or "delete" basis for applicability to the prime item. Limiting safety characteristics peculiar to the prime item due to hazards in assembly, disassembly, test, transport, storage, operation or maintenance shall be stated when covered neither by standard industrial or service practices nor by the system specification. "Fail-safe" and emergency operating restrictions shall be included where applicable. These shall include interlocks and emergency and standby circuits required to either prevent injury or provide for recovery of the prime item in the event of failure.

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20.3.3.7 Paragraph 3.3.7, Human performance/human engineering. Human engineering requirements for the configuration item should be specified herein and applicable documents (e.g., MIL-STD-1472) included by reference. This paragraph should also specify any special or unique requirements, e.g., constraints on allocation of functions to personnel and communications and personnel/equipment interactions. Included should be those specific areas, stations, or equipment which would require concentrated human engineering attention due to the sensitivity of the operation or criticality of the task, i.e., those areas where the effects of human error would be particularly serious.

20.3.4 Paragraph 3.4, Documentation. This paragraph shall specify the plan for prime item documentation such as: specifications, drawings, technical manuals, test plans and procedures, installation instruction data.

20.3.5 Paragraph 3.5, Logistics.

20.3.5.1 Paragraph 3.5.1, Maintenance. This paragraph shall include considerations such as: (a) use of multipurpose test equipment, (b) use of module vs. part replacement, (c) maintenance and repair cycles, (d) accessibility, and (e) level of repairability by the Government.

20.3.5.2 Paragraph 3.5.2, Supply. This paragraph shall specify the impact of the prime item on the supply system and the influence of the supply system on prime item design and use. Considerations shall include: (a) introduction of new components into the supply system, (b) supply and resupply methods, (c) distribution and location of prime item stocks.

20.3.5.3 Paragraph 3.5.3, Facilities and facility equipment. This paragraph shall specify the impact of the prime item on existing facilities and facility equipment. It also shall specify requirements for new facilities or ancillary equipment to support the prime item.

20.3.6 Paragraph 3.6, Personnel and training.

20.3.6.1 Paragraph 3.6.1, Personnel. This paragraph shall specify personnel requirements which must be integrated into the prime item design. Requirements shall be specified in a positive sense, assuming that the numbers and skill levels of personnel will be made available. Requirements stated in this paragraph shall be the basis for ultimate complete determination of item personnel training and training equipment/facility requirements. It shall include but not be limited to: number and types of operational crew personnel for each deployment mode and the intended duty cycles, both normal and emergency; numbers and types of maintenance crew personnel for each operational deployment mode and the intended duty cycle, both normal and emergency; and types

and total number of personnel which may be allocated to the operation, maintenance, and control of the prime item. It should describe in general qualitative terms the personnel resources expected to be available for the scheduled beginning of training on the item.

20.3.6.2 Paragraph 3.6.2, Training. This paragraph shall consider:

- a. Training requirements that will be generated by new equipment to include, if possible, the concept of how training should be accomplished, e.g., school, unit, or contractor training.
- b. Estimates of quantities of equipment being developed that will be required solely for training purposes.
- c. The need to develop associated training devices, including types required. Prepare actual detailed statements of requirements for characteristics of training devices.
- d. Training time and locations available for effective training programs.

20.3.7 Paragraph 3.7, Major component characteristics. This paragraph shall include a subparagraph for each major component listed in paragraph 3.1.3. In stating requirements for the various major components, it should be recognized that verification may necessarily need to be accomplished following the delivery, installation, and checkout of the parts constituting the major components. The functional relationship may be such that verification of requirements specified for a major component can only be accomplished when the units, assemblies, or parts which comprise the major component are assembled into the prime item. For each major component, a separate paragraph shall be prepared specifying the performance and physical characteristics.

20.3.8 Paragraph 3.8, Precedence. This paragraph shall either specify the order of precedence of requirements or assign weights to indicate the relative importance of characteristics and other requirements. These include requirements allocated from prime item requirements as well as requirements which are peculiar to the major component and cannot be directly referenced to prime item requirements. It shall also establish the order of precedence of this specification relative to referenced documents.

20.4 Section 4, Quality Assurance provisions. Requirements for formal tests/verifications of prime item performance and design characteristics and operability shall be specified in this paragraph. Tests/verifications specified herein shall include prime item and component design evaluation and operational capability verification. Subparagraphs under this section shall

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include:

- a. Reliability testing with respect to prime item and component reliability. Requirements shall be specified for collection and recording of data during all testing which is to be part of the reliability analysis.
- b. Engineering evaluation and test requirements to the level of detail necessary to define the extent of the test program and the objectives of the tests. The specific elements to be included in the test shall be specified. If data generated during the progress of tests specified herein is to be recognized as formal verification that specified requirements in Section 3 of the specification have been satisfied, the test objectives shall so state.
- c. Qualification testing of the prime item and critical components.
- d. Installation testing and checkout, such as continuity checking, interface mating, major component operation in the installed environment, support equipment compatibility, and documentation verification.
- e. Formal test verification of performance characteristics to demonstrate that prime item requirements in Section 3 of the specification have been satisfied.

20.4.1 Paragraph 4.1, General. This paragraph shall discuss the philosophy of testing, location for performance of tests, and other information related to prime item testing not covered elsewhere.

20.4.1.1 Paragraph 4.1.1, Responsibility for tests. This paragraph shall assign responsibilities for performance of tests to each agency, Government or contractor, as applicable.

20.4.1.2 Paragraph 4.1.2, Special tests and examinations. This paragraph is optional in the development specification, and, when used, would generally cover testing requirements for qualification evaluation for selection of parts, components, or equipments to be used in the system.

20.4.2 Paragraph 4.2, Quality conformance inspections. This paragraph shall cover, or reference, test and inspection requirements necessary to determine if all requirements of Section 3 of the specification have been achieved. Insofar as practical, tests shall be arranged in a logical order for sequential performance.

20.5 Section 5, Preparation for delivery. This section shall provide guidance for the preparation of equipment for delivery.

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Such guidance will be peculiar to the prime item being specified and other than standard practice. It shall include specific requirements to incorporate such non-standard practices in appropriate item descriptions. It may impose requirements to comply with standard practices by referencing appropriate military specifications and standards.

20.6 Section 6, Notes. The contents of this section are not contractually binding. Any information which should be made known as background information or as instructions to the contracting officer may be included herein.

20.7 Section 10, Appendix I. This section of the specification shall contain requirements which are contractually a part of the specification but which, for convenience in specification maintenance, are incorporated herein; e.g., requirements of a temporary nature or for limited effectivity. Appendixes may be bound as separate documents for convenience in handling, e.g., when only a few parameters of the prime item are classified, an appendix containing only the classified material may be established. Where parameters are placed in an appendix, the paragraph of Section 10 shall be referenced in the main body of the prime item specification in the place where the parameter would normally have been specified.

30. TYPE B2, CRITICAL ITEM DEVELOPMENT SPECIFICATION

30.1 Section 1, Scope. The content of Section 1 of a critical item development specification shall be a statement similar to the following example:

Example:

1. SCOPE

1.1 This specification establishes the performance, design, development, and test requirements for the (insert identifier and nomenclature) critical item.

30.2 Section 2, Applicable documents. The content of Section 2 shall be in accordance with 4.2.

30.3 Section 3, Requirements.

30.3.1 Paragraph 3.1, Critical item definition. This paragraph shall contain a comprehensive definition of the critical item to be developed.

30.3.2 Paragraph 3.2, Characteristics.

30.3.2.1 Paragraph 3.2.1, Performance. Performance characteristics paragraph shall state what the critical item shall do, including both upper and lower performance limits. As a general guide include such considerations as:

- a. Dynamic actions or changes that occur (rates, velocities, movements, and noise levels).
- b. Quantative criteria covering endurance capabilities of the critical item required to meet user needs under stipulated environmental and other conditions, including minimum total life expectancy. Indicate required mission duration and planned utilization rate.

30.3.2.2 Paragraph 3.2.2, Physical characteristics. This paragraph shall include the following, as applicable:

- a. Weight limits of the critical item.
- b. Dimensional and cube limitations, crew space, operator station layout, ingress, egress, and access for maintenance.
- c. Requirements for transport and storage, such as tie-downs, pallets, packaging, and containers.
- d. Durability factors to indicate degree of ruggedness.

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- e. Health and safety criteria, including consideration of adverse explosive, mechanical, and biological effects. Included in this criteria are the toxicological effects of the critical item on the user and the adverse effects of any electromagnetic radiation that might emanate therefrom.
- f. Vulnerability factors including consideration of atomic, chemical, biological, and radiological operations, electromagnetic radiation, fire and impact.

30.3.2.3 Paragraph 3.2.3, Reliability. This paragraph shall state the requirements for reliability in quantitative terms, defining the conditions under which the requirements are to be met.

30.3.2.4 Paragraph 3.2.4, Maintainability. This paragraph shall specify the quantitative maintainability requirements. The requirements shall apply to maintenance in the planned maintenance and support environment and shall be stated in quantitative terms.

30.3.2.5 Paragraph 3.2.5, Environmental conditions. This paragraph shall include both induced and natural environmental conditions expected to be encountered by this critical item during storage, shipment, and operation. It shall include factors such as climate, shock, vibration, noise, and noxious gases.

30.3.2.6 Paragraph 3.2.6, Transportability. This paragraph shall include requirements for transportability which are common to all components to permit employment, deployment, and logistic support. All components that, due to operational or functional characteristics, will be unsuitable for normal transportation methods shall be identified.

30.3.3 Paragraph 3.3, Design and construction. This paragraph shall specify minimum critical item design and construction standards which have general applicability and are applicable to major classes of equipment (e.g., aerospace vehicle equipment, support equipment) or are applicable to particular design standards. To the maximum extent possible, these requirements shall be specified by reference to the established military standards and specifications. In addition, this paragraph shall specify criteria for the selection and imposition of Federal, military, and contractor specifications and standards.

30.3.3.1 Paragraph 3.3.1, Materials, processes, and parts. This paragraph shall specify those configuration item-peculiar requirements governing use of materials, parts, and processes to be utilized in the design of the critical item. It shall also contain specifications as necessary for particular materials and processes to be utilized in the design of the critical item. Special attention shall be directed to prevent unnecessary use of strategic or critical materials. A strategic and critical materials list can be obtained from the contracting agency. In

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addition, requirements for the use of standard and commercial parts for which qualified products lists have been established shall be specified in this paragraph.

30.3.3.2 Paragraph 3.3.2, Electromagnetic radiation. This paragraph shall contain requirements pertaining to electromagnetic radiation. It shall cover both the environment in which it operates as well as that which it generates.

30.3.3.3 Paragraph 3.3.3, Nameplates and product marking. This paragraph shall contain requirements for nameplates, part marking, serial and lot number marking, and all other identifying markings required for the critical item and its component parts. Requirements shall usually be stated in general terms and reference made to existing standards on the content and application of such markings.

30.3.3.4 Paragraph 3.3.4, Workmanship. This paragraph shall contain workmanship requirements for development models of critical items to be produced during development, including requirements for manufacture by production techniques, if applicable.

30.3.3.5 Paragraph 3.3.5, Interchangeability. This paragraph shall identify those components to be interchangeable and replaceable. Entries in this paragraph are for the purpose of establishing a condition of design, and are not to define the conditions of interchangeability that are required by the assignment of a part number.

30.3.3.6 Paragraph 3.3.6, Safety. This paragraph shall specify requirements to preclude or limit hazard to personnel and equipment. To the extent practicable, these requirements shall be imposed by citing established and recognized standards. Limiting safety characteristics peculiar to the critical item due to hazards in assembly, disassembly, test, transport, storage, operation and maintenance shall be stated when covered neither by standard industrial or service practices nor by a higher level specification. "Fail safe" and emergency operating restrictions shall be included when applicable. These shall include interlocks and emergency and standby circuits required to either prevent injury or provide for recovery of the critical item in the event of failure.

30.3.3.7 Paragraph 3.3.7, Human performance/human engineering. Human engineering requirements for the critical item should be specified herein and applicable documents (e.g., MIL-STD-1472) included by reference. This paragraph should also specify any special or unique requirements, e.g., constraints on allocation of functions to personnel and communications and personnel/equipment interactions. Included should be those specific areas, stations, or equipment which would require concentrated human engineering

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attention due to the sensitivity of the operation or criticality of the task, i.e., those areas where the effects of human error would be particularly serious.

30.3.4 Paragraph 3.4, Documentation. This paragraph shall specify the plan for critical item documentation such as: specifications, drawings, technical manuals, test plans and procedures, installation instruction data.

30.3.5 Paragraph 3.5, Logistics.

30.3.5.1 Paragraph 3.5.1, Maintenance. This paragraph shall include considerations such as: (a) use of multipurpose test equipment, (b) use of module vs. part replacement, (c) maintenance and repair cycles, (d) accessibility, and (e) level of repairability by the Government.

30.3.5.2 Paragraph 3.5.2, Supply. This paragraph shall specify the impact of the critical item on the supply system and the influence of the supply system on critical item design and use. Considerations shall include: (a) introduction of new components in the supply system, (b) supply and resupply methods, (c) distribution and location of critical item stocks.

30.3.6 Paragraph 3.6, Precedence. This paragraph shall either specify the order of precedence of requirements or assign weights to indicate the relative importance of characteristics and other requirements. It shall also establish the order of precedence of this specification relative to referenced documents.

30.4 Section 4, Quality Assurance provisions. Requirements for formal tests/verifications of critical item performance and design characteristics and operability shall be specified in this paragraph. Tests/verifications to be specified herein shall include critical item and component design evaluation, and operational capability verification. Subparagraphs under this section shall include:

- a. Reliability testing with respect to critical item and component reliability. Requirements shall be specified for collection and recording of data during all testing which is to be part of the reliability analysis.
- b. Engineering evaluation and test requirements to the level of detail necessary to define the extent of the test program and the objectives of the tests. The specific elements to be included in the test shall be specified. If data generated during the progress of tests specified herein is to be recognized as formal verification that specified requirements in Section 3 of the specification have been satisfied, the test objectives shall so state.

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- c. Qualification testing of the critical item and selected components.
- d. Installation testing and checkout such as continuity checking, interface mating, support equipment compatibility, and documentation verification.
- e. Formal test verification of performance characteristics to demonstrate that critical item requirements in Section 3 have been satisfied.

30.4.1 Paragraph 4.1, General. This paragraph shall discuss the philosophy of testing, location for performance of tests, and other information related to testing not covered elsewhere.

30.4.1.1 Paragraph 4.1.1, Responsibility for tests. This paragraph shall assign responsibilities for performance of tests to each agency, Government or contractor, as applicable.

30.4.1.2 Paragraph 4.1.2, Special tests and examinations. This paragraph is optional in a development specification, and when used, would generally cover testing requirements for qualification evaluation for selection of parts, components, or equipments to be used in the item.

30.4.2 Paragraph 4.2, Quality conformance inspections. This paragraph shall cover, or reference, test and inspection requirements necessary to determine if all requirements of Section 3 of the specification have been achieved. Insofar as practical, tests shall be arranged in a logical order for sequential performance.

30.5 Section 5, Preparation for delivery. This section shall provide guidance for the preparation of the critical item for delivery. Such guidance will be peculiar to the critical item being specified and other than standard practice. It shall include specific requirements to include such non-standard practices in appropriate configuration item descriptions. It may impose requirements to comply with standard practices by referencing appropriate military specifications and standards.

30.6 Section 6, Notes. The contents of this section are not contractually binding. Any information which should be made known as background information or as instructions to the contracting officer may be included herein.

30.7 Section 10, Appendix I. This section of the specification shall contain requirements which are contractually a part of the specification but which, for convenience in specification maintenance, are incorporated herein, e.g., requirements of a temporary nature or for limited effectivity. Appendixes may be bound as separate documents for convenience in handling, e.g.,

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when only a few parameters of the critical item are classified, an appendix containing only the classified material may be established. Where parameters are placed in an appendix, the paragraph of Section 10 shall be referenced in the main body of the critical item specification in the place where the parameter would normally have been specified.

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40. TYPE B3, NON-COMPLEX ITEM DEVELOPMENT SPECIFICATION

40.1 Section 1, Scope. the content of Section 1 of a non-complex item development specification shall be as defined in the following example.

Example:

1. SCOPE

1.1 This specification establishes the performance, design, development, and test requirements for the (insert nomenclature) non-complex item.

40.2 Section 2, Applicable documents. The content of Section 2 shall be in accordance with 4.2.

40.3 Section 3, Requirements.

40.3.1 Paragraph 3.1, Item Definition. This paragraph shall contain a brief description of the non-complex item and shall, in general terms, state its purpose. For non-complex items where the general characteristics are commonly known, the description should consist of no more than the non-complex item name with appropriate modifiers. Where the non-complex item is not commonly recognized by its name, the description should consist of no more than two or three brief sentences describing its principal characteristics.

40.3.2 Paragraph 3.2, Characteristics.

40.3.2.1 Paragraph 3.2.1, Performance. This paragraph shall state what the non-complex item shall do including both upper and lower performance limits.

40.3.2.2 Paragraph 3.2.2, Physical characteristics. This paragraph shall include such physical requirements as necessary to ensure form and fit, including weight, mounting and mating dimensions, color, protective coating, etc.

40.4 Section 4, Quality assurance provisions. (See 4.4)

40.5 Section 5, Preparation for delivery. (See 4.5)

40.6 Section 6, Notes. (See 4.6)

50. TYPE B4, FACILITY OR SHIP DEVELOPMENT SPECIFICATION

50.1 Section 1, Scope. The content of Section 1 of a facility or ship development specification shall be as defined in the following example:

Example:

1. SCOPE

1.1 This specification establishes the requirements and basic constraints imposed on the development of an architectural and engineering design for (insert nomenclature); add, "in support of (insert system nomenclature)," if applicable.

50.2 Section 2, Applicable documents. The content of Section 2 shall be in accordance with 4.2.

50.3 Section 3, Requirements.

50.3.1 Paragraph 3.1, Facility or ship definition. Describe in detail the mission of the facility or ship; describe the flow of personnel, material, and functions to be performed in or by the facility or ship, including time elements, etc; identify the maintenance and logistics policies to be employed; establish design useful life requirements; establish facility or ship self-sufficiency requirements and any special survival requirements.

50.3.1.1 Paragraph 3.1.1, Facility or ship drawings. For a facility, include topographical and geographical diagrams as well as plot drawings, if applicable. For a ship, include preliminary deck layouts and profiles, as well as schematic drawings, if applicable. Functional diagrams should also be included, as well as equipment layout and processing flow diagrams, if applicable.

50.3.1.2 Paragraph 3.1.2, Interface Definition. Interfaces of the facility or ship with the system or functional areas of the system will be defined by the system/segment specification and those interfaces defined here must be consistent with the system/segment specification. Both functional and physical interfaces with other systems and between the major subsystems or components of this facility or ship shall be defined in this paragraph.

50.3.1.3 Paragraph 3.1.3, Major subsystems and component list. This paragraph shall include a complete list of all subsystems and major components which comprise the facility or ship, or are required by the facility or ship to support the system. If necessary, it shall include a specification tree or indented listing showing the relationships of the identification documents for the subsystems and major components of the facility or ship.

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50.3.2 Paragraph 3.2, Characteristics. Wherever practicable, characteristics shall be specified in terms of the facility or ship itself and not by reference to equipment with which the facility or ship must be compatible. The integrated performance and design requirements shall be allocated from, identical with, or in recognition of the requirements established by the system/segment specification. The following represents an outline of specific information normally required to define a facility or ship; however, it is not intended that non-pertinent requirements be specified nor is it to be construed as preventing the addition of such additional information as may be required to properly identify the peculiar facility or ship requirements.

Facility characteristics shall include consideration of the following, as necessary.

a. Civil

- (1) Axle or wheel loads on roads.
- (2) Special lane width.
- (3) Turn and weight provisions for special vehicles.
- (4) Jack loads, transfer requirements.
- (5) Parking (number of vehicles).
- (6) Grades on roads, types pavement (flexible or rigid), type walks (flexible or rigid).
- (7) Special water and sewage requirements. Quantity and nature of water and sewage, if special.
- (8) Special fire protection requirements (exterior).
- (9) Fencing and security.
- (10) Location and types of existing utilities if any (water, gas, sewer, electrical, storm drainage).

b. Architectural.

- (1) Personnel occupancy, types, hours per day.
- (2) Designation of use of areas within facility. Partition layout. Hazard areas. Special treatment areas.
- (3) Types of special doors required.
- (4) Floor level requirements. Floor drainage.

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- (5) Window requirements, if any.
- (6) Controlling dimension requirements.
- (7) Clear ceiling heights.
- (8) Exterior architectural treatment (concrete, masonry, brick, etc.). Indicate whether treatment is to match existing, if applicable.
- (9) Explosive safety requirements for construction.

c. Structural

- (1) Crane and hoist location and loads. Control requirements.
- (2) Floor and roof loads. Special loads, seismic loads, wind loads.
- (3) Clear span and column-free areas.
- (4) Blast loads, shielding requirements.
- (5) Personnel ladders, elevators.
- (6) Transfer piers, dock loads.
- (7) General configuration of building, number of stories.
- (8) Barricades and shielding for explosive blast areas.

d. Mechanical

- (1) Interior potable water.
- (2) Environment limits, temperature, humidity, ventilation.
- (3) Compressed air.
- (4) Fire protection.
- (5) Vibration and acoustical requirements.
- (6) Equipment cooling requirements.

e. Electrical

- (1) Power requirements - types and magnitude.
- (2) Light intensities.

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- (3) Communications requirements.
- (4) Grounding.
- f. Equipment (Provide layout and list each piece of equipment):
 - (1) Equipment name.
 - (2) Units required (number).
 - (3) Purpose of equipment.
 - (4) Size of equipment (governing dimensions, weight).
 - (5) Power requirements - heat gain, BTU's per hour, type cooling, in-out temperatures, relative humidities.
 - (6) Minimum access requirements - front, back sides.

Ship characteristics shall include the consideration of the following as necessary.

- a. General
 - (1) Limiting dimensions
 - (2) Weight control
 - (3) Reliability and maintainability
 - (4) Environmental conditions
 - (5) Standardization and interchangeability
 - (6) Shock, noise, and vibration
 - (7) Navy or commercial marine standards, including certification of the latter.
- b. Hull structure
 - (1) Structural loading and configuration
 - (2) Basic structural materials
 - (3) Welding, riveting and fastenings
 - (4) Access features
- c. Propulsion plant
 - (1) Type and number of propulsion units

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- (2) Type and number of propellers
- (3) Propulsion control equipment
- d. Electric plant
 - (1) Type and number of generator units
 - (2) Power distribution system
 - (3) Lighting system
- e. Communications and control
 - (1) Navigation equipment
 - (2) Interior communication systems and equipment
 - (3) Electronics systems
 - (4) Weapon control systems
- f. Auxiliary system
 - (1) Air conditioning system
 - (2) Fuel systems
 - (3) Fresh and sea water systems
 - (4) Steering system
 - (5) Aircraft handling system
 - (6) Underway replenishment system
 - (7) Cargo handling system
- g. Outfit and furnishings
 - (1) Hull fittings, boat storage and rigging
 - (2) Painting, deck covering, and insulation
 - (3) Special stowages
 - (4) Workshops and utility spaces
 - (5) Living spaces and habitability
- h. Armament

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- (1) Guns and ammunition stowage and handling
- (2) Ship-launched weapon systems
- (3) Cargo munitions handling and stowage

50.3.3 Paragraph 3.3, Documentation. Requirements for documenting the design shall be specified in general terms. Requirements shall specify the types of documents (such as specifications, drawings, studies, and calculations) required for design review and approval, for procurement, and for historical records.

50.4 Section 4, Quality assurance provisions. This section shall identify special testing, quality control procedures, and quality conformance inspections necessary to assure the adequacy of special or unique facility or ship features.

50.5 Section 5, Preparation for delivery. This section is normally not applicable. But when used shall provide guidance to the architect/engineer regarding any delivery preparation requirements for the facility or ship.

50.6 Section 6, Notes. The contents of this section are not contractually binding. Any information which should be made known as background information or instructions to the contracting officer may be included herein.

*50.7 Section 10, Appendix I. (See 4.7)

* (Omit if not applicable)

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60. TYPE B5, SOFTWARE DEVELOPMENT SPECIFICATION

60.1 Scope. This specification shall consist of the Software Requirements Specification and the Interface Requirements Specification(s). These specifications shall be prepared in accordance with the Software Requirements Specification Data Item Description and the Interface Requirements Specification Data Item Description (see 6.2).

70. TYPE Cla, PRIME ITEM PRODUCT FUNCTION SPECIFICATION

70.1 Section 1, Scope. The content of Section 1 of a prime item product function specification shall be as defined in the following example:

Example:

1. SCOPE

1.1 This specification establishes the performance, design, test, manufacture, and acceptance requirements for the (insert nomenclature) prime item.

1.2 Classification. (when applicable, see 4.1.2)

70.2 Section 2, Applicable documents. The content of Section 2 shall be in accordance with 4.2.

70.3 Section 3, Requirements.

70.3.1 Paragraph 3.1, Item definition. This paragraph shall contain a comprehensive definition of the functional characteristics of the configuration item which is covered by this specification. For a prime item which directly supports a system, the relationship of the configuration item to the system shall be defined. This paragraph shall identify the major components to be produced.

70.3.1.1 Paragraph 3.1.1, Prime item diagrams. This paragraph shall incorporate functional schematic and flow diagrams. Applicable layout drawing or other graphic portrayals which establish the general relationship of major components shall be included.

70.3.1.2 Paragraph 3.1.2, Interface definition. This paragraph shall cover the functional and physical interfaces between (a) the prime item and other configuration items, and (b) the major components within the prime item. The functional interfaces shall be specified in quantitative terms of input/output voltages, accelerations, temperature ranges, shock limitations, loads, speeds, pitch and roll rates, etc. Where interfaces differ due to a change in operational mode, the requirements shall be specified in a manner which identifies specific functional interface requirements with each different mode. Physical interface relationships shall be expressed in terms of dimensions with tolerances. This paragraph shall incorporate, either directly or by reference, interface control drawings and other engineering data as necessary to define all functional and physical interfaces required to make the prime item compatible with other

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configuration items and to make its major components compatible within the prime item.

70.3.1.3 Paragraph 3.1.3, Major component list. This paragraph shall include a complete list of all major components which comprise the prime item. It shall include a specification tree showing the indentured relationship among the components making up the prime item.

70.3.1.4 Paragraph 3.1.4, Government-furnished property list. This paragraph shall list the Government furnished property which the prime item shall be designed to incorporate or which is required for prime item fabrication. This list shall identify the property by reference to its nomenclature, specification number, part number, and other pertinent identifiers.

70.3.2 Paragraph 3.2, Characteristics. All characteristics in Section 3 of the specification shall be capable of being measured and such measurement will be the basis for the inspections of Section 4 of the specification.

70.3.2.1 Paragraph 3.2.1, Performance. this paragraph shall state what the prime item shall do in terms of complete functional characteristics only and shall specify upper and lower limits for each performance characteristic. These characteristics shall be expressed as requirements that must be achieved, and not as goals or best efforts.

70.3.2.2 Paragraph 3.2.2, Physical characteristics. This paragraph shall include the following, as applicable:

- a. Weight limits of the prime item.
- b. Dimensional and cube limitations, crew space, operator station layout, ingress, egress, and access for maintenance.
- c. Requirements for transport and storage, such as tiedowns, palletization, packaging, and containers.
- d. Durability factors to indicate degree of ruggedness.
- e. Health and safety criteria, including consideration of adverse explosive, mechanical, and biological effects. Included in this criteria are the toxicological effects of the prime item or component thereof on the user and the adverse effects of any electromagnetic radiation that might emanate therefrom. For prime items with nuclear warheads, include general requirements as to peacetime operations, troop safety in handling and firing, and other considerations as required.
- f. Safety criteria.

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- g. Command control requirements.
- h. Vulnerability factors including consideration of atomic and chemical, biological, and radiological operations, electromagnetic radiation, fire and impact.

70.3.2.3 Paragraph 3.2.3, Reliability. Reliability shall be stated in quantitative terms, defining the conditions under which the requirements are to be met. This paragraph may include a reliability apportionment model to support apportionment of reliability values assigned to major components for their share in achieving desired prime item reliability.

70.3.2.4 Paragraph 3.2.4, Maintainability. This paragraph shall specify the quantitative maintainability requirements. The requirements shall apply to maintenance in the planned maintenance and support environment and shall be stated in quantitative terms. Examples are:

- a. Time (e.g., mean and maximum downtime, reaction time, turnaround time, mean and maximum time to repair, mean time between maintenance actions).
- b. Rate (e.g., maintenance manhours per flying hour, maintenance manhours per specific maintenance action, operational ready rate, maintenance hours per operating hours, frequency of preventive maintenance).
- c. Maintenance complexity (e.g., number of people and skill levels, variety of support equipment).
- d. Maintenance costs (e.g., maintenance costs per operation hours, manhours per overhaul).

70.3.2.5 Paragraph 3.2.5, Environmental conditions. This paragraph shall include both induced and natural environmental conditions expected to be encountered by this prime item during storage, shipment, and operation. It shall include factors such as climate, shock, vibration, noise, and noxious gases.

70.3.2.6 Paragraph 3.2.6, Transportability. This paragraph shall include requirements for transportability which are common to all components to permit employment, deployment, and logistic support. All components that, due to operational or functional characteristics, will be unsuitable for normal transportation methods shall be identified.

70.3.3 Paragraph 3.3, Design and construction. This paragraph shall specify minimum prime item design and construction standards which have general applicability and are applicable to major classes of equipment (e.g., aerospace vehicle equipment, support equipment) or are applicable to particular design standards. To

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the maximum extent possible, these requirements shall be specified by reference to the established military standards and specifications. In addition, this paragraph shall specify criteria for the selection and imposition of Federal, military, and contractor specifications and standards.

70.3.3.1 Paragraph 3.3.1, Materials, processes, and parts. This paragraph shall specify those prime item peculiar requirements governing use of materials, parts, and processes to be utilized in the design of the prime item. It shall also contain specifications as necessary for particular materials and processes to be utilized in the design of the prime item. Special attention shall be directed to prevent unnecessary use of strategic and critical materials. A strategic and critical materials list can be obtained from the contracting agency. In addition, requirements for the use of standard and commercial parts listed in the qualified products lists shall be specified in this paragraph.

70.3.3.2 Paragraph 3.3.2, Electromagnetic radiation. This paragraph shall specify requirements related to electromagnetic radiation both the radiation in which the prime item must operate as well as radiation emanating from the prime item which could inadvertently activate or explode ordnance, or interfere with associated communications/electronics equipment.

70.3.3.3 Paragraph 3.3.3, Identification and marking. This paragraph shall cover the requirements for the use of color function and identification coding of electrical and hydraulic lines. This paragraph shall also cover the requirements for nameplates for identification and for operation or safety. Requirements for serialization and nomenclature shall not be included in this paragraph.

70.3.3.4 Paragraph 3.3.4, Workmanship. This paragraph shall specify the general requirements for workmanship which are incident to the manufacture of the prime item. Although general in nature the requirement stated herein relates to the finesse of manufacture which should be provided by the craftsman or the manufacturing technique.

70.3.3.5 Paragraph 3.3.5, Interchangeability. This paragraph shall specify the requirements for the prime item and those components to be interchangeable and replaceable. Entries in this paragraph are for the purpose of establishing a condition of design, and are not to define the conditions of interchangeability that are required by the assignment of a part number.

70.3.3.6 Paragraph 3.3.6, Safety. This paragraph shall specify requirements to preclude or limit hazards to personnel and equipment. To the extent practicable, these requirements shall be imposed by citing established and recognized standards. For prime

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items directly supporting a system, appropriate paragraphs of the system specification shall be cited, such paragraphs being amended on "add" or "delete" basis for applicability to this prime item. Limiting safety characteristics peculiar to the prime item due to hazards in assembly, disassembly, test, transport, storage, operation or maintenance shall be stated when covered neither by standard industrial or service practices nor by the system specification. "Fail-safe" and emergency operating restrictions shall be included where applicable. These shall include interlocks and emergency and standby circuits required to either prevent injury or provide for recovery of the prime item in the event of failure.

70.3.3.7 Paragraph 3.3.7, Human performance/human engineering. Human engineering requirements for the configuration item should be specified herein and applicable documents (e.g., MIL-STD-1472) included by reference. This paragraph should also specify any special or unique requirements, e.g., constraints on allocation of functions to personnel and communications and personnel/equipment interactions. Included should be those specific areas, stations, or equipment which would require concentrated human engineering attention due to the sensitivity of the operation or criticality of the task, i.e., those areas where the effects of human error would be particularly serious.

70.3.3.8 Paragraph 3.3.8, Standards of manufacture. This paragraph, when applicable, shall include those standards or essential processes that, because of their significance, must be set forth as a requirement for the manufacture of the prime item. Requirements specified herein shall be to the level of detail necessary to clearly establish limits for the inspections included in Section 4 of the specification.

70.3.4 Paragraph 3.4, Major component characteristics. This paragraph shall include a subparagraph for each major component listed in 3.1.3. In stating requirements for the various major components, it should be recognized that verification may necessarily need to be accomplished following the delivery, installation, and checkout of the major components constituting the prime item. The functional relationship may be such that verification of requirements specified for a major component can only be accomplished when the units, assemblies or parts which comprise the major component are assembled into the prime item. For each listed major component, a separate paragraph shall be prepared specifying the performance and physical characteristics.

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70.3.5 Paragraph 3.5, Qualification (Preproduction) (Periodic production) inspection. (See 4.3.9 and 4.3.11)

*70.3.6 Paragraph 3.6, Standard sample. (See 4.3.10)

70.4 Section 4, Quality Assurance Provisions. Requirements for formal tests/verifications of the item performance and physical characteristics shall be specified in this section.

70.4.1 Paragraph 4.1, General. This paragraph shall, as applicable, provide general information pertinent to tests and inspections not covered elsewhere in Section 4, such as location or conditions for qualification testing, requirements for special testing of prime item components, etc.

70.4.1.1 Paragraph 4.1.1, Responsibility for inspection. This paragraph shall usually state that the responsibility for performing all specified tests/verifications rests with the supplier, and that the Government reserves the right to witness or separately perform all tests specified or otherwise inspect any or all tests and inspections.

70.4.1.2 Paragraph 4.1.2, Special tests and examinations. (See 4.4.1.2). This paragraph shall cover the testing routine, sequence of tests, number of prime items to be tested, data required, etc. for all testing requirements for other than acceptance inspection. It shall also include, preferably in tabular form, a correlation between each requirement, its test, and the type of unit on which the test shall be performed.

70.4.2 Paragraph 4.2, Quality conformance inspections. This paragraph shall include, or reference test and examination procedures for all requirements covered in Section 3 and 5. All characteristics shall be classified as critical, major or minor, and other requirements of 4.4.2 shall be included or referenced. In addition, this paragraph shall specify the method of confirming that the prime item, as fabricated and assembled, complies with the requirements of the prime item product function specification and the drawings.

70.5 Section 5, Preparation for delivery. (See 4.5)

70.6 Section 6, Notes. (See 4.6)

70.7 Section 10, Appendix I. This section of the specification shall contain requirements which are contractually a part of the specification but which, for convenience in specification maintenance, are incorporated herein, e.g., requirements of a

* (Omit if not applicable)

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temporary nature or for limited effectivity. Appendixes may be bound as separate documents for convenience in handling, e.g., when only a few parameters of the prime item are classified, an appendix containing only the classified material may be established. When parameters are placed in an appendix, the paragraph of Section 10 shall be referenced in the main body of the prime item specification in the place where the parameter would normally have been specified.

80. TYPE C1b, PRIME ITEM PRODUCT FABRICATION SPECIFICATION

80.1 Section 1, Scope. The content of Section 1 of a prime item fabrication specification shall be as defined in the following example:

Example:

1. SCOPE

1.1 Scope. This specification establishes the requirements for manufacture and acceptance of the (insert identifier and nomenclature) prime item.

1.2 Classification. (When applicable, see 4.1.2).

80.2 Section 2, Applicable documents. The content of Section 2 shall be in accordance with 4.2.

80.3 Section 3, Requirements.

80.3.1 Paragraph 3.1, Prime item definition. This paragraph shall provide a brief description of the subject prime item. It shall identify: (a) the major components of the prime item and (b) the individual components that must be manufactured.

80.3.1.1 Paragraph 3.1.1, Major component list. This paragraph shall include a complete list of all major components that comprise the prime item.

80.3.1.2 Paragraph 3.1.2, Government furnished property list. This paragraph shall list the Government furnished property required for fabrication of the prime item. This list shall identify the property by reference to its nomenclature, specification number and part number. If the list is extensive, it may be included in an appendix, which shall be referenced in this paragraph.

80.3.2 Paragraph 3.2, Characteristics.

80.3.2.1 Paragraph 3.2.1, Performance. This paragraph shall include those performance requirements that are to be demonstrated by the quality conformance inspections in Section 4 of the specification. It may also include requirements for performance, reliability, etc., when such requirements are not completely controlled by drawings. In no instance should contradicting requirements be specified.

All requirements included herein shall, in most cases and as excepted by 80.3.4, be limited to performance at environmental

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conditions normal to the place of acceptance and shall not attempt to simulate service environment. Requirements included herein shall be specified in physically measurable quantitative terms with tolerances. Such performance shall be in terms of the prime item itself without reference to equipments or facilities with which it must be compatible.

80.3.3 Paragraph 3.3, Design and construction. This paragraph shall include any essential requirements that are not controlled by the drawings or referenced documents.

80.3.3.1 Paragraph 3.3.1, Production drawings. This paragraph shall contain a statement similar to the following: "This (prime item name) shall be fabricated and assembled in accordance with the drawings, parts lists, and other documents listed on (insert identification of data lists, index lists, parts lists or top drawing depending on which is the highest level listing of the applicable data)."

80.3.3.2 Paragraph 3.3.2, Standards of manufacture. This paragraph shall include those standards or essential processes that, because of their significance, must be set forth as a requirement for the manufacture of the prime item. Requirements specified herein shall be to the level of detail necessary to clearly establish limits for the inspections included in Section 4 of the specification.

80.3.3.3 Paragraph 3.3.3, Workmanship. This paragraph shall specify the general requirements for workmanship that are incident to the manufacture of the prime item. Although general in nature, the requirement stated here relates to the finesse of manufacture that should be provided by the craftsman and is not always specifically covered by the drawings. The requirements of this paragraph shall generally cover features that can be verified by visual examination. When applicable and logical, this paragraph should cover:

- a. Burrs and sharp edges
- b. Presence of foreign matter
- c. Uniformity and general appearance.

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*80.3.4 Paragraph 3.4, Preproduction sample. (See 4.3.11) This paragraph, if appropriate, shall specify that a preproduction sample(s) shall be tested prior to regular production to demonstrate the adequacy and suitability of the contractor's processes and procedures in achieving the performance that is inherent in the design. Whereas in a function specification the purpose of preproduction tests is to provide a basis for design approval, in a fabrication specification preproduction tests, like periodic production tests, are intended to show that the manufacturing and production techniques employed do not degrade the design. Preproduction tests in a fabrication specification are particularly necessary when a contract is awarded to a new source that has not previously produced the prime item. Selected performance requirements in the service environment may be added to paragraph 3.2 of a fabrication specification to provide requirements upon which preproduction tests in Section 4 of the specification are to be based. However, since all such performance requirements should be in the development specification for the prime item, it will reduce the bulk of the fabrication specification if performance requirements in the service environment are invoked by referencing the associated development specification. In addition, the titles and requirements of this paragraph may be made to cover samples for periodic production tests if such tests are considered necessary.

80.4 Section 4, Quality Assurance Provisions. Requirements for formal tests/verifications of the prime item performance and physical characteristics shall be specified in this section. In general, this section shall conform to the requirements of 4.4.

80.4.1 Paragraph 4.1, General. This paragraph shall, as applicable, provide general information pertinent to tests and inspections not covered elsewhere in section 4, such as location or conditions for preproduction and periodic production testing, requirements for special testing of prime item components, etc.

80.4.1.1 Paragraph 4.1.1, Responsibility for inspection. This paragraph shall usually state that the responsibility for performing all specified tests/verifications rests with the supplier, and that the contracting agency reserves the right to witness or separately perform all tests specified or otherwise inspect any or all tests and inspections.

80.4.1.2 Paragraph 4.1.2, Special tests and examinations. This paragraph shall cover the testing routine, sequence of tests, number of prime items to be tested, data required, etc. for all testing requirements for other than acceptance inspection. It shall also include, preferably in tabular form, a correlation between each requirement, its test, and the type of unit on which

* (Omit if not applicable)

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the test shall be performed.

80.4.2 Paragraph 4.2, Quality conformance inspections. This paragraph shall include, or reference, test and examination procedures for all requirements covered in Sections 3 and 5. All characteristics shall be classified as critical, major or minor, and other requirements of 4.4.2 shall be included or referenced.

In addition, this paragraph shall specify the method of confirming that the prime item, as fabricated and assembled, complies with requirements of the prime item product fabrication specification and drawings.

80.5 Section 5, Preparation for delivery. (See 4.5)

80.6 Section 6, Notes. (See 4.6)

80.6.1 Paragraph 6.1, Intended use. (See 4.6.1)

80.6.2 Paragraph 6.2, Ordering data. (See 4.6.2) This paragraph shall contain the following:

- a. If preproduction inspection is specified, a paragraph shall be provided suggesting the number of samples to order for such tests. The ordering of samples for preproduction tests may be limited to contracts awarded to new sources with no previous production or development experience on the prime item. Disposition of the preproduction models after testing should be covered, e.g., replace all damaged parts and deliver for service use, scrap, or hold for use in future development programs, etc.
- b. If preproduction tests are based on requirements in a development specification (Type B1), the fact that the development specification as well as this specification must be supplied to bidders should be stated.

80.7 Section 10, Appendix I. This section of the specification shall contain requirements which are contractually a part of the specification but which, for convenience in specification maintenance, are incorporated herein, e.g., requirements of a temporary nature or for limited effectivity. Appendixes may be bound as separate documents for convenience in handling, e.g., where only a few parameters of the prime item are classified, an appendix containing only the classified material may be established. Where parameters are placed in an appendix, the appropriate paragraph of Section 10 shall be referenced in the main body of the prime item specification in the place where the parameter would normally have been specified.

90. TYPE C2a, CRITICAL ITEM PRODUCT FUNCTION SPECIFICATION

90.1 Section 1, Scope. The content of Section 1 of a critical item product function specification shall be as defined in the following example:

1. SCOPE

1.1 This specification establishes the performance, design, test, manufacture and acceptance requirements for the (insert nomenclature) critical item.

90.2 Section 2, Applicable documents.

90.3 Section 3, Requirements.

90.3.1 Paragraph 3.1, Critical item definition. This paragraph shall contain a comprehensive definition of the functional characteristics of the critical item covered by the specification.

90.3.2 Paragraph 3.2, Characteristics. All characteristics in Section 3 of the specification shall be capable of being measured and such measurement will be the basis for the inspections in Section 4 of the specification.

90.3.2.1 Paragraph 3.2.1, Performance. This paragraph shall state what the critical item shall do in terms of complete functional characteristics with upper and lower limits for each performance characteristic. These characteristics shall be expressed as values that must be achieved and not as goals or best efforts.

90.3.2.2 Paragraph 3.2.2, Physical characteristics. This paragraph shall include the following as applicable:

- a. Weight limits of the critical item.
- b. Dimensional and cube limitations, crew space, operator panel layout, ingress, egress, and access for maintenance.
- c. Requirements for transport and storage, such as packaging, and containers.
- d. Durability factors to indicate degree of ruggedness.
- e. Health and safety criteria, including consideration of adverse explosive, mechanical, and biological effects. Included in this criteria are the toxicological effects of the critical item on the user and the adverse effects of any electromagnetic radiation that might emanate therefrom.

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f. Vulnerability factors including consideration of atomic, chemical, biological, and radiological operations, electromagnetic radiation, fire and impact.

90.3.2.3 Paragraph 3.2.3, Reliability. Reliability shall be stated in quantitative terms, defining the conditions under which the requirements are to be met.

90.3.2.4 Paragraph 3.2.4, Maintainability. This paragraph shall specify the quantitative maintainability requirements. The requirements shall apply to maintenance in the planned maintenance and support environment and shall be stated in quantitative terms.

90.3.2.5 Paragraph 3.2.5, Environmental conditions. This paragraph shall include both induced and natural environmental conditions expected to be encountered by this critical item during storage, shipment, and operation. It shall include factors such as climate, shock, vibration, noise, and noxious gases.

90.3.2.6 Paragraph 3.2.6, Transportability. This paragraph shall include requirements for transportability which are common to all components to permit employment, deployment, and logistic support. All components that, due to operational or functional characteristics, will be unsuitable for normal transportation methods shall be identified.

90.3.3 Paragraph 3.3, Design and construction. This paragraph shall specify minimum critical item design and construction standards that have general applicability and are applicable to major classes of equipment (e.g., aerospace vehicle equipment, support equipment) or are applicable to particular design standards. To the maximum extent possible, these requirements shall be specified by reference to the established military standards and specifications. In addition, this paragraph shall specify criteria for the selection and imposition of Federal, military, and contractor specifications and standards.

90.3.3.1 Paragraph 3.3.1, Materials, processes, and parts. This paragraph shall specify those critical item-peculiar requirements governing use of materials, parts, and processes to be utilized in the design of the critical item. It shall also contain specifications as necessary for particular materials and processes to be utilized in the design of the critical item. Special attention shall be directed to prevent unnecessary use of strategic and critical materials. A strategic and critical materials list can be obtained from the contracting agency. In addition, requirements for the use of standard and commercial parts for which qualified products lists have been established shall be specified in this paragraph.

90.3.3.2 Paragraph 3.3.2, Electromagnetic radiation. This paragraph shall specify requirements related to electromagnetic

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radiation both the radiation in which the critical item must operate as well as radiation emanating from the critical item which could inadvertently activate or explode ordnance, or interfere with associated communications/electronics equipment.

90.3.3.3 Paragraph 3.3.3, Identification and marking. This paragraph shall cover the requirements for the use of color function and identification coding of electrical and hydraulic lines. This paragraph shall also cover the requirements for nameplates for identification and for operation or safety. Requirements for serialization and nomenclature shall not be included in this paragraph.

90.3.3.4 Paragraph 3.3.4, Workmanship. This paragraph shall specify the general requirements for workmanship which are incident to the manufacture of the critical item. Although general in nature the requirement stated herein relates to the finesse of manufacture which should be provided by the craftsman or the manufacturing technique.

90.3.3.5 Paragraph 3.3.5, Interchangeability. This paragraph shall cover all requirements for interchangeability or replaceability of the critical item or its components.

90.3.3.6 Paragraph 3.3.6, Safety. This paragraph shall specify requirements to preclude or limit hazards to personnel and equipment. To the extent practicable, these requirements shall be imposed by citing established and recognized standards. Limiting safety characteristics peculiar to the critical item due to hazards in assembly, disassembly, test, transport, storage, operation or maintenance shall be stated when covered neither by standard industrial or service practices nor by a higher level specification. "Fail-safe" and emergency operating restrictions shall be included where applicable. These shall include interlocks and emergency and standby circuits required to either prevent injury or provide for recovery of the critical item in the event of failure.

90.3.3.7 Paragraph 3.3.7, Human performance/human engineering. Human engineering requirements for the critical item should be specified herein and applicable documents (e.g., MIL-STD-1472) included by reference. This paragraph should also specify any special or unique requirements, e.g., constraints or allocation of functions to personnel and communications and personnel/equipment interactions. Included should be those specific areas which would require concentrated human engineering attention due to the sensitivity of the operation or criticality of the task, i.e., those areas where the effects of human error would be particularly serious.

90.3.3.8 Paragraph 3.3.8, Standards of manufacture. This paragraph, when applicable, shall include those standards or

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essential processes that, because of their significance, must be set forth as a requirement for the manufacture of the critical item. Requirements specified herein shall be to the level of detail necessary to clearly establish limits for the inspections included in Section 4 of the specification.

90.3.4 Paragraph 3.4, Qualification (Preproduction) (Periodic production) inspection. (See 4.3.9 and 4.3.11)

90.3.5 Paragraph 3.5, Standard sample. (See 4.3.10)

90.4 Section 4, Quality Assurance Provisions. Requirements for formal tests/verifications of the critical item performance and physical characteristics shall be specified in this section. In general, this section shall conform to the requirements of 4.4.

90.4.1 Paragraph 4.1, General This paragraph shall, as applicable, provide general information pertinent to tests and inspections not covered elsewhere in Section 4 of the specification, such as location or conditions for qualification testing, requirements for special testing of critical item components, etc.

90.4.1.1 Paragraph 4.1.1, Responsibility for inspection. This paragraph shall usually state that the responsibility for performing all specified tests/verifications rests with the supplier, and that the contracting agency reserves the right to witness or separately perform all tests specified or otherwise inspect any or all tests and inspections.

90.4.1.2 Paragraph 4.1.2, Special tests and examinations. This paragraph shall cover the testing routine, sequence of tests, number of critical items to be tested, data required, etc. for all testing requirements for other than acceptance inspection. It shall also include, preferably in tabular form, a correlation between each requirement, its tests, and the type of unit on which the test shall be performed.

90.4.2 Paragraph 4.2, Quality conformance inspections. This paragraph shall include, or reference, test and examination procedures for all requirements covered in Sections 3 and 5. All characteristics shall be classified as critical, major or minor, and other requirements of 4.4.2 shall be included or referenced. In addition, this paragraph shall specify the method of confirming that the critical item, as fabricated and assembled, complies with requirements of the critical item product function specification and the drawings.

90.5 Section 5, Preparation for delivery. (See 4.5)

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90.6 Section 6, Notes. (See 4.6)

*90.7 Section 10, Appendix I. (See 4.7)

* (Omit if not applicable)

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100. TYPE C2b, CRITICAL ITEM PRODUCT FABRICATION SPECIFICATION

100.1 Section 1, Scope. The content of Section 1 of a critical item product fabrication specification shall be as defined in the following example:

Example:

1. SCOPE

1.1 This specification establishes the requirements for manufacture and acceptance of the (insert identifier and nomenclature) critical item.

*1.2 Classification. (See 4.1.2)

100.2 Section 2, Applicable documents. The content of Section 2 of the specification shall be in accordance with paragraph 4.2.

100.3 Section 3, Requirements.

100.3.1 Paragraph 3.1, Critical item definition. This paragraph shall provide a brief description of the subject critical item. It shall, as appropriate, identify: (a) the major components of the critical item and (b) the individual components that must be manufactured.

*100.3.1.1 Paragraph 3.1.1, Government furnished property list. This paragraph shall list the Government furnished property which the critical item shall be designed to incorporate. This list shall identify the property by reference to its nomenclature, specification number and part number. If the list is extensive, it may be included in an appendix which shall be referenced in this paragraph.

100.3.2 Paragraph 3.2, Characteristics.

100.3.2.1 Paragraph 3.2.1, Performance. This paragraph shall include those performance requirements which are to be demonstrated by the quality conformance inspections in Section 4 of the specification. It may also include requirements for performance, reliability, etc., when such requirements are not completely controlled by detail drawings. In no instance should contradicting requirements be specified. All requirements included herein shall, in most cases, be limited to performance at environmental conditions normal to the place of acceptance and

* (Omit if not applicable)

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shall not attempt to simulate service environment. Requirements included herein shall be specified in physically measurable quantitative terms with tolerances. Such performance shall be in terms of the critical item itself without reference to equipments or facilities with which it must be compatible.

100.3.3 Paragraph 3.3, Design and construction. This paragraph shall include any essential requirements that are not controlled by the drawings or referenced documents.

100.3.3.1 Paragraph 3.3.1, Production drawings. This paragraph shall contain a statement similar to the following: "This (critical item name) shall be fabricated and assembled in accordance with the drawings, parts list, and other documents listed on (insert identification of data lists, index lists, parts lists or top drawing depending on which is the highest level listing of the applicable data)."

100.3.3.2 Paragraph 3.3.2, Standards of manufacture. This paragraph shall include those standards or essential processes that, because of their significance, must be set forth as a requirement for the manufacture of the critical item. Requirements specified herein shall be to the level of detail necessary to clearly establish limits for the inspections included in Section 4 of the specification.

100.3.3.3 Paragraph 3.3.3, Workmanship. This paragraph shall specify the general requirements for workmanship that are incident to the manufacture of the critical item. Although general in nature the requirement stated herein relates to the finesse of manufacture which should be provided by the craftsman and is not always specifically covered by the drawings. The requirements of this paragraph shall generally cover features that can be verified by visual examination. When applicable and logical this paragraph may cover:

- a. Burrs and sharp edges
- b. Presence of foreign matter
- c. Uniformity and general appearance.

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*100.3.4 Paragraph 3.4, Preproduction sample. (See 4.3.11) This paragraph, if provided, shall specify that a preproduction sample(s) shall be tested prior to regular production to demonstrate the adequacy and suitability of the contractor's processes and procedures in achieving the performance that is inherent in the design. Although in a function specification, the purpose of preproduction tests is to provide a basis for design approval, in a fabrication specification preproduction tests, like periodic production tests are intended to show that the techniques employed do not degrade the design. Preproduction tests in a fabrication specification are particularly necessary when a contract is awarded to a new source that has not previously produced the critical item. Selected performance requirements in the service environment may be added to paragraph 3.2 of a fabrication specification to provide requirements upon which preproduction tests in Section 4 of the specification are to be based. However, since all such performance requirements should be in the development specification for the critical item, it will reduce the bulk of the fabrication specification if performance requirements in the service environment are invoked by referencing the associated development specification. In addition, the titles and requirements of this paragraph may be made to cover samples for periodic production tests if such tests are considered necessary.

100.4 Section 4, Quality Assurance Provisions. Requirements for formal tests/verifications of the critical item performance and physical characteristics shall be specified in this section. In general, this section shall conform to the requirements of 4.4.

100.4.1 Paragraph 4.1, General. This paragraph shall, as applicable, provide general information pertinent to tests and inspections not covered elsewhere in Section 4, such as location or conditions for preproduction and periodic production testing, requirements for special testing of critical item components, etc.

100.4.1.1 Paragraph 4.1.1, Responsibility for inspection. This paragraph shall usually state that the responsibility for performing all specified tests/verifications rests with the supplier, and that the Government reserves the right to witness or separately perform all tests specified or otherwise inspect any or all tests and inspections.

100.4.1.2 Paragraph 4.1.2, Special tests and examinations. This paragraph shall cover the testing routine, sequence of tests, number of critical items to be tested, data required, etc. for all testing requirements for other than acceptance inspection. It shall also include, preferably in tabular form, a correlation between each requirement, its test, and the type of unit on which

* (Omit if not applicable)

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the test shall be performed.

100.4.2 Paragraph 4.2, Quality conformance inspections. This paragraph shall include, or reference, test and examination procedures for all requirements covered in Sections 3 and 5. All characteristics shall be classified as critical, major or minor, and other requirements of 4.4.2 shall be included or referenced.

In addition, this paragraph shall specify the method of confirming that the critical item, as fabricated and assembled, complies with requirements of the critical item product fabrication specification and the drawings.

100.5 Section 5, Preparation for delivery. (See 4.5)

100.6 Section 6, Notes. (See 4.6)

100.6.1 Paragraph 6.1, Intended use. (See 4.6.1)

100.6.2 Paragraph 6.2, Ordering data. (See 4.6.2) This paragraph shall contain the following:

- a. If preproduction inspection is specified a paragraph should be provided suggesting the number of samples to be ordered for such tests. The ordering of samples for preproduction tests may be limited to contracts awarded to new sources, with no previous production or development experience on the critical item. Disposition of the preproduction models after testing should be covered (e.g., replace all damaged parts and deliver for intended issue for service use, scrap, or hold for use in future development programs, etc.).

*100.7 Section 10, Appendix I. (See 4.7)

* (Omit if not applicable)

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110. TYPE C3, NON-COMPLEX ITEM PRODUCT FABRICATION SPECIFICATION

110.1 Section 1, Scope. The content of Section 1 shall be as defined in one of the following examples:

Example (1):

1. SCOPE

1.1 This specification establishes the requirements for manufacture and Government acceptance of the (insert nomenclature) non-complex item.

Example (2):

1. SCOPE

1.1 This specification establishes the performance, design, development, test, manufacture and acceptance requirements for the (insert nomenclature) non-complex item.

110.2 Section 2, Applicable documents. The content of Section 2 shall be in accordance with 4.2.

110.3 Section 3, Requirements. This section shall include those performance requirements which are to be demonstrated by the quality conformance inspections in Section 4 of the specification. In most cases for a non-complex item this section shall call out the production drawings and associated data that are to be followed in the manufacture of the non-complex item. In such instances, the drawings should be a full statement of the requirements.

110.3.1 Paragraph 3.1, Non-complex item definition. This paragraph shall provide a brief description of the non-complex item.

110.3.2 Paragraph 3.2, Characteristics.

110.3.2.1 Paragraph 3.2.1, Performance. This paragraph shall state what the non-complex item shall do including both upper and lower performance limits. When a complete set of drawings is invoked, performance characteristics shall be limited to those that are not completely controlled by the drawings.

110.3.2.2 Paragraph 3.2.2, Physical characteristics. This paragraph shall include physical requirements, as necessary, including weight, mounting and mating dimensions, color, protective coating, etc. when a set of manufacturing drawings is not available. When a set of drawings is invoked, this paragraph

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shall include a statement similar to the following:

"The (non-complex item name) shall be fabricated and assembled in accordance with the drawings, parts lists, and other documents listed on (insert identification of data lists, index lists, parts list or assembly drawing depending on which is the highest level listing of the applicable data)."

110.3.3 Paragraph 3.3, Workmanship. This paragraph shall specify the general requirements for workmanship which are incident to the manufacture of the non-complex item. Although general in nature the requirement stated herein relates to the finesse of manufacture which should be provided by the craftsman and is not always specifically covered by the drawings. The requirements of this paragraph shall generally cover features that can be verified by visual examination. When applicable and logical, the paragraph may cover:

- a. Burrs and sharp edges
- b. Presence of foreign matter
- c. Uniformity and general appearance.

110.3.4 Paragraph 3.4, Qualification inspection and samples. This paragraph shall, as applicable, cover requirements for qualification inspection (See 4.3.9), standard sample (See 4.3.10), and preproduction sample, periodic sample, pilot model or pilot lot (See 4.3.11).

110.4 Section 4, Quality Assurance Provisions.

110.4.1 Paragraph 4.1, General. This paragraph shall, if necessary, provide any information relative to quality assurance provisions not covered in other paragraphs of Section 4 of the specification.

110.4.1.1 Paragraph 4.1.1, Responsibility for inspection. (See 4.4.1.1)

110.4.1.2 Paragraph 4.1.2, Special tests and examinations. (See 4.4.1.2)

110.4.2 Paragraph 4.2, Quality conformance inspections. (See 4.4.2)

110.5 Section 5, Preparation for delivery. (See 4.5)

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110.6 Section 6, Notes. (See 4.6)

*110.7 Section 10, Appendix I. (See 4.7)

* (Omit if not applicable)

120. TYPE C4, INVENTORY ITEM SPECIFICATION

120.1 Section 1, Scope. The content of Section 1 of an inventory item specification shall be as defined in the following example:

Example:

1. SCOPE

1.1 This specification covers the requirements for inventory items that are available in the Government inventory for use in or with (include name and specification number of the system/configuration item in or with which these inventory items will be used).

120.2 Section 2, Applicable documents. If certain documents are applicable to all inventory items covered by this specification, such documents should be listed in accordance with 4.2. Otherwise, each appendix of the inventory item specification shall list documents applicable to that particular inventory item. When no such documents are to be listed in Section 2 of the inventory item specification, this section shall contain the following note: "See appendixes for applicable documents."

120.3 Section 3, Requirements. This section shall include a paragraph for each inventory item covered by the specification. Each paragraph shall reference an appendix for characteristics of the inventory item. Each appendix shall include all of the functional and physical requirements of the inventory item that must be satisfied to assure compatibility with the system/configuration item.

120.4 Section 4, Quality Assurance Provisions. This section shall invoke the quality assurance provisions contained in the appendix applicable to each inventory item.

120.5 Section 5, Preparation for Delivery. This section shall invoke the requirements of the applicable appendix.

120.6 Section 6, Notes. This section may refer to the appendixes and may also contain information to the contracting officer when such information relates to the entire group of inventory items.

120.7 Section 10, 20, etc., Appendixes. These sections shall include a function specification for each inventory item. A separate appendix shall be prepared for each required inventory item and requirements and quality assurance provisions specified shall be limited to those necessary to ensure the form, fit, and function required to achieve its intended purpose in the system/configuration item. The function specification shall be

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prepared in accordance with the applicable appendix of this standard.

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130. TYPE C5, SOFTWARE PRODUCT SPECIFICATION

130.1 Scope. This specification shall consist of the final up-dated versions of the Software Top Level Design Document, the Software Detailed Design Document(s), the Data Base Design Document(s), the Interface Design Document(s) and source and object code listings of the software that has successfully undergone formal testing. These documents shall be prepared in accordance with the Software Top Level Design Document Data Item Description, the Software Detailed Design Document Data Item Description, the Data Base Design Document Data Item Description, and the Interface Design Document Data Item Description. The Software Product Specification shall be prepared in accordance with the Software Product Specification Data Item Description.

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140. TYPE D, PROCESS SPECIFICATION

140.1 Section 1, Scope. The content of Section 1 shall be as defined in the following example:

Example:

1. SCOPE

1.1 Scope. This paragraph shall contain a statement of the technical coverage of this specification and of the general use of the process.

*1.2 Classification. This paragraph shall designate and define various types, classes, etc.

140.2 Section 2, Applicable documents. The content of Section 2 of the specification shall be in accordance with 4.2.

140.3 Section 3, Requirements. This section shall cover actual minimum needs and describe equipment, materials, and processing requirements for maximum application and eliminate as far as practical features that restrict the process to one, or a relatively few suppliers.

140.3.1 Paragraph 3.1, Equipment. This paragraph shall list or describe equipment such as heating media, control devices, etc.

140.3.2 Paragraph 3.2, Materials. This paragraph shall list and reference specifications for prime or basic materials, secondary materials, solutions, etc., as required.

140.3.3 Paragraph 3.3, Required procedures and operations. This paragraph shall provide detailed procedures that must be followed to assure that when the process is performed, the resulting item or material will be in accordance with its requirements.

140.3.4 Paragraph 3.4, Recommended procedures and operations. This paragraph covers optional or permitted procedures that would result in items or materials conforming to their specifications.

*140.3.5 Paragraph 3.5, Certification. This paragraph shall specify the requirements for certification of operators or process technique.

* (Omit if not applicable)

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140.4 Section 4, Quality assurance provisions. This paragraph shall cover all examinations and tests to be performed in order to decide that the processes, as well as the equipment, used in the process conform to the requirements in Section 3.

140.4.1 Paragraph 4.1, Responsibility for inspection. (See 4.4.1.1)

140.4.2 Paragraph 4.2, Monitoring procedures for equipment used in process. This paragraph shall include requirements for periodic checking and calibrating equipments used in the process to assure process control.

140.4.3 Paragraph 4.3, Monitoring procedures for materials. This paragraph shall include inspection requirements and sampling plans for materials used in the process to assure proper quality prior to use.

140.4.4 Paragraph 4.4, Certification. This paragraph shall specify sampling and procedures for certification of operators or process technique.

140.4.5 Paragraph 4.5, Test methods. This paragraph shall provide procedures for testing items or materials subjected to the process to ascertain that the process was properly performed.

140.5 Section 5, Preparation for delivery. This section is not applicable to this specification.

140.6 Section 6, Notes.

140.6.1 Paragraph 6.1, Intended use. This paragraph shall contain a complete and detailed description of the intended use of the process described herein.

*140.6.2 Paragraph 6.2, General information.

*140.6.3 Paragraph 6.3, Definitions. This paragraph shall define any terminology used in this specification which may not be recognized by the anticipated recipients of this specification.

*140.7 Section 10, Appendix I. (See 4.7)

* (Omit if not applicable)

150. TYPE E, MATERIAL SPECIFICATION

150.1 Section 1, Scope. The contents of Section 1 shall be as defined in the following example:

Example:

1. SCOPE

1.1 Scope. This paragraph shall contain a statement of the technical coverage of this specification and of the general use of the material.

*1.2 Classification. This paragraph shall contain the designations of types, classes, grades, sizes, compositions, and the definitive characteristics applicable to such designation.

150.2 Section 2, Applicable documents. The content of Section 2 shall be in accordance with 4.2.

150.3 Section 3, Requirements. This section shall cover the actual minimum functional, physical, chemical, electrical, and mechanical requirements of the material. These requirements shall be complete and to the level of detail necessary to reproduce the same material without recourse to the original manufacturer.

150.3.1 Paragraph 3.1, General material requirements. This paragraph shall include those requirements which the material must meet.

150.3.1.1 Paragraph 3.1.1, Character or quality. This paragraph shall contain qualitative statements as to the general condition or property of the material.

150.3.1.2 Paragraph 3.1.2, Formulation. This paragraph shall contain the quantitative values with upper and lower limits for material and each component of the material.

150.3.1.3 Paragraph 3.1.3, Product characteristics. This paragraph shall cover specific conditions and properties such as color, protective coating, waviness, surface finish, dimensions, weight, etc.

150.3.1.4, Paragraph 3.1.4, Chemical, electrical and mechanical properties. This paragraph shall cover composition, concentration, hardness, tensile strength, elongation, thermal expansion, electrical resistivity, etc.

* (Omit if not applicable)

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150.3.1.5, Paragraph 3.1.5, Environment conditions. This paragraph shall specify both induced and natural environmental conditions which the materials must withstand. These conditions and their effects on the material must be stated in measurable quantitative terms with limits.

150.3.1.6, Paragraph 3.1.6, Stability. This paragraph shall cover the requirements for shelf life, aging, etc.

150.3.1.7 Paragraph 3.1.7, Toxic products and safety. This paragraph shall specify requirements concerning effects on the health and safety of the user and include adequate safety provisions where applicable.

150.3.1.8 Paragraph 3.1.8, Identification and marking. This paragraph shall cover the requirements for the use of color for function or identification coding, for stamping or imprinting information on the material, etc.

150.3.1.9 Paragraph 3.1.9, Workmanship. This paragraph shall specify the general requirements for workmanship which are incident to the manufacture or processing of the material. Although general in nature the requirements stated herein relate to the finesse of manufacture processing that should be provided by the craftsman or by the manufacturing process. Requirements stated herein generally cover features that can be verified by visual examination.

150.3.2 Paragraph 3.2, Qualification (Preproduction) (Periodic production) inspection. (See 4.3.9 and 4.3.11)

*150.3.3 Paragraph 3.3, Differentiating requirements. This paragraph shall include the differentiating requirements for each type, class, grade, etc.

150.4 Section 4, Quality assurance provisions.

150.4.1 Paragraph 4.1, Responsibility for inspection. (See 4.4.1.1)

150.4.2 Paragraph 4.2, Special tests and examinations. (See 4.4.1.2)

150.4.3 Paragraph 4.3, Quality conformance inspection. (See 4.4.2)

*150.4.4 Paragraph 4.4, Test methods.

150.5 Section 5, Preparation for delivery. (See 4.5)

* (Omit if not applicable)

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150.6 Section 6, Notes. (See 4.6)

*150.7 Section 10, Appendix I. (See 4.7)

* (Omit if not applicable)

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SPECIFICATION CHANGE NOTICE
(SEE MIL-STD-490 FOR INSTRUCTIONS)

DATE PREPARED

1. ORIGINATOR NAME AND ADDRESS		2. <input type="checkbox"/> PROPOSED <input type="checkbox"/> APPROVED	3. CODE IDENT.		4. SPEC. NO.		
			5. CODE IDENT.		6. SCN NO.		
7. SYSTEM DESIGNATION	8. RELATED ECP NO.	9. CONTRACT NO.		10. CONTRACTUAL ACTIVITY			
11. CONFIGURATION ITEM NOMENCLATURE		12. EFFECTIVITY					
<p>THIS NOTICE INFORMS RECIPIENTS THAT THE SPECIFICATION IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS SCN BEING THOSE FURNISHED HEREWITH AND CARRYING THE SAME DATE AS THIS SCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES. COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4. CONSTITUTE THE CURRENT VERSION OF THIS SPECIFICATION.</p>							
13. SCN NO.	14. PAGES CHANGED (INDICATE DELETIONS)				* S	* A	15. DATE
16. TECHNICAL CONCURRENCE					DATE		

FORM DD 1 DEC 68 1696

* "S" indicates supersedes earlier page. "A" indicates added page

FIGURE 3. Sample Specification Change Notice.

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Custodians:

Army - AR
Navy - AS
Air Force - 10

Preparing activity:

Air Force - 10
(Project: CMAN-0-008)

Reviewing activities:

Army - AR, AT, AV, CR, GL, ME, MI, SC, SM
Navy - AS, EC, MC, OS, SA, YD, OM, SH
Air Force - 11, 15, 16, 17, 19, 23, 85

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-STD-490A	2. DOCUMENT TITLE
3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION (Mark one)
b. ADDRESS (Street, City, State, ZIP Code)	<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____
5. PROBLEM AREAS	
a. Paragraph Number and Wording:	
b. Recommended Wording:	
c. Reason/Rationale for Recommendation:	
6. REMARKS	
7a. NAME OF SUBMITTER (Last, First, MI) - Optional	b. WORK TELEPHONE NUMBER (Include Area Code) - Optional
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional	8. DATE OF SUBMISSION (YYMMDD)