NOTICE OF CHANGE

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NOT MEASUREMENT SENSITIVE

MIL-STD-961D
NOTICE 1
22 August 1995

DEPARTMENT OF DEFENSE
STANDARD PRACTICE

DEFENSE SPECIFICATIONS

TO ALL HOLDERS OF MIL-STD-961D:
1. THE FOLLOWING PAGES OF MIL-STD-961D HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
Cover page	22 August 1995	Cover page	22 March 1995
ii	22 August 1995	ii	22 March 1995
iii	22 August 1995	iii	22 March 1995
iv	22 August 1995	iv	22 March 1995
1	22 August 1995	1	22 March 1995
2	22 August 1995	2	22 March 1995
19	22 August 1995	19	22 March 1995
20	22 August 1995	20	22 March 1995
27	22 August 1995	27	22 March 1995
28	22 March 1995	28	Reprinted without change
51	22 March 1995	51	Reprinted without change
52	22 August 1995	52	22 March 1995
59	22 August 1995	59	22 March 1995
60	22 August 1995	60	22 March 1995
61	22 August 1995	61	22 March 1995
62	22 August 1995	62	22 March 1995
73	22 August 1995	73	22 March 1995
74	22 August 1995	74	22 March 1995
93 through 128*	22 August 1995	New pages	----------

* Pages 93 through 99 in MIL-STD-961D are the index and concluding material. These new pages do not replace the index and concluding material, but are to be placed in front of the index. Document users may renumber the index and concluding material pages, if desired.

AMSC D7162 AREA SDMP

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

3. Holders of MIL-STD-961D will verify that page changes and additions indicated above have been entered. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the standard is completely revised or canceled.

Custodians:
Army - AR
Navy - SH
Air Force - 11
DLA - DH

Preparing activity:
OSD - SO
(Project SDMP-0019)

Review activities:
Army - AL, AT, AV, CE, CR, EA, ER, GL, LM, MD, ME, MI, MR, MT, SC, SM, TE, TM
Navy - AS, CG, EC, MC, OS, SA, YD
Air Force - 10, 16, 17, 19, 22, 35, 45, 50, 68, 69, 70, 71, 79, 82, 84, 85, 99
DLA - CS, CT, DM, DP, ES, GS, IS, PS, SS
DISA - DC
DMA - MP
DNA - DS
OSD - DO

NOT MEASUREMENT SENSITIVE

MIL-STD-961D
22 March 1995

SUPERSEDING
(See 6.6)

DEPARTMENT OF DEFENSE STANDARD PRACTICE

DEFENSE SPECIFICATIONS

AMSC D7117 AREA SDMP

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

SUPERSEDES COVER PAGE OF MIL-STD-961D

FOREWORD

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

2. DoD 4120.3-M, "Defense Standardization Program Policies and Procedures," discusses the different types of specifications used by the DoD. This standard establishes practices for developing performance specifications, detail specifications, and program-unique specifications prepared by or for the DoD. This standard covers the requirements for "standard" performance and detail specifications that are used on multiple programs or applications. This standard also covers the requirements for program-unique performance and detail specifications that are used for a single program or system with little or no potential for use with other programs or systems. The requirements for program-unique specifications were previously covered by MIL-STD-490, which this standard supersedes.

3. It is DoD policy to give first preference to developing and using performance specifications. If it is not practical or effective to use a performance specification, a non-Government standard should be used. If it is not practical or effective to develop and use a performance specification or non-Government standard, a detail specification may be developed and used, but only as a last resort.

4. There are two primary objectives for the changes to this standard. First, for the DoD to meet its military needs in the current economic and political environment, it must increase access to an expanded industrial base that can meet defense needs at lower costs with state-of-the-art commercial technology. The changes herein will move the DoD to greater use of performance-based specifications and commercial-type specifications and standards. The second objective is to ensure that the contents of specifications cover only the requirements for a product (preferably in terms of performance) and the tests to verify that those requirements are met. Specifications should not include contractual provisions, such as data requirements, quality assurance, packaging, or contract administration.

5. Proper preparation and use of specifications is a difficult task requiring careful analysis and good judgment. The following points highlight areas of policy emphasis, intent, or changes. Areas where actual problems have been encountered on specific documents are also included. They are intended as a "checklist" to assist in document preparation.

a. For commercial products, consideration should first be given to using or developing a non-Government standard or including DoD requirements in an existing non-Government standard, or developing or revising a commercial item description.

b. Documents should be structured and formatted to categorize requirements as precisely as possible. Requirements that are generally necessary but can occasionally be removed should be written so that they can be tailored out while leaving other requirements unaffected. Requirements that are necessary only in certain instances should be written so that they can be tailored in. There is sufficient flexibility to make adjustments which may be required for a particular document.

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c. Detailed application guidance should be provided in the "Notes" section of each documen The purpose of this guidance is to provide noncontractual information on when and how to use the document. Information such as the following is recommended: (1) how to apply the document to different contract types and different program phases, (2) the source of and flexibility inherent with specific document requirements, (3) guidance on what is required to satisfy document requirement the extent of Government review and approval, and (5) the relationship between the particular doc and other related documents in the acquisition process.

d. A carefully documented, permanent record should be maintained by the specification prep activity of the source and reason behind particular requirements and changes to requirements. The rationale (measurement, testing, judgment, etc.) behind a specific numeric level is one example of v the record should contain. Issues and controversial areas during the coordination process should b noted, and it may be desirable to summarize these issues and areas in the "Notes" section of the document and solicit feedback as experience develops. This record should provide a basis for relat application guidance and a history useful in future document revisions.

e. Clear distinction should be made between requirements portions and guidance portions of documents. Careful attention to use of the words "should" (guidance language) and "shall" (requirement language) is important.

f. Requirement statements should be clear and unambiguous. One test to apply in preparing document is to ask what will a contractor have to do as a result of this requirement. The answer sh be apparent to both the Government and the contractor.

g. To the extent possible, requirements should be stated in performance or "what-is-necessar terms, as opposed to telling a contractor "how to" perform a task.

h. Care should be taken to avoid unnecessary reference to other documents and document "tiering". References should be justified. When only a portion of another document needs to be referenced, only that portion should be referenced. Document preparers are cautioned that only fir references are contractually binding. Critical requirements appearing in references below the first ti should be directly stated in the specification.

i. Ways to increase the use of commercial products that will satisfy Government requirement should be an important consideration during document preparation or revision.

j. Data item descriptions should be developed and circulated with documents during the draf coordination stages when applicable.

k. Feedback on the success or difficulties (benefits and costs) encountered in the application the document on specific contracts should be encouraged. Such feedback may be made by DD For 1426, by Material Deficiency Reports, or by letter or other appropriate forms.

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l. Efforts should be made to encourage and obtain inputs and perspectives outside of a document's normal proponent group (such as the quality, reliability, or packaging communities).

m. Care should be taken to ensure that industry comments are requested during the draft stages of document preparation and that proper Government coordination occurs.

n. The figures appearing at the back of this standard are fictitious and are used only as examples to illustrate format. If there is any conflict between the text and the figures, the text applies.

6. This revision more strongly reaffirms the DoD's policy on prohibiting fixed levels of defects, such as acceptable quality levels (AQLs) and lot tolerance percent defectives (LTPDs), as firm specification requirements. Such specification requirements imply that defects are allowable, institutionalize the process of accepting non-conforming materiel, and do not motivate contractors to improve product quality. In addition, AQLs and LTPDs are not requirements or tests for the product being acquired. They reflect levels of risk that the customer is willing to take when acquiring a product. As such, AQLs and LTPDs should not be part of the specification, but may be part of the quality assurance provisions in the contract.

7. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Office of the Assistant Secretary of Defense (Economic Security), Standardization Program Division, 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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1. SCOPE

1.1 Scope. This standard establishes the formats, contents, and procedures for the preparation of performance specifications, detail specifications, program-unique specifications, and associated documents, prepared either by Government activities or under contract (see 6.3 and 6.4). Associated documents for performance and detail specifications include associated specifications, specification sheets, supplements, revisions, amendments, and notices. Associated documents for program-unique specifications include revisions, drawings, software design descriptions, and software listings.

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

STANDARDS

FEDERAL

FED-STD-376 - Preferred Metric Units for General Use by the Federal Government.

DEPARTMENT OF DEFENSE

MIL-STD-12 - Abbreviations for Use on Drawings, and in Specifications, Standards and Technical Documents.
DOD-STD-963 - Data Item Descriptions (DIDs), Preparation of.
MIL-STD-1806 - Marking Technical Data Prepared by or for the Department of Defense.

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HANDBOOK

DEPARTMENT OF DEFENSE

MIL-HDBK-248 - Acquisition Streamlining.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

DoDISS	-	Department of Defense Index of Specifications and Standards.
DoD 5010.12-L	-	Acquisition Management System and Data Requirements Control List (AMSDL).
SD-1	-	Standardization Directory.
SD-14	-	Listing of Toxic Chemicals, Hazardous Substances, and Ozone-Depleting Chemicals.
Cataloging Handbook H2-1	-	Federal Supply Classification, Part 1, Groups and Classes.
Cataloging Handbook H6	-	Federal Item Name Directory for Supply Cataloging.

United States Government Printing Office (GPO) Style Manual.

(Copies of DoD 5010.12-L, SD-1, and SD-14 are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. Copies of Cataloging Handbooks H2-1 and H6 are available from the Commander, Defense Logistics Services Center, Battle Creek, MI 49017-3084. Copies of the GPO Style Manual are available from the Superintendent of Documents, U.S. Government Printing Office, North Capitol & "H" Streets, N.W., Washington, DC 20402-0002. Copies of the DoDISS are available on a yearly subscription basis either from the Government Printing Office or the DoDSSP Subscription Services, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

only to the specific paragraph number. The word "paragraph" shall not appear, for example, "(see 3.1.1)".

4.21 References to other documents. Judicious referencing of other documents in specifications is a valuable tool that eliminates the repetition of requirements and tests adequately set forth elsewhere. However, unnecessary or untailored referencing of other documents can lead to increased costs, excessive tiering, ambiguities, and compliance with unneeded requirements. The following rules shall apply when referencing another document as a requirement in a specification and listing it in section 2 as an applicable document:

a. If the information is less than a page and if it is not a violation of copyright provisions (see 4.3.4), it should be included directly into the specification without referencing another document.

b. Referenced documents shall be current (not canceled or superseded), approved for use (not drafts), and readily available.

c. Unless the entire referenced document applies, it shall not be cited in total, but shall be tailored by citing the appropriate sections of the document, such as specific types, grades, or classes; test methods; or definitive descriptions (for example, "the painting requirements of MIL-STD-000"). Do not reference specific paragraph, table, or figure numbers from other documents since revisions to these documents often result in renumbering.

d. References shall not be made to the following types of documents:

(1) Directives, instructions, regulations, and other types of policy documents, except in section 6 for information only.

(2) Data Item Descriptions, except as allow by 4.3 and 5.3.6.5.

(3) Management, manufacturing, and process type documents that should be cited in contracts. A known list of these documents is identified in the SD-1, and these documents shall not be referenced. However, such a list can never be totally complete. Document preparers shall not reference any documents that do not comply with the intent of this restriction.

(4) Specifications, standards, drawings, or other documents that contain proprietary or unique design solutions that would restrict competition, or that would not be readily available to competing contractors because they are owned by a particular company.

4.22 Preparation of documents. Documents shall be single spaced with a margin of 1 inch at the sides, top, and bottom of the page. Documents sent to the DoDSSP for printing, distribution, and indexing in the DoDISS shall be submitted on a 3.5" diskette, in Printer Description Language or Portable Document Format. A one-sided paper copy of the document shall also be submitted.

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5. DETAILED REQUIREMENTS

5.1 General. This section contains detailed format requirements for preparing a "standard" performance or detail specification as well as the associated documents, namely - supplement, amendment, notice, associated specification, and specification sheet. The detailed format requirements for preparing program-unique performance and detail specifications are contained in the appendix.

5.2 First page information. Drafts of proposed specifications shall carry one of the notes below at the top of the first page, as applicable. This note shall be removed from the camera ready master after approval and prior to reproduction.

"NOTE: This draft, dated (date) prepared by (preparing activity), has not been approved and is subject to modification. DO NOT USE FOR ACQUISITION PURPOSES. (Project)"

"NOTE: This draft, dated (date) prepared by (name of agent), as agent for (preparing activity), has not been approved and is subject to modification. DO NOT USE FOR ACQUISITION PURPOSES. (Project)"

5.2.1 Heading. Specifications shall have one of the following headings centered above the title:

a. "PERFORMANCE SPECIFICATION" if the document meets the criteria specified in 5.3.3.3.

b. "DETAIL SPECIFICATION" if the document meets the criteria specified in 5.3.3.4.

5.2.2 Specification titles. A specification title shall consist of a basic item name, Government type designator (when applicable), and modifiers to differentiate between similar specifications listed in the DoDISS. Duplication of specification titles is not permissible. Reference to major assemblies or end items shall be included in the title only to the extent necessary to distinguish between similar items.

5.2.2.1 Item names. Item names shall conform to Cataloging Handbook H6. Use of other than an approved item name in Cataloging Handbook H6 shall be on an agreed-upon basis between the cataloging organizations and the specification preparing activity.

5.2.2.2 General rules. The following rules shall apply to specification titles:

a. Specification titles may be in two parts. The first part shall be an item name in accordance with 5.2.2.1. When required, the second part shall consist of those modifiers and Government type designators necessary to complete the item identification (see 5.2.2.4). The first part of the title shall be separated from the second part of the title by a dash. For example:

"SPRING, HELICAL COMPRESSION - RECOIL ADAPTER"
{First part of title} {Second part of title}

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5.2.6 DD Form 1426 note. Specifications in six-section format shall include the following note on the bottom center of the first page immediately above the FSC designation. The note shall be boxed for emphasis.

> Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: (insert name and address of the preparing activity) by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

5.2.7 Designation of federal supply class (FSC), group (FSG), or area assignment. The specification shall be assigned a FSC or FSG as defined in the Cataloging Handbook H2-1, Part 1, or a standardization area as defined in the SD-1. The applicable FSC, FSG, or area assignment shall appear in the lower right corner of the first page of the specification below the beneficial comments box. The symbol "GP" shall follow the FSG number, (for example, 59GP) when the FSG number identifies the assignment or project. Specifications covering more than one FSC shall be designated with the applicable FSG or with the appropriate standardization area if more than one FSG is covered. Dual or multiple FSC, FSG, or standardization area designations shall not be used.

5.2.8 AMSC number. All standardization documents shall reflect either an AMSC number or "AMSC N/A" at the bottom left of the first page, below the beneficial comments box. The following indicates which documents require an AMSC number and which ones require "AMSC N/A."

a. With the exceptions noted in b. and c. below, specifications shall be marked "AMSC N/A."

b. Data product specifications require assignment of an AMSC number (see 4.3.1).

c. Technical manual specifications require assignment of an AMSC number (see 4.3.2).

d. Amendments require either the same AMSC number or "AMSC N/A" as shown on the document being amended. While amendments do not require clearance, a copy of all amendments bearing an AMSC number shall be sent to the AMSDL Clearance Office concurrent with submittal of the manuscript to the DoDSSP for printing.

e. Validation notices, cancellation notices, reinstatement notices, inactive for new design notices, and supplements require "AMSC N/A."

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5.2.9 Distribution statement. All standardization documents prepared by the DoD will cite the appropriate distribution statement in accordance with MIL-STD-1806 on the line immediately below the FSC, FSG, or area designation flush with the left hand margin. The distribution statement shall be placed on all coordination drafts, as well as the camera ready copy of the document. Since most specifications do not contain sensitive technical information, the following distribution statement is the one that will usually be used:

"DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited."

5.3 Sectional arrangement of specifications. Except for specification sheets (see 5.12), specifications shall contain six numbered sections, titled and numbered as shown below. A table of contents and cover sheet shall not be used. For lengthy documents, an alphabetical index may be used (see 5.6).

1. SCOPE

2. APPLICABLE DOCUMENTS

3. REQUIREMENTS

4. VERIFICATION

5. PACKAGING

6. NOTES

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. 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."

5.3.1 SECTION 1.

5.3.1.1 Scope. The statement of the scope shall repeat the item name and its modifiers and consist of a clear, concise abstract of the coverage of the specification and may include, whenever necessary, information as to the use of the item other than specific detailed applications covered under "Intended use" (section 6). This brief statement shall be the beginning paragraph in section 1 of the six-section specification. As applicable, reference may be made to information contained in section 6 (see figure 3). The scope shall not contain requirements. Figures shall not be included in the scope.

5.9.10 Insertion of paragraphs, figures, and tables. When new paragraphs, figures, or tables are added to the specification, they should be numbered in such a way that renumbering of existing paragraphs, figures, and tables is not necessary. For example:

Existing	Added	Existing
Table II	Table II-1	Table III
Figure 2	Figure 2A	Figure 3
Paragraph 5.11	Paragraph 5.11.1	Paragraph 5.12

5.9.11 Successive (cumulative) amendments. Amendments are cumulative and each successive amendment shall be written to completely supersede the previous amendment.

5.9.12 Successive interim amendments. Except for those requirements that are being changed, each successive interim amendment shall consolidate information contained in the previous interim amendment.

5.9.13 Page numbering. The first page shall indicate the total number of pages in the amendment and the page number (such as, 1 of 3 or 1 of 1) at the bottom center of page. All remaining pages of multi-page amendments shall be successively numbered with Arabic numerals at the bottom center of page. Insertable replacement pages shall carry the page number of the page being replaced and, for the purpose of page numbering only, shall not be counted as part of the amendment.

5.9.14 Concluding material. The concluding material of the specification shall be shown after the text of the amendment in the same manner as in the basic specification, including the project number for the amendment action. For interim amendments, the preparing activity, review activities, if any, of the limited coordination department, and project number shall be listed.

5.9.15 Changes from the previous amendment. An asterisk or vertical line shall be placed in the left margin opposite the change to denote a change from the previous amendment (on figures, the asterisk shall be placed as near the actual change as possible, so that it can be readily identified). The following note shall be added at the end of the amendment preceding the concluding material:

"The margins of this amendment are marked with an asterisk (or vertical lines) to indicate where changes from the previous amendment 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 notations and relationship to the last previous amendment."

5.10 Notices.

5.10.1 Purpose. Notices are used to inactivate for new design, cancel, reinstate, reactivate, or validate specifications. Notices shall not be used to transmit revisions or amendments. Notices completely supersede all previous notices.

5.10.2 Validation notice. A validation notice shall be prepared to indicate that a specification is technically valid without change. A validation notice shall be issued without a project number and without formal coordination. The notice is required at the time of the five year overage review if the document is determined to be valid and in compliance with defense acquisition and standardization policies. Technical changes shall not be made on the validation notice, but the preparing activity shall update the custodians, review activities, and other interested activities on the notice. The format of the notice shall be similar to that shown on figure 13, figure 14 for validation of inactive for new design documents, or figure 15 for a group validation. The actual wording may vary to indicate the reason for the notice, however, it shall include a definite statement that the document as approved is still valid for acquisition without change.

5.10.3 Inactive for new design notice. An inactive for new design notice shall be prepared to indicate that an item or process is prohibited for use in new design and is used only in existing assemblies or units. Items or processes so designed may be used for new assemblies or units developed for existing design contracts where the inactive item or process is being used for existing designs in the same contract, or in assemblies for existing units or systems required under future contracts. Superseding documents for new design application shall be referenced in the notice when applicable and shall have a different specification number than that of the specification covered by the notice. When applicable, a precautionary note shall be included as follows: "CAUTION: The supersession information is valid as of the date of this notice and may be superseded by subsequent revisions of the superseding document." When a QPL is associated with the "inactive for new design" specification, the following sentence shall be included in the notice: "The Qualified Products List (QPL) associated with this inactive for new design specification will be maintained until acquisition of the product is no longer required whereupon the specification and QPL will be canceled" (see figure 16). Inactive status can also be accomplished in a revision (see 5.2.4.1). Documents inactivated for new design may be maintained by revision or amendment without updating of the existing inactive for new design notice.

5.10.4 Cancellation notice. A cancellation notice shall be prepared when a specification or specification sheet is no longer required (see figures 17 and 18). A group cancellation may also be done for a general specification and associated specifications or specification sheets (see figure 19). The cancellation notice shall indicate supersession information and classification cross-references, when applicable. Custodians and review activities shall be shown.

b. Example of significant PIN (second type).

"PIN: Consists of the letter M, the basic number of the specification sheet, and a dash number compiled from the code.

Specification
sheet number _____ Dash number _____

M12345/1-	A	1	0	L	1A
	Insert	Shield and shield clamp location or retaining plate	Shell type	Jackscrews or guide pins	Contacts

PIN CODE:

Insert	Shield and Shield clamp location or retaining plate		Shell type
A - MS18264	Shield		0 - None
B - MS18240	1 - Top	MS24132	
C - MS18242	2 - Side	MS24132	
D - MS18244	3 - Top	MS24133	
E - MS18246	4 - Side	MS24133	
F - MS19258	5 - Top	MS18193	
G - MS18250	6 - Side	MS18193	
H - MS18252	0 - None included		
J - MS18254			

Jackscrews or guide pins		Contacts:
L - Long jackscrews	MS18194	1A - 100 percent size 16-16
S - Short jackscrews	MS18195	2A - 100 percent size 16-20"
G - Guidepins	MS18197	
0 - None included		

5.12.15 Revisions and amendments. Revisions shall be prepared in accordance with 5.7, and amendments shall be in accordance with 5.9.

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5.12.16 MS sheets. Existing MS Sheet Form Standards, as they are revised, shall be reformatted on 8-1/2 by 11 paper. The DD Form 672 has been discontinued and shall not be used. The existing MS number may be retained; however, it is preferred that existing MS numbers be converted to specification sheet numbers (see 5.2.3.1.1) if the renumbering does not adversely affect existing systems. If MS numbers are converted to specification sheet numbers, then substitution data shall be included to supersede every MS dash number. New specification sheets with the MS prefix shall not be prepared for any new specifications. MS specification sheets (formerly known as MS Sheet Form Standards) using the MS numbering system may continue to be used only with a specification where a series of MS numbered documents already exists.

6. NOTES

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

6.1 Intended use. Specifications conforming to the requirements of this standard are intended for use as military standardization documents and are listed in the DoDISS. The general format described should also be considered for use in developing purchase descriptions and other non-DoDISS procurement specifications especially those which may be converted to a military standardization document at a later date.

6.2 Issue of DoDISS. When this standard is used in acquisition, the applicable issue of the DoDISS must be cited in the solicitation (see 2.2.1 and 2.3).

6.3 Associated Data Item Descriptions (DIDs). This standard is cited in DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), as the source document for the following DIDs. When it is necessary to obtain the data, the applicable DIDs must be listed on the Contract Data Requirements List (DD Form 1423), except where the DoD Federal Acquisition Regulation Supplement exempts the requirement for a DD Form 1423.

DID Number	DID Title
DI-SDMP-81465	Performance Specification Documents
DI-SDMP-81464	Detail Specification Documents
DI-SDMP-81493	Program-Unique Specification Documents

The above DIDs were current as of the date of this standard. The current issue of the AMSDL must be researched to ensure that only current and approved DIDs are cited on the DD Form 1423.

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6.4 Tailoring guidance. To ensure proper application of this standard, invitations for bids, requests for proposals, and contractual statements of work should tailor the requirements in sections 4 and 5 of this standard to exclude any unnecessary requirements. For example, if the statement of work requires a revision to a stand alone specification, then all the paragraphs in this standard related to amendments, notices, supplements, and specification sheets should be excluded.

6.5 Subject term (key word) listing.

Amendments
Cancellation notices
Data item descriptions
Detail specifications
Metric
MS sheets
Notices
Performance specifications
Program-unique specifications
Reinstatement notices
Revisions
Specification sheets
Standardization documents
Supplements
Validation notices

6.6 Supersession information. This standard supersedes the following documents:

MIL-STD-961C dated 20 May 1988
MIL-STD-490A dated 4 June 1985
MIL-S-83490 dated 30 October 1968
MIL-S-83490/1 dated 18 June 1974
MIL-S-83490/2 dated 18 June 1974

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

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The following checklist may be used in specifications covered by this standard. It is not all inclusive, nor must every item listed be included. This is only a guide and not a replacement for the instructions in this standard.

1. Security classification
2. Document identifier
3. Initial draft note
4. Heading
5. Title
6. Supersession data
7. Preamble
8. Beneficial comments
9. FSC, FSG, or area
10. AMSC number or AMSC N/A
11. Distribution statement

SECTION 1: SCOPE

1. Scope
2. Classification

SECTION 2: APPLICABLE DOCUMENTS

1. Required general paragraph
2. Correct document numbers and titles
3. Documents referenced in sections 3, 4, and 5 only
4. Sources for documents
5. Order of precedence

SECTION 3: REQUIREMENTS

1. Paragraph on associated specifications, MS sheets, or specification sheets
2. Qualification
3. First article
4. Standard sample
5. Materials
6. Environmental considerations
7. Recycled, reclaimed, recovered material
8. Design
9. Construction
10. Hardware
11. Reliability
12. Maintainability
13. Transportability
14. Performance characteristics
15. Energy efficiency
16. Human factors
17. Safety
18. Chemical and physical properties
19. Electromagnetic interference suppression
20. Dimensions
21 Weight
22. Color
23. Finish
24. Identification plate
25. Anti-counterfeiting
26. Government-furnished property
27. Government-loaned property
28. Workmanship
29. Requirements covered examinations and tests in section 4

FIGURE 1. Checklist for drafting specifications.

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4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 First article inspection. First article inspection shall be performed on one complete pumping assembly when a first article sample is required (see 3.1). This inspection shall include the examination of 4.4 and the tests of 4.5.1 through 4.5.6.

4.3 Conformance inspection. Conformance inspection shall include the examination of 4.4 and the tests of 4.5.1 and 4.5.4.

4.4 Examination. Each pumping assembly shall be examined for compliance with the requirements specified in 3.2 through 3.5. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet the specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.5 Methods of inspection.

4.5.1 Hydrostatic. The pump and fittings shall be subjected to a hydrostatic test gauge pressure of 300 lb/in^2, for a period of 5 minutes to determine conformance to 3.6.2.

4.5.2 Performance.

4.5.2.1 Test conditions. All data shall be corrected to sea level conditions, barometric pressure 29.92 inches of mercury, for JP-5 and Navy special fuels at 60°F at a specific gravity of 0.80 and 0.98 respectively. Water at a temperature of 60°F to 80°F shall be used as a test fluid.

FIGURE 7. Example of section 4.

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4.5.2.2 Pumping. The pump shall be operated as specified herein to determine pump brake horsepower required, pump efficiency, and the net positive suction head required, based on the data obtained. The resultant data shall be used to plot the corrected performance characteristics of the performance chart (see 3.8). The test shall be conducted in accordance with the Hydraulic Institute Standards of the HI, Centrifugal Pump Section. Performance at rates less than those specified in 3.6.1 shall constitute failure of this test.

4.5.3 Operational test. The pumping assembly shall be operated for 24 hours at the rated conditions specified in 3.6.1. The pump shall be examined at the end of each 8 hour interval during the 24 hours. Maintenance and minor adjustments shall be permitted during the examination periods. The pump shall be examined during the operation for leakage through the pump casing or the shaft seals and for malfunction of any component. Any leakage attributes to defects in design, workmanship, materials, or to the malfunction of any component, or inability of the pump to deliver the minimum capacities specified herein shall constitute failure of this test.

4.5.4 Functional test. The pump shall be operated 1 hour at rated capacity under the conditions specified in 3.6.1 and shall be operated as required to verify the functional operation of the controls. The control functions shall be in accordance with the applicable requirements of 3.7.

4.5.5 Tilted position. The pumping assembly shall be operated for not less than 30 minutes while it is positioned 15 degrees from level along the longitudinal centerline of the skid base. Evidence of malfunction or misalignment of components shall constitute failure of this test.

4.5.6 Cold starting. The pumping assembly shall be placed in a cold chamber at 20°F for 48 hours or until stabilization temperature is reached. The system shall demonstrate three successive starting cycles without the use of external power. Sufficient time shall be allowed so that components can return to 20°F equilibrium.

FIGURE 7. Example of section 4 - Continued.

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PROGRAM-UNIQUE SPECIFICATION PREPARATION GUIDELINES

A.1 GENERAL

A.1.1 Scope. This appendix establishes the style and format requirements and the content guidelines for program-unique system, item, software, process, and material specifications. This Appendix is a mandatory part of this standard when program-unique specifications are ordered. The information contained herein is intended for compliance.

A.1.2 Applicability. This appendix applies to DoD activities and contractors who are tasked with the preparation of specifications for program-unique systems, items, software, processes, and materials. Program-unique specifications are not DoDISS documents. They are not listed in the DoDISS, do not follow the DoDISS numbering methodology, and are not subject to the standardization document approval or maintenance process. The preparing activity typically assigns the document number using their local methodology. The tasking activity is the approval authority for program-unique specifications. Program-unique item and software specifications are to be prepared as unified specifications containing all applicable performance and design requirements in a single document as opposed to separate development (or requirements) and product specifications, as in the past.

A.1.3 Purpose. The purpose of this appendix is to provide uniform guidelines for the preparation of program-unique specifications. The preparing activity will be responsible for following the guidelines for specification content contained in this appendix for all types of program-unique specifications. The preparing activity will be responsible for selecting and completing the paragraphs identified within a specification section that are appropriate for the kind and complexity of system, item, software, process, or material being addressed in the specification.

A.2 APPLICABLE DOCUMENTS. No applicable documents are cited in this appendix.

A.3 DEFINITIONS.

A.3.1 Acronyms. Most of the acronyms used in this appendix are defined in 3.1. The following acronyms apply only to this appendix.

CAGE - Commercial and Government Entity

CSCI - Computer Software Configuration Item

DBDD - Data Base Design Description

GFP - Government Furnished Property

IDD - Interface Design Description

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IS - Item Specification

MS - Material Specification

PS - Process Specification

SDD - Software Design Description

SS - Software Specification

SYS - System Specification

A.3.2 Definitions. Most of the special words used in this appendix are defined in 3.2. The following definitions apply only to this appendix.

A.3.2.1 Entity. The general term used in this appendix to denote the system, item, software, process, or material that is the subject of the program-unique specification.

A.3.2.2 Program-unique specification. A specification that describes a system, item, software program, process, or material developed and produced (including repetitive fiscal year production and spares purchases) for use within a specific program, or as a part of a single system and for which there is judged to be little potential for use by subsequently developed systems.

A.4 GENERAL REQUIREMENTS FOR PROGRAM-UNIQUE SPECIFICATIONS

A.4.1 General. This section provides general requirements for the style and format, the selection and preparation of the paragraphs, the content and format of the cover page, and the format of a Requirements/Verification Cross-reference Matrix.

A.4.2 Style and format. Program-unique specifications shall meet the style and format requirements of section 4.

A.4.3 Paragraph selection and preparation. Program-unique specifications shall include the appropriate requirements as a part of the appropriate section of the specification. Table A-I, located at the end of this appendix, provides a listing of paragraph titles together with indicators showing when the paragraphs should be included in the various types of specifications. Section A.5 and table A-I provide content guidelines for the system specification (SYS), the item specification (IS), the software specification (SS), the process specification (PS), and the material specification (MS). Table A-I references the paragraphs in A.5 where information can be found prescribing the kind of requirements commonly included in that specification paragraph. Each paragraph cited as recommended in the table

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should be evaluated for applicability to the entity (see A.3.2.1) for which the specification is being prepared. Where the paragraph is determined to be applicable, the information recommended for inclusion in that paragraph should be provided. Titles need not be incorporated exactly as cited in A.5, especially if there is a more descriptive title that can be used (such as to indicate broader or narrower coverage of the topic area). Activities preparing program-unique specifications should ensure that the appropriate requirements (including any not covered herein that may be unique to the entity being specified) are incorporated as a part of the appropriate recommended paragraph of the specification or incorporated as additional paragraphs in the appropriate section of the specification.

A.4.4 Cover page. Program-unique specifications shall include a cover page as the first page (see figure A-1). The cover page shall include the specification identification (consisting of the original design activity Commercial and Government Entity (CAGE) code and specification number), specification revision level, type of specification, title of specification, the preparing activity name, address and CAGE code (if different than the original design activity CAGE code), the current change control authority CAGE code (if different than the original design activity CAGE code), the applicable distribution statement and, when applicable, the Federal Supply Class (FSC). If the document is managed as paper, and the preparing activity and current change control authority are different, the cover page may include preparation and approval signatures and dates. At the discretion of the current change control authority, the cover page may also include the contract number and CDRL sequence number under which the specification is submitted for approval by the current change control authority.

A.4.4.1 Identification of program-unique specifications. Program-unique specifications shall be identified and dated as specified in the following paragraphs.

A.4.4.1.1 Specification identifier. The program-unique specification identifier shall be generated by the original design activity and shall be appear in the upper right corner of the first page. The identifier shall include any combination of numbers, letters, and dashes, subject to the following limitations:

a. The number should not contain more than fifteen characters, including dashes.

b. The letters I, O, Q, S, and Z shall not be used.

c. The letters used shall be upper case.

d. The numbers used shall be Arabic numerals. Fractional, decimal, and Roman numerals shall not be used.

e. Blank spaces shall not be used within the specification number.

f. Symbols such as parentheses "()", asterisks "*", plus "+", or similar shall not be used.

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g. The specification revision letter shall not be considered as a part of the specification number.

h. Specification numbers shall not be repeated within a CAGE-coded original design activity.

A.4.4.1.2 Revisions. Specifications shall be updated, as a result of an approved engineering change, only by means of a revision. A revision consists of a complete reissue of the entire specification, with all pages being undated and identified by the new revision letter assigned by the current configuration control authority. Revisions shall be indicated by a capital Gothic letter following the number. The first revision shall be marked with the letter "A" and succeeding revisions shall be indicated by the other letters in alphabetical sequence, except that the letters I, O, Q, S, and Z shall not be used. Revision letter "A" shall be assigned to the first revision. Each revision shall incorporate all outstanding approved wording changes since the last revision. Specification revisions shall be issued in the same manner as the original issue. A new cover page shall be generated reflecting the revision level and new date.

A.4.4.2 CAGE code. The CAGE code for the preparing activity of the specification shall be identified on the cover page. If a revision of the specification is being prepared, and if the design activity which is currently responsible for the specification is different than the original design activity, the CAGE code of the current change control authority shall be identified beneath the original design activity's CAGE code (see figure A-1).

A.4.4.3 Date of specification. The specification approval date shall appear on the cover page under the specification identifier.

A.4.4.4 Heading. Program-unique specifications shall have one of the following headings centered above the title:

a. "PERFORMANCE SPECIFICATION" as defined in 3.29.

b. "DETAIL SPECIFICATION" as defined in 3.9.

The letters "PRF", if it is a performance specification, or "DTL", if it is a detail specification, shall be entered in front of the specification number. These letters shall not be considered to be a part of the specification number.

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A.4.4.5 Type of specification. The appropriate type of program-unique specification shall be included as a part of the specification title, as follows:

"SYSTEM SPECIFICATION FOR THE"

"ITEM SPECIFICATION FOR THE"

"SOFTWARE SPECIFICATION FOR THE"

"MATERIAL SPECIFICATION FOR THE"

"PROCESS SPECIFICATION FOR THE"

A.4.4.6 Specification title. The specification title shall be the name by which the entity [system, item, software, process, or material] will be known. In most cases, it shall consist of the approved item name and type designator issued by the appropriate nomenclaturing activity. Specification titles shall not be duplicated within a program. References to major assemblies, end items, computer software units, processes, or materials shall be included in a title only to the extent necessary to distinguish between similar systems, items, software, processes, or materials. Where an approved item name is not required, the following guidelines shall be used in generating a specification title:

a. Specification titles may be in two parts. The first part shall be a descriptive name. The second part shall consist of those modifiers and government type designators as necessary to complete the identification.

b. No abbreviations shall be used in the first part of the title; abbreviations may be used in the second part of the title.

c. Specification titles shall not begin with numbers.

d. Specification titles shall be as brief as possible and shall be constructed so as to distinguish between similar items.

e. No word(s), symbol(s), or combination thereof which would disclose information regarding established security categories shall be used in specification titles.

A.4.4.7 "Submitted By" authorization signature and date. The applicable preparing design activity's authorizing signature and date indicating that the specification is complete and ready to submit to the government for approval shall be identified as follows: (Only required for paper copies.)

"SUBMITTED BY:"

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A.4.4.8 "Approved for use" authorization signature and date. The applicable government approval signature and date shall be identified as follows: (Only required for paper copies.)

"APPROVED FOR USE AS THE FUNCTIONAL BASELINE BY:"

"APPROVED FOR USE AS THE ALLOCATED BASELINE BY:"

"APPROVED FOR USE AS THE PRODUCT BASELINE BY:"

A.4.4.9 Distribution statement. (See 5.2.9.)

A.4.4.10 Designation of FSC. (See 5.2.7.)

A.4.4.11 Government rights in technical data and software. Where applicable, limited rights, restricted rights, or Government Purpose License Rights claims shall be identified on the cover page of the specification with the appropriate approved legend.

A.4.5 Cross-referencing requirements and verifications. Each requirement identified in section 3 shall be cross-referenced with the section 4 method used to verify compliance with the requirements. Section 4 of a program-unique performance specification shall include a Requirements/Verification Cross-Reference matrix (see figure A-2) which cross-references all the performance requirements in section 3 with the appropriate verification requirements in section 4. Likewise, section 4 of a program-unique detail specification shall include a Requirements/Verification Cross-Reference matrix (see figure A-3) which cross-references the performance and design requirements in section 3 with the appropriate verification requirements in section 4. If the performance specification has changed into a detail specification through the addition of the design requirements, the detail specification version of the matrix must continue to maintain the design verification column of the matrix, including all future approved engineering changes, as a separate column (classification) of verifications.

A.5 DETAILED GUIDELINES FOR SPECIFICATION CONTENT

A.5.1 SECTION 1 - SCOPE. This section should identify the name of the entity covered by this specification, including appropriate modifiers to better differentiate it from similar items. It should provide a clear, concise abstract of the coverage of the specification. It may include, whenever necessary, information as to the use of the entity other than specific detailed applications covered under "Intended use" (see A.5.6.1).

A.5.1.1 Identification. The beginning subparagraph in section 1 should identify the approved alphanumeric identifier, title, and if applicable, abbreviation of the entity to which this specification applies. If this specification is the identifying document for parts or materials, this paragraph should list the assigned part number(s) and, where applicable, the parameters which differentiate them.

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A.5.1.2 Entity type description. Where applicable, this paragraph should provide a brief description of the entity covered by the specification. It should identify all immediately subordinate functional elements of the entity, including, as applicable, their names, identifiers, and project-unique identifiers.

A.5.1.3 System overview. For software, this paragraph should briefly state the purpose of the system and the software to which this specification applies. It should describe the general nature of the system and software; summarize the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

A.5.2 SECTION 2, APPLICABLE DOCUMENTS. (See 5.3.2.1)

A.5.2.1 Government documents. (See 5.3.2.1.1, except that "specific revision levels" should be cited as shown in the following sample paragraphs in lieu of "issue listed in DoDISS".)

"2.1 Government documents."

"2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks of the exact revision listed below form a part of this specification to the extent specified herein."

"2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications of the exact revision level shown form a part of this document to the extent specified herein."

A.5.2.2 Non-Government documents. (See 5.3.2.1.2, except that "specific revision levels" should be cited for all non-Government documents, as shown in the following sample paragraph.)

"2._ Non-Government publications. The following document(s) of the exact revision listed below form a part of this document to the extent specified herein."

A.5.2.3 Order of precedence. In order to avoid confusion in the possible conflict between the requirements of the specification and the documents referenced therein, the following statement should be included:

"2._ Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained."

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A.5.3 SECTION 3 - REQUIREMENTS. This section shall define the requirements that the entity must meet to be acceptable. Each requirement shall be stated in such a way that an objective verification can be defined for it. Each requirement should be cross-referenced to the associated verification (see A.4.5). For software, each requirement should be assigned a project-unique identifier to support testing and traceability. It should incorporate the essential requirements and constraints that apply to performance, design, interoperability, reliability, user personnel skill levels, and similar, of the entity covered by the specification. The requirements section shall be written so that compliance with all requirements will ensure the suitability of the entity for its intended purpose, and non-compliance with any requirement will indicate unsuitability for the intended purpose. Only requirements that are necessary, measurable, achievable, and verifiable shall be included. Requirements should not include, or be dependent upon, reference to test method documents or to quality assurance paragraphs within the specification. Each requirement paragraph (and subparagraphs, where applicable) should address only one requirement topic or area. Requirements shall be worded to provide a definitive basis for acceptance or rejection.

A.5.3.1 Functional and performance requirements.

A.5.3.1.1 Missions. Where applicable, this paragraph should describe the missions of the system to the extent that such missions affect design requirements. This description should include operational information such as tactics, system deployment, operating locations, and facilities. If this information is classified, it may be contained in a separate document and referenced in this paragraph.

A.5.3.1.2 Threat. Where applicable, this paragraph should describe the characteristics of potential targets, the characteristics of current and potential enemy weapon capabilities which are relevant to the system, and any additional threat considerations that affect the system design. This information may be contained in a separate document and referenced in this paragraph, especially if it is classified.

A.5.3.1.3 Required states and modes. If the entity is required to operate in more than one state or mode having requirements distinct from other states or modes, this paragraph should identify each state and mode. Examples of states and modes include: idle, ready, active, post-use analysis, training, degraded, emergency, backup, wartime, and peacetime. If states/ modes are required, each requirement or group of requirements in this specification should be correlated to the states and modes. A table or other method may be used to depict this correlation.

A.5.3.1.4 Entity capability requirements. Where applicable, this paragraph should, usually in a series of subparagraphs, identify all of the requirements associated with each capability of the entity. A "capability" is defined as a group of related requirements. The word "capability" may be replaced with "function," "subject," "object," or other term useful for presenting the requirements.

A.5.3.1.4.1 Entity capability. Each subparagraph should identify a required capability of the entity and should itemize the requirements associated with the capability in measurable terms. The requirements should specify the required behavior of the entity and should include applicable parameters

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such as response times, sequencing, accuracy, capacities (how much/how many), priorities, continuous operation requirements, and allowable deviations based on operating conditions. If the capability can be more clearly specified by dividing it into constituent capabilities, the requirements for each constituent capability should be provided as one or more sub-subparagraphs. Where applicable, the requirements should also address required behavior under unexpected or "out of bounds" conditions, requirements for error handling, and any provisions to be incorporated into the entity to provide continuity of operations in the event of emergencies.

A.5.3.1.5 Reliability. Where applicable, this paragraph should state the reliability requirements numerically (with confidence levels, if appropriate). Initially, reliability may be stated as a goal and a lower minimum acceptable requirement.

A.5.3.1.6 Maintainability. Where applicable, this paragraph should state the numerical maintainability requirements in such terms as Mean-Time-To-Repair or maintenance man-hours per flight or operational hour. The requirements for maintainability should address their achievement utilizing existing support equipment and software items, including that listed as a part of the government-furnished property interfaces, and new design support equipment and support software being developed as a part of this system. Initially, maintainability may be stated as a goal and a higher maximum acceptable requirement. This paragraph should include a reference to the logistics requirements contained in the specification as the basis for the maintainability.

A.5.3.1.7 Deployability. Where applicable, this paragraph should state the deployability requirements in terms of numerical limits (for example, two of a specific type of transport aircraft or one of a specific type of merchant vessel.) The limits should be related to the transport of a specific number of items over a specific distance for a specific period of deployment.

A.5.3.1.8 Availability. Where applicable, this paragraph should specify the extent to which the entity shall be in an operable and committable state at the start of the mission(s), where the mission(s) is called for at an unknown (random) point in time. If quantitative requirements for both reliability and maintainability are specified, this requirement is not applicable.

A.5.3.1.9 Environmental conditions. Where applicable, this paragraph should specify environments that the entity is expected to experience in shipment, storage, service, and use. [For entities which include software, these requirements would define the environment in which the Computer Software Configuration Item (CSCI) would operate, such as the computer hardware or the operating system on which the CSCI must run.] Where applicable, it specifies whether the system will be required to withstand, or be protected against, specified environmental conditions. In addition, it provides a description of the electromagnetic environment in which the system must operate effectively, the environment which it generates, and the external environments in which the item must survive. Where applicable, this paragraph should specify requirements pertaining to nuclear survivability. Where systems must survive the initial nuclear weapons effects phase, it should specify permissible deviations from system performance characteristics after exposure to nuclear detonation environments. [The initial

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effects phase occurs within the first minutes after detonation and includes electromagnetic pulse, blast, thermal radiation, and initial nuclear radiation effects.] It should specify performance requirements for mechanical configurations, optical components, electronic or electrical circuits and electronic components. Subparagraphs should be included as necessary to cover environmental conditions such as: climate, shock, vibration, noise, noxious gases, chemical agents, biological agents, and nuclear weapons effects.

A.5.3.1.10 Transportability. Where applicable, this paragraph should identify requirements for transportability which are common to all components to permit employment and logistic support. [For example, it might specify that the equipment be designed so that, with its packing for transport, each package would be no greater than ____ (volume units) and no more than ____ (length units) high, ____ (length units) wide, and ____ (length units) deep.] It should identify all major functional elements of the system or item that, due to operational characteristics, will be unsuitable for normal transportation methods (for example, oversize, hazardous, or delicate items).

A.5.3.1.11 Materials and processes. Where applicable, this paragraph should specify requirements for materials and processes to be used in the entity covered by the specification, 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. Where applicable, this paragraph should address requirements which would form the basis for the development of new processes and materials specifically for this system or item. (Design constraint, see Table A-I.)

A.5.3.1.11.1 Toxic chemicals, hazardous substances, and ODCs. (See 5.3.3.9.)

A.5.3.1.11.2 Recycled, recovered, or environmentally preferable materials. (See 5.3.3.10.)

A.5.3.1.12 Electromagnetic radiation. Where applicable, this paragraph should specify requirements pertaining to electromagnetic radiation in terms of performance, design (including grounding requirements), and interface considerations.

A.5.3.1.13 Nameplates or product markings. Where applicable, this paragraph should specify all requirements pertaining to nameplates or markings, referencing applicable specifications, drawings, or standards. If part numbers are included in section 1, this paragraph should include the requirement that parts be marked with the design CAGE code and part number. Where applicable, this paragraph should address the use of special markings (for example, colored letters, lines, or dots) for function or identification coding and the use of stamped or imprinted information (for example, standard alloy designators or scannable bar codes) on the entity.

A.5.3.1.14 Producibility. Where applicable, this paragraph should require the selection of fabrication techniques, design parameters, and tolerances which enable the product to be fabricated, assembled, inspected, and tested economically and with repeatable quality. Product and process characteristics having a direct relationship to safety, performance, durability, or supportability should be

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matched to corresponding manufacturing capabilities. It should specify, where applicable, numerical values for the short-term process capability index for assessing this compatibility as a process qualification requirement and design tool. These requirements should include, as applicable and consistent with potential production quantities and rates, compatibility with flexible, automated or semi-automated, manufacturing and inspection processes.

A.5.3.1.15 Interchangeability. Where applicable, this paragraph should specify the requirements for the level of assembly at which components should 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.

A.5.3.1.16 Safety. Where applicable, this paragraph should specify requirements to preclude or limit hazards to the physical environment and to personnel and equipment. To the extent practicable, it should cite established and recognized standards. It should identify those safety characteristics unique to the entity which constrain the design due to hazards in assembly, disassembly, test, transport, storage, operation, maintenance or disposal when they are not addressed by standard industrial or service practices. It should address "fail-safe" and emergency operating restrictions, when applicable. Where applicable, this paragraph should also state health and safety criteria, including physical, mechanical, biological and explosive effects. These criteria should include consideration of the toxicological effect and environmental impact of hazardous materials, waste and by-products; ionizing and non-ionizing radiation; provisions in the software to prevent inadvertent actions or non-actions; gas detection and warning devices; grounding of electrical systems; decontamination; explosion proofing; and mishap mitigating factors such as crash worthiness, escape and fire suppression systems. It should also identify special safety rules such as those required for nuclear weapons, including, as applicable, requirements for component design, prevention of inadvertent detonation, and compliance with nuclear safety rules.

A.5.3.1.17 Human factors engineering. Where applicable, this paragraph should specify human factors engineering requirements for the entity, including any special or unique requirements (for example, constraints on allocation of functions to personnel, interactions of communications and of personnel with equipment.) 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, particularly those areas where the effects of human error would be particularly serious. These requirements should include, as applicable, considerations for:

a. Human information processing capabilities and limitations.

b. Foreseeable human errors under both normal and extreme conditions (especially for input, display, control, maintenance and management of critical information and systems).

c. Implications for the total system environment (including training, support, and operational environment).

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A.5.3.1.18 Security and privacy. Where applicable, this paragraph should specify security/privacy requirements that are basic to the design with respect to the operational environment of the entity. Where applicable, this paragraph should also specify those security requirements necessary to prevent access to the internal operating areas of the hosting system or item and compromise of sensitive information or materials. As applicable, these requirements should address the security and/or privacy environment in which the entity will operate, the type and degree of security or privacy to be provided, the security/privacy risks the entity should withstand, the security/privacy policy that should be met, the security/privacy accountability the entity should provide, and the criteria that should be met for security/privacy certification or accreditation. (To control dissemination of sensitive information, all or portions of this paragraph may be maintained and distributed separately from the remainder of the document.) (Design constraint, see Table A-I.)

A.5.3.1.19 Computer resource requirements. Where applicable, this paragraph should specify computer resource requirements (such as memory reserve, timing constraints, and capacity) necessary to assure that the entity meets its performance requirements. Depending on the nature of the entity, the computer resources covered in the subparagraphs may constitute the environment of the entity (as for a software entity) or the components of the entity (as for a hardware entity).

A.5.3.1.19.1 Computer hardware resource utilization requirements. Where applicable, this paragraph should specify the requirements on the entity's computer hardware resource utilization, such as maximum allowable use of processor capacity, memory capacity, input/output device capacity, auxiliary storage device capacity, and communications/network capacity. The requirements (stated, for example, as percentages of the capacity of each computer hardware resource) should include the conditions under which the resource utilization is to be measured. (Design constraint, see Table A-I.)

A.5.3.1.19.2 Design and implementation constraints. Where applicable, this paragraph should specify the requirements that constrain the design and implementation of the entity. For hardware-software entities, this paragraph should include physical requirements imposed on the entity. These requirements may be specified by reference to appropriate commercial or military standards and specifications. Examples include requirements concerning: (Design constraint, see Table A-I.)

a. Use of a particular CSCI architecture or requirements on the architecture, such as required databases or other software units; use of standard, military, or existing components; or use of government/acquirer-furnished property (equipment, information, software)

b. Use of a particular design or implementation standards; use of particular data standards; use of a particular programming language.

c. Flexibility and expandability that should be provided to support anticipated areas of growth or changes in technology, threat, or mission.

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A.5.3.1.19.2.1 Sizing and timing requirements. Where applicable, this paragraph should specify the amount and, if applicable, location of internal and auxiliary memory and the amount of processing time allocated to the CSCI. It should also specify the resources required of both the memory unit and the Central Processing Unit for the CSCI. (Design constraint, see Table A-I.)

A.5.3.1.19.2.2 Database/data bank requirements. Where applicable, this paragraph should specify any requirements imposed on databases/data banks that must be incorporated into the item. A data element dictionary may be referenced. (Design constraint, see Table A-I.)

A.5.3.1.19.2.3 Flexibility and expansion. Where applicable, this paragraph should specify areas of CSCI and computer hardware growth which require planning for system flexibility and expansion. In addition, this paragraph should define specific system or item elements which require spare capacity (for example, memory and timing) to support flexibility and expansion.

A.5.3.1.19.3 Software portability. Where applicable, this paragraph should specify requirements for the replication, distribution, and installation of new versions of software for the item. In addition, this paragraph should specify system or item requirements which will permit minimum cost and time impacts in the methods used for replication, deployment, and installation of the new versions of software to fielded systems or items. All logistic support considerations required for fielding new versions of software should be included.

A.5.3.1.19.4 Software supportability. Where applicable, this paragraph should identify requirements for software supportability; for integration or use of existing software support capabilities; for the development or delivery of added support resources; for any limitations on the use of any particular support facilities, computer equipment or software; and, if a waiver of the use of Ada has been approved, for use of a particular programming language.

A.5.3.1.19.5 Adaptation requirements. Where applicable, this paragraph should specify the requirements concerning installation-dependent data that the entity is required to provide (such as site-dependent latitude and longitude or site-dependent state tax codes) and operational parameters that the entity is required to use that may vary according to operational needs (such as parameters indicating operation-dependent targeting constants or data recording). (Design constraint, see Table A-I.)

A.5.3.1.19.6 Software quality factors. Where applicable, this paragraph should be divided into subparagraphs, as appropriate, to specify each software quality factor which must be achieved by this CSCI. These factors may include reusability (the ability to be used in multiple applications), testability (the ability to be easily and thoroughly tested), usability (the ability to be easily learned and used), and other attributes.

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A.5.3.1.20 Logistics. Where applicable, this paragraph should specify logistic considerations and conditions that will apply to the entity. It should define logistic conditions such as maintenance considerations, software support, modes of transportation, supply system requirements, and impact of existing facilities and equipment.

A.5.3.1.20.1 Maintenance. Where applicable, this paragraph should specify requirements relating to:

a. Use of multipurpose test equipment.

b. Repair versus replacement criteria.

c. Levels of maintenance.

d. Maintenance and repair cycles.

e. Accessibility.

A.5.3.1.20.2 Supply. Where applicable, this paragraph should specify the limitations of the present supply system as a basis for the subassembly and piece part breakout of the entity. It should define supply elements such as centralized supply systems used for certain classes of parts, supply stock locations, and types of items stored at those locations.

A.5.3.1.20.3 Facilities and facility equipment. Where applicable, this paragraph should specify the constraints imposed on the system or item by the existing facilities and facility equipment.

A.5.3.1.21 Personnel and training. Where applicable, this paragraph should specify requirements imposed by, or limited by, personnel or training considerations. It should allocate the numbers and skills of personnel to the operation, maintenance, and control of the system, item, and software. It should also establish constraints on the types and degree of training relating to the use of existing facilities, to equipment, to special/emergency procedures, to hazardous tasks, and to the use of training simulators, as well as the need for additional facilities, equipment, and mission simulators.

A.5.3.1.21.1 Personnel. Where applicable, this paragraph should specify personnel requirements, in terms of numbers of personnel, which must be integrated into entity's design. Personnel requirements should include:

a. Skills and numbers of personnel that should be allocated to the operation, maintenance, and control of the system or item.

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b. Numbers and skills of support personnel for each operational deployment mode and the intended duty cycle, both normal and emergency.

A.5.3.1.21.2 Training. Where applicable, this paragraph should include the following training requirements, as applicable:

a. Restrictions on the type of training to be used for the system or item (for example, technical training school, local on-the-job training).

b. Constraints specifying the use of available government training facilities and equipment.

c. Required capabilities of training devices to be developed, characteristics of the training devices, and training and skills to be developed through the use of training devices.

d. Limitations on the length of training time and on training locations.

A.5.3.1.22 Requirements traceability. This paragraph does not apply to the system specification or, if there is no system specification, the top-level item specification. Where applicable, this paragraph should provide: (Tables may be used to present this information.)

a. Traceability from each entity requirement in this specification to the top-level entity requirements it addresses, including traceability through the higher-level specifications between the entity and the top-level entity. (Alternatively, this traceability may be provided by annotating each requirement in section 3.)

Note: Each level of system refinement may result in requirements not directly traceable to higher-level requirements. For example, a system architectural design that creates multiple CSCIs may result in requirements about how the entities will interface, even though these interfaces are not directly covered in the higher-level entity requirements. Such requirements may be traced to a general requirement such as "entity implementation" or to the entity design aspects that resulted in their generation.

b. Traceability from each top-level entity requirement allocated to this entity and identification of all entity requirements that address it. All top-level entity requirements allocated to this entity should be accounted for. Those that trace to entity requirements contained in interface documentation should reference the interface document(s) by identifier and cite the applicable portions of the interface document that apply.

A.5.3.2 Interface requirements. Where applicable, this paragraph, or a series of subparagraphs, should describe interface requirements between this entity and other entities. Detailed quantitative interface requirements may be defined in separate specifications or interface control documents and referenced herein. (Design constraint, see Table A-I.)

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A.5.3.2.1 Government-Furnished Property (GFP) interfaces. Where applicable, this paragraph should identify the interface characteristics for all items of GFP that have been identified by the system engineering process for incorporation into the system, item, or software. It should include a list of all GFP items by their nomenclature, specification number, and part number. In addition, if software is furnished by the government to a contractor for integration into the system or item, it should be treated as GFP and identified in the specification by its software identifier, specification number, and part number. If the list of GFP is extensive, it may be included as an appendix to the specification and referenced in this paragraph.

A.5.3.2.2 External interface requirements. Where applicable, this paragraph should identify the external interfaces of the system, item, or software. An external interface diagram(s) may be used to aid in this description. It should identify each external interface by name (and, for software, project-unique identifier); should designate the interfacing entities (such as systems, configuration items, parts, software units) by name, number, version, and documentation reference(s); and should provide a brief description of each interfacing entity. The identification should also state which items already exist (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them). When applicable, identifying documentation, such as an interface control document, should be referenced for each interface. When appropriate, the paragraph should be divided into subparagraphs, as follows, to identify each required external interface and to specify the requirements associated with each interface. For this paragraph or each subparagraph, the requirements should address the following, as applicable, presented in any order suited to the requirements and should note any differences in these characteristics from the point of view of the interfacing entities (such as different expectations about the size, frequency, or other characteristics of data elements). (Design constraint, see Table A-I.)

a. Priority that the entity should assign to the interface

b. Requirements on the type of interface (such as real-time data transfer, storage-and-retrieval of data, and physical mounting points/dimensions) to be implemented

c. Required characteristics of individual data elements that the entity should interact with (for example, provide, store, send, access, receive), such as:

(1) Names/identifiers

(a) Project-unique identifier

(b) Non-technical (natural language) name

(c) DoD standard data element name

(d) Technical name (for example, variable name or field name in the code or database)

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(e) Abbreviated, acronym, or synonymous name

(2) Data type (such as alphanumeric, integer, floating point)

(3) Size and format (such as length and punctuation of a character string)

(4) Units of measurement (such as meters, dollars, nanoseconds)

(5) Range of enumeration of possible values (such as 0 - 99)

(6) Accuracy (how correct) and precision (number of significant digits)

(7) Priority, timing, frequency, volume, sequencing, and other constraints (such as whether the data element may be updated and whether business rules apply)

(8) Security and privacy constraints

(9) Sources (setting/sending entities) and recipients (using/receiving entities)

d. Required characteristics of data element assemblies (such as records, messages, files, arrays, displays, and reports) that the entity should interact with (for example, provide, store, send, access, receive), such as:

(1) Names/identifiers

(a) Project-unique identifier

(b) Non-technical (natural language) name

(c) Technical name (for example, record name or data structure name in the code or database)

(d) Abbreviated, acronym, or synonymous name

(2) Data elements in the assembly and their structure (such as number, order, grouping)

(3) Medium (such as disk) and structure of data elements/assemblies on the medium

(4) Visual and auditory characteristics of displays, and other outputs (such as colors, layouts, fonts, icons, beeps, lights)

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(5) Relationships among assemblies (such as sorting/access characteristics)

(6) Priority, timing, frequency, volume, sequencing, and other constraints (such as whether the data element may be updated and whether business rules apply)

(7) Security and privacy constraints

(8) Sources (setting/sending entities) and recipients (using/receiving entities)

e. Required characteristics of communication methods that the system should use for the interface, such as:

(1) Project-unique identifier(s)

(2) Communication links/bands/frequencies/media and their characteristics

(3) Message formatting

(4) Flow control (such as sequence numbering and buffer allocation)

(5) Data transfer rate, whether periodic or aperiodic, and interval between transfers

(6) Routing, addressing, and naming conventions

(7) Transmission services, including priority and grade

(8) Safety/security/privacy considerations (such as encryption, user authentication, compartmentalization, and auditing)

f. Required characteristics of protocols the entity should use for the interface, such as:

(1) Project-unique identifiers

(2) Priority/layer of the protocol

(3) Packeting, including fragmentation and reassembly, routing, and addressing

(4) Legality checks, error control, and recovery procedures

(5) Synchronization, including connection establishment, maintenance, and termination

(6) Status, identification, and any other reporting features

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g. Other required characteristics, such as physical compatibility of the interfacing entities (for example, dimensions, tolerances, loads, connector compatibility) or voltages.

A.5.3.2.2.1 Interface name (and project-unique identifier). Where applicable, this paragraph should identify each interface by name (and, for software, project-unique identifier), should briefly identify the interfacing entities, and should be divided into subparagraphs, as needed, to state the requirements imposed on this entity to achieve the interface. [Interface characteristics of the other interfacing entities should be stated as assumptions or as "When the (entity not covered by this specification) does this, the entity should ....", not as requirements on the other entities.] Where applicable, this paragraph and subparagraphs may reference other documents (such as data dictionaries, drawings/diagrams, standards for communications protocols, and standards for user interfaces) in place of stating the information here. (Design constraint, see Table A-I.)

A.5.3.2.2.1.1 Computer hardware requirements. Where applicable, this paragraph should specify the requirements regarding computer hardware that must be used by, or incorporated into, the entity. The requirements should include, as applicable, number of each type of equipment, type, size, capacity, and other required characteristics of processors, memory, input/output devices, auxiliary storage, communications/network equipment, and other required equipment.

A.5.3.2.2.1.2 Computer communications requirements. Where applicable, this paragraph should specify the additional requirements concerning the computer communications that must be used by the entity. Examples include geographic locations to be linked; configuration and network topology; transmission techniques; data transfer rates; gateways, required system use times; type and volume of data to be transmitted/received; time boundaries for transmission/reception/response; peak volumes of data; and diagnostic features. (Design constraint, see Table A-I.)

A.5.3.2.2.1.3 Computer software requirements. Where applicable, this paragraph should specify the requirements regarding computer software that must be used by, or incorporated into, the CSCI. Examples include operating systems, database management systems, communications/network software, utility software, input and equipment simulators, test software, and manufacturing software. The correct nomenclature, version, and documentation references of each software item should be provided. (Design constraint, see Table A-I.)

A.5.3.2.3 CSCI internal interfaces. Where applicable, this paragraph should specify the requirements imposed on interfaces internal to the CSCI. If all internal interfaces are left to the design, this fact should be so stated. If internal interface requirements are to be imposed, see A.5.3.2.2 and subparagraphs for a list of topics to be considered. (Design constraint, see Table A-I.)

A.5.3.2.4 CSCI internal data requirements. Where applicable, this paragraph should specify the requirements imposed on data internal to the CSCI. It should include requirements on databases and data files to be included in the CSCI. If all decisions about internal data are left to the design, this fact

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should be so stated. If such requirements are to be imposed, see A.5.3.2.2.c and A.5.3.2.2.d for a list of topics to be considered.

A.5.3.3 Design and construction. Where applicable, this paragraph should specify essential requirements that define the exact design of the entity covered by the specification. The subparagraphs should reference the design documentation that defines the design and should include appropriate design standards, workmanship requirements, and special production inspection requirements, as applicable. (Design requirements, see Table A-I.)

A.5.3.3.1 Production drawings. If the exact design of some or all of the parts of the item is to be controlled, this paragraph should include a statement similar to the following:

"This (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) and on all lower-level drawings, parts lists, and other documents contained in Appendix (fill in appendix letter)."

A.5.3.3.2 Software design.

A.5.3.3.2.1 Executable files. Where applicable, this paragraph should provide, by reference to an enclosed or otherwise provided electronic medium, the executable files for the CSCI and any batch files, command files, or other software files needed to install and operate the software on its target computer(s). In order for a body of software to be considered a valid copy of the CSCI's executable files, it must be shown to match these executable files exactly.

A.5.3.3.2.2 Source files. Where applicable, this paragraph should provide, by reference to an enclosed or otherwise provided electronic medium, the source files for the CSCI and any batch files, command files, or other software files needed to regenerate the executable files for the CSCI. In order for a body of software to be considered a valid copy of the CSCI's source files, it must be shown to match these source files exactly.

A.5.3.3.2.3 "As built" software design. Where applicable, this paragraph should contain, or reference an appendix or other deliverable document that contains, information describing the design of the "as built" CSCI. The information should be similar to that required in a Software Design Description (SDD), Interface Design Description (IDD), and Database Design Description (DBDD), as applicable. If these documents, or their equivalents, are to be delivered for the "as built" CSCI, the paragraph should reference them. If not, the information should be provided in this document. Information included in the headers, comments, and code of the source code listings may be referenced and need not be repeated in this section. If the SDD, IDD, or DBDD is included in an appendix, the paragraph numbers and page numbers need not be changed.

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A.5.3.3.2.4 Compilation/build procedures. Where applicable, this paragraph should describe, or reference an appendix that describes, the compilation/build process used to create the executable files from the source files and to prepare the executable files to be loaded into firmware or other distribution media. It. should specify the compiler(s)/assembler(s) to be used, including version numbers; other hardware and software needed, including version numbers; any settings, options, or conventions to be used; and procedures for compiling/assembling, linking, and building the CSCI and the software system/subsystem containing the CSCI, including variations for different sites, configurations, versions, and similar. Build procedures above the CSCI level may be presented in the hosting item specification and referenced in the software specifications.

A.5.3.3.2.5 Modification procedures. Where applicable, this paragraph should describe procedures that should be followed to modify the CSCI. It should include or reference information on the following, as applicable:

a. Support facilities, equipment, and software, and procedures for their use

b. Databases/data files used by the CSCI and procedures for using and modifying them

c. Design, coding, or other conventions to be followed

d. Compilation/build procedures if different from those above

e. Integration and testing procedures to be followed

A.5.3.3.2.6 Computer hardware resource utilization. Where applicable, this paragraph should describe the "as built" CSCI's measured utilization of computer hardware resources (such as processor capacity, memory capacity, input/output device capacity, auxiliary storage capacity, and communications/network equipment capacity). It should cover all computer hardware resources included in the utilization requirements for the CSCI, in system-level resource allocations affecting the CSCI, or in the software development plan. If all utilization data for a given computer hardware resource is presented in a single location, such as in a single software specification, this paragraph may reference that source. Included for each computer hardware resource should be:

a. The CSCI requirements or system-level resource allocations being satisfied. (Alternatively, the traceability to CSCI requirements may be provided in that paragraph.)

b. The assumptions and conditions on which the utilization data are based (for example, typical usage, worst-case usage, assumption of certain events)

c. Any special considerations affecting utilization (such as use of virtual memory, overlays, or multiprocessors or the impacts of operating system overhead, library software, or other implementation overhead)

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d. The units of measure used (such as percentage of processor capacity, cycles per second, bytes of memory, kilobytes per second)

e. The level(s) at which the estimates or measures have been made (such as software unit, CSCI, or executable program)

A.5.3.3.2.7 Design traceability. This section should provide:

a. Traceability from each CSCI source file to the software unit(s) that it implements, or, if a software unit corresponds to multiple source files, traceability from each source file to the detailed design aspects of those software units that it implements.

b. Traceability from each software unit to the source files that implement it, or if a software unit corresponds to multiple source files, traceability from each detailed design aspect of the software unit to the source files that implement it.

c. Traceability from each computer hardware resource utilization measurement to the CSCI requirements it addresses. (Alternatively, this traceability may be provided in the computer hardware resource utilization section.)

d. Traceability from each CSCI requirement regarding computer hardware resource utilization to the utilization measurements given in the computer hardware resource utilization section.)

A.5.3.3.3 Workmanship. Where applicable, this paragraph should specify the workmanship requirements and should include the necessary requirements relative to the standard of workmanship desired, freedom from defects, and general appearance of the finished product. The requirements should 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 should be applicable to the requirements of this paragraph.

A.5.3.3.4 Standards of manufacture. Where applicable, this paragraph should identify those standards or essential processes that, because of their significance, must be set forth as a requirement for the manufacture of the item. It should provide the level of detail necessary to clearly define verifiable metrics related to these standards. The requirements will normally reference standards, specifications, and similar documents issued by professional associations, by industry standardization organizations, and by the DoD.

A.5.3.3.5 Process definition. Where applicable, this paragraph should describe equipment, materials, and processing requirements for the program-unique process. It should identify key product features which must be controlled, the design limits for these key features, and the minimum process capability required for producing these key features.

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A.5.3.3.5.1 Equipment. Where applicable, this paragraph should list or describe equipment, such as heating media, and control devices, necessary to ensure that the process produces the desired results.

A.5.3.3.5.2 Materials. Where applicable, this paragraph should list, or reference specifications for, prime or basic materials, secondary materials, solutions, and similar, as required.

A.5.3.3.5.3 Required procedures and operations. Where applicable, this paragraph should 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. It should address all process procedures and operations which control key product features. These requirements may be expressed in terms of the limits of key process variables required to assure product quality.

A.5.3.3.5.4 Recommended procedures and operations. Where applicable, this paragraph should cover optional or permitted procedures that would result in items or materials conforming to their requirements.

A.5.3.3.5.5 Certification. Where applicable, this paragraph should specify the requirements for certification of operators or of the process technique.

A.5.3.3.6 Material definition. Where applicable, this paragraph should describe the requirements, characteristics, and properties of the program-unique material. It should identify key product features which must be controlled and the design limits for these key features.

A.5.3.3.6.1 Character or quality. Where applicable, this paragraph should specify the general qualitative condition or property of the material.

A.5.3.3.6.2 Formulation. Where applicable, this paragraph should identify the quantitative values, with upper and lower limits, for the overall material and for each component of the material.

A.5.3.3.6.3 Product characteristics. Where applicable, this paragraph should identify specific conditions and properties such as color, protective coating, waviness, surface finish, dimensions, weight, and similar, that are necessary for the material to perform adequately in its intended use.

A.5.3.3.6.4 Chemical, electrical and mechanical properties. Where applicable, this paragraph should define the requirements for composition, concentration, hardness, tensile strength, elongation, thermal expansion, electrical resistivity, and similar, that are necessary for the material to perform adequately in its intended use.

A.5.3.3.6.5 Stability. Where applicable, this paragraph should define the requirements for shelf life and aging that are necessary for the material to perform adequately in its intended use and over its intended life.

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A.5.3.3.6.6 Differentiating requirements. Where applicable, this paragraph should specify the requirements which allow differentiation between two or more similar materials covered by this specification, for example, with part numbers.

A.5.3.4 Precedence and criticality of requirements. Where applicable, this paragraph should specify the order of precedence, criticality, or assigned weights indicating the relative importance of the requirements in this specification. Examples include identifying those requirements deemed critical to safety, to security, or to privacy for purposes of singling them out for special treatment. If all requirements have equal weight, this paragraph should so state.

A.5.4 SECTION 4 - VERIFICATION. This section should include all verifications to be performed to determine that the entity to be offered for acceptance conforms to all requirements in sections 3 of the specification. Single or multiple verification subparagraphs and methods may be required to verify a specific requirement. This section should not include quality assurance provisions that belong in the contract, such as responsibility for inspection, establishment of quality or inspection program requirements, warranties, instructions for nonconforming items, and contractor liability for nonconformance.

A.5.4.1 Methods of verification. Methods utilized to accomplish verification include:

a. Analysis. An element of verification that utilizes established technical or mathematical models or simulations, algorithms, charts, graphs, circuit diagrams, or other scientific principles and procedures to provide evidence that stated requirements were met.

b. Demonstration. An element of verification which generally denotes the actual operation, adjustment, or re-configuration of items to provide evidence that the designed functions were accomplished under specific scenarios. The items may be instrumented and quantitative limits of performance monitored.

c. Examination. An element of verification and inspection consisting of investigation, without the use of special laboratory appliances or procedures, of items to determine conformance to those specified requirements which can be determined by such investigations. Examination is generally nondestructive and typically includes the use of sight, hearing, smell, touch, and taste; simple physical manipulation; mechanical and electrical gauging and measurement; and other forms of investigation.

d. Test. An element of verification and inspection which generally denotes the determination, by technical means, of the properties or elements of items, including functional operation, and involves the application of established scientific principles and procedures.

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A.5.4.2 Classes of verification.

A.5.4.2.1 Design verification. When a performance specification is used, this paragraph should reference the portion of the cross-reference matrix specifying the requirements of section 3 that are the basis for the design verification, the inspection methods to be used, and the specific section 4 inspections to be used to verify the requirements. Where applicable, this paragraph should also define any requirements relating to mandatory sequence of inspections, number of units to be inspected, data to be recorded, and the criteria for determining conformance to the design verification requirements.

A.5.4.2.2 First article inspection. When a first article is required, the appropriate detail specification paragraph should reference the portion of the cross-reference matrix specifying the requirements of section 3 that are the basis for the first article inspection, the inspection methods to be used, and the specific section 4 inspections to be used to verify the requirements. Where applicable, this paragraph should also define any requirements relating to mandatory sequence of inspections, number of units to be inspected, data to be recorded, and the criteria for determining conformance to the first article inspection requirements.

A.5.4.2.3 Acceptance (conformance) inspection. Acceptance inspection is normally used for each production-line unit of the item prior to its delivery to, and acceptance by, the government. Where applicable, this paragraph of the detail specification for an item, software, or a material should reference the portion of the cross-reference matrix specifying the requirements of section 3 that are the basis for the acceptance inspection, the inspection methods to be used, and the specific section 4 inspections to be used to verify the requirements. Where applicable, this paragraph should also define any requirements relating to mandatory sequence of inspections, number of units to be inspected, data to be recorded, and the criteria for determining conformance to the acceptance inspection requirements.

A.5.4.2.3.1 Sampling inspection. Where sampling is used, sampling plans should be based on a zero failure lot acceptance criterion either included in this paragraph or submitted separately by the contractor to the government for approval. Through an effective statistical process control program, either sampling or 100 percent inspection may be reduced or eliminated. The appropriate inspection level and the designated sampling plan should be specified in this paragraph.

A.5.4.2.3.1.1 Inspection lot. When inspections are to be based on lots or samples from lots, this paragraph should provide the definition of what constitutes an inspection lot. Restrictions concerning the formation of inspection lots, such as limiting inspection lots to like units of the same part number or manufacturing lot number, should be specified. (Note: An inspection lot is distinct from a manufacturing lot; inspection lot numbers should not be required to be marked on parts.)

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A.5.4.2.3.1.2 Classification of defects. When applicable, this paragraph should provide the classification of defects as critical, major, or minor. Defect numbers should be in accordance with the following:

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

If additional groupings are required, they should be numbered in the 301, 401, and 501 series. If the number of defects in any group exceeds 100, the series should start over with a letter suffix (for example, 101a, 102a, 103a.) When the classification of defects or classification of characteristics is relatively extensive, a tabular listing of the defects and their related specification, drawings and inspection methods may be used.

A.5.4.3 Inspections. In a series of subparagraphs, this paragraph should list all analyses, demonstrations, examinations, and tests required to verify that all requirements of section 3 have been achieved in the entity.

A.5.4.3.1 General inspection requirements. Unless otherwise specified, the following requirements should apply to all verification classes and methods.

A.5.4.3.1.1 Inspection conditions. When applicable, this paragraph should identify the environmental conditions under which all inspections of production items (first article and acceptance) are performed, as illustrated in the following example:

"Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in [applicable test method document] or [applicable paragraph(s) in the specification]."

A.5.4.3.1.2 Inspection equipment. Where applicable, this paragraph should identify the inspection equipment required to perform the specified inspections and should relate the equipment to each inspection characteristic, as appropriate. This may cover the broad scope from standard measuring equipment (commercial) to complex, Specially-designed Inspection Equipment.

A.5.4.3.1.3 Toxicological product formulations. When section 3 of the specification includes a requirement for review of the toxicological product formulations (see A.5.3.1.10), the following is an example of the statement that should be included in section 4:

"Toxicological data and product formulations. The toxicological product formulations and associated information shall be reviewed to evaluate the safety of the material for the proposed use."

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A.5.4.3.2 Detailed inspection requirements. Where applicable, this paragraph should provide the details of all of the inspections to be used in verifying that the requirements of sections 3 have been met. Where appropriate, the detailed inspections should be provided in a series of subparagraphs to completely depict all of the detailed inspections. The subparagraphing should be arranged in some logical order, normally by subassembly being inspected, functional grouping being inspected, type of inspection being accomplished, following the order of the section 3 requirements, or similar.

A.5.4.3.2.1 Detailed inspection element X. A separate paragraph should be included for each detail element of the inspection to be conducted on the entity. Where subparagraphing is necessary to define all of the requirements, this should be a title paragraph; where subparagraphing is not necessary, all of the information should be provided with this heading.

A.5.4.3.2.1.1 Methods of inspection. Where applicable, this paragraph should describe, in detail, the inspection to be used on the entity. The description should include the inspection method, location and number of inspections, inspection routine, and criteria for determining conformance. Inspection methods appearing in standards and in other appropriate standardization documents should be included only by reference. Where applicable, this paragraph should include identification of the specific options selected from the applicable inspection method standards for use in the inspection of this entity.

A.5.4.3.2.1.2 Special inspection conditions. When applicable, this paragraph should specify the special environmental conditions under which this specific inspection is to be performed.

A.5.4.3.2.1.3 Special inspection equipment. When applicable, this paragraph should include requirements relating to the adequacy of the inspection equipment. Where special inspection equipment is critical to the accurate performance of this specific inspection, it should be identified by design CAGE code and part number in this paragraph.

A.5.5 SECTION 5 - PACKAGING. (See 5.3.5.)

A.5.6 SECTION 6 - NOTES. The information provided in section 6 of a specification is not contractually binding unless it is specifically referenced in sections 3 or 4. Section 6 should only contain information of a general or explanatory nature, and no requirements should appear therein. It should contain information designed to assist in determining the applicability of the specification and other information deemed appropriate. Section 6 should include, as applicable, the information required by the succeeding paragraphs and information relating to the following topics:

a. Intended use

b. Special requirements (other than "first article", "standard sample", and similar) that must be incorporated in the contract if the specification is cited in a contract.

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c. Requirement to cite DoDISS issue in effect for the contract invoking this specification, if specific revision levels are not specified in section 2.

d. Definitions

e. List of acronyms and abbreviations

f. Other information as necessary.

The following parenthetical note should appear immediately below the header, "6. NOTES":

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

A.5.6.1 Intended use. This paragraph should include information relative to the use of the entity covered by the specification. If applicable, the differences among types, grades, and classes of entities in the specification should be explained. If there are any particular applications for which the entity is not well adapted, this information also may be included. This paragraph should not restate information that is covered in section 1, the Scope section.

A.5.6.2 Government-furnished property. When GFP is listed in the specification, and if the GFP is to be furnished as military property, the following paragraph should be included in section 6 of the specification:

"6._ Government-furnished property (GFP). The contracting officer should arrange to furnish the property listed in 3._._ in accordance with the contract."

A.5.6.3 International standardization agreements. (See 5.3.6.14)

A.5.7 APPENDIXES. An appendix, identified by the heading "APPENDIX", is an optional section of provisions added at the end of a specification. An appendix may be used to append large (multi-page) data tables, a specification tree, software design documentation, interface documents, classified information, or other information or requirements related to the entity that would normally be included in 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 should be included in sections 2, 3, or 4 of the specification. The following types of appendixes are often used in software and item specifications and require further content guidelines.

A.5.7.1 Software appendixes. The software specification should incorporate the following appendixes, as applicable:

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A.5.7.1.1 Appendix A, Software design. This appendix should contain the software design information if that information is not contained in the software design paragraph in section 3 or in another document referenced in that paragraph.

A.5.7.1.2 Appendix B, Source code listings. This appendix should contain the source code listir of the CSCI if they are not contained in the software design paragraph in section 3.

A.5.7.1.3 Appendix C, Interface design. This appendix should contain the interface design information, if applicable and if that information is not contained in the software design paragraph in section 3 or in another document referenced in that paragraph.

A.5.7.1.4 Appendix D, Data base design. This appendix should contain the data base design information, if applicable and if that information is not contained in the software design paragraph in section 3 or in another document referenced in that paragraph.

A.5.7.2 Appendixes for multiple-entity specifications. When multiple items, software programs. processes, or materials are to be covered by a single specification, a listing of all entities, including a reference to the appendix containing the detailed requirements of each, should be included in section 3 of the specification. A separate appendix should be prepared for each item listed in section 3; the appendix should be in the same six-section format as the basic specification.

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USA Information Systems, Inc

TABLE A-I. Specification content guidelines.

SUGGESTED PARAGRAPH TITLE	CONTENTS OF SYS	IS	SS	PS	MS	REF PARA
1. SCOPE	R	R	R	R	R	A.5.1
Identification	RI	RI	RI	RI	RI	A.5.1.1
Entity description	RI	RI	RI	RI	RI	A.5.1.2
System overview	RI		RI			A.5.1.3
2. APPLICABLE DOCUMENTS	R	R	R	R	R	A.5.2
Government documents	RI	RI	RI	RI	RI	A.5.2.1
Non-government documents	RI	RI	RI	RI	RI	A.5.2.2
Order of precedence	RI	RI	RI	RI	RI	A.5.2.3
3. REQUIREMENTS	R	R	R	R	R	A.5.3
Functional and performance requirements	FP	FP	FP	FP	FP	A.5.3.1
Missions	FP					A.5.3.1.1
Threat	FP					A.5.3.1.2
Required states and modes	FP	FP	FP			A.5.3.1.3
Entity capability requirements	FP	FP	FP	FP	FP	A.5.3.1.4
Entity capability	FP	FP	FP	FP	FP	A.5.3.1.4.1
Reliability	FP	FP	FP			A.5.3.1.5
Maintainability	FP	FP	FP			A.5.3.1.6
Deployability	FP					A.5.3.1.7
Availability	O	O	O			A.5.3.1.8
Environmental conditions	FP	FP			FP	A.5.3.1.9
Transportability	FP	FP				A.5.3.1.10
Materials and processes	DC	DC			DC	A.5.3.1.11
Toxic, hazardous substances, and ozone depl chemicals (ODCs)	FP	FP			FP	A.5.3.1.11.1
Recycled, recovered, or environmentally preferable materials	FP	FP			FP	A.5.3.1.11.2
Electromagnetic radiation	FP	FP				A.5.3.1.12
Nameplates or product markings	FP	FP			FP	A.5.3.1.13
Producibility	FP	FP				A.5.3.1.14
Interchangeability	FP	FP				A.5.3.1.15
Safety	FP	FP	FP		FP	A.5.3.1.16
Human factors engineering	FP	FP	FP			A.5.3.1.17

LEGEND
R - REQUIRED SECTION TITLE
FP - FUNCTIONAL/PERFORMANCE REQUIREMENT
DC - DESIGN CONSTRAINT
DS - DESIGN SOLUTION INCORPORATED INTO A DETAIL SPECIFICATION
O - OPTIONAL REQUIREMENT
RI - RELATED INFORMATION
V - VERIFICATIONS RELATED TO SECTION 3 REQUIREMENTS

NEW PAGE

TABLE A-I. Specification content guidelines - continued.

SUGGESTED PARAGRAPH TITLE	CONTENTS OF SYS	IS	SS	PS	MS	REF PARA
Security and privacy	DC	DC	DC			A.5.3.1.18
Computer resource requirements	FP	FP				A.5.3.1.19
Comp hardware resource utilization requirements	DC	DC	DC			A.5.3.1.19.1
Design and implement constraints	DC	DC	DC			A.5.3.1.19.2
Sizing and timing requirements	DC	DC	DC			A.5.3.1.19.2.1
Database/data bank requirements	DC	DC				A.5.3.1.19.2.2
Flexibility and expansion	FP	FP	FP			A.5.3.1.19.2.3
Software portability	FP	FP	FP			A.5.3.1.19.3
Software supportability	FP	FP				A.5.3.1.19.4
Adaptation requirements			DC			A.5.3.1.19.5
Software quality factors	FP	FP	FP			A.5.3.1.19.6
Logistics	FP	FP	FP			A.5.3.1.20
Maintenance	FP	FP				A.5.3.1.20.1
Supply	FP	FP				A.5.3.1.20.2
Facilities and facility equipment	FP	FP				A.5.3.1.20.3
Personnel and training	FP	FP				A.5.3.1.21
Personnel	FP	FP				A.5.3.1.21.1
Training	FP	FP				A.5.3.1.21.2
Requirements traceability			FP			A.5.3.1.22
Interface requirements	FP	FP	FP			A.5.3.2
Gov't-furnished property (GFP) interfaces	DC	DC	DC			A.5.3.2.1
External interface requirements	FP	FP	FP			A.5.3.2.2
Interface name (and project-unique identifier)	FP	FP	FP			A.5.3.2.2.1
Computer hardware reqts	DC	DC	DC			A.5.3.2.2.1.1
Computer communications reqts	DC	DC	DC			A.5.3.2.2.1.2
Computer software reqts	DC	DC	DC			A.5.3.2.2.1.3
CSCI internal interfaces			FP			A.5.3.2.3
CSCI internal data requirements			DC			A.5.3.2.4
Design and construction		DS	DS	DS	DS	A.5.3.3
Production drawings		DS				A.5.3.3.1

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TABLE A-I. Specification content guidelines - continued.

SUGGESTED PARAGRAPH TITLE	CONTENTS OF SYS	IS	SS	PS	MS	REF PARA
Software design			DS			A.5.3.3.2
Executable files			DS			A.5.3.3.2.1
Source files			DS			A.5.3.3.2.2
"As built" software design			DS			A.5.3.3.2.3
Compilation/build procedures			DS			A.5.3.3.2.4
Modification procedures			DS			A.5.3.3.2.5
Computer hardware resource utilization			DS			A.5.3.3.2.6
Design traceability			DS			A.5.3.3.2.7
Workmanship		DS			DS	A.5.3.3.3
Standards of manufacture		DS				A.5.3.3.4
Process definition				DS		A.5.3.3.5
Equipment				DS		A.5.3.3.5.1
Materials				DS		A.5.3.3.5.2
Required procedures and operations				DS		A.5.3.3.5.3
Recommended procedures and operations				DS		A.5.3.3.5.4
Certification				DS		A.5.3.3.5.5
Material definition					DS	A.5.3.3.6
Character or quality					DS	A.5.3.3.6.1
Formulation					DS	A.5.3.3.6.2
Product characteristics					DS	A.5.3.3.6.3
Chemical, electrical and mechanical properties					DS	A.5.3.3.6.4
Stability					DS	A.5.3.3.6.5
Differentiating requirements					DS	A.5.3.3.6.6
Special inspection requirements		DS			DS	A.5.3.3.7
First article		DS			DS	A.5.3.3.7.1
Standard sample		DS			DS	A.5.3.3.7.2
Precedence and criticality of requirements	FP	FP	FP	FP	FP	A.5.3.4
4. VERIFICATION	R	R	R	R	R	A.5.4
Methods of verification	V	V	V	V	V	A.5.4.1
Classification of inspections		V		V	V	A.5.4.2
Design verification	V	V	V		V	A.5.4.2.1

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TABLE A-I. Specification content guidelines - continued.

SUGGESTED PARAGRAPH TITLE	CONTENTS OF SYS	IS	SS	PS	MS	REF PARA
First article		V				A.5.4.2.2
Acceptance		V				A.5.4.2.3
Sampling inspection		V				A.5.4.2.3.1
Inspection lot formation		V				A.5.4.2.3.1.1
Classification of defects		V				A.5.4.2.3.1.2
Inspections	V	V	V	V	V	A.5.4.3
General inspection requirements	V	V	V	V	V	A.5.4.3.1
Inspection conditions	V	V		V	V	A.5.4.3.1.1
Inspection equipment	V	V		V	V	A.5.4.3.1.2
Toxicological product formulations		V		V	V	A.5.4.3.1.3
Detailed inspection requirements	V	V	V	V	V	A.5.4.3.2
Detailed inspection element	V	V	V	V	V	A.5.4.3.2.1
Methods of inspection	V	V		V	V	A.5.4.3.2.1.1
Special inspection conditions	V	V		V	V	A.5.4.3.2.1.2
Special inspection equipment	V	V		V	V	A.5.4.3.2.1.3
5. PACKAGING	R	R	R	R	R	A.5.5
6. NOTES	R	R	R	R	R	A.5.6
Intended use	RI	RI	RI	RI	RI	A.5.6.1
Government-furnished property (GFP)	RI	RI	RI		RI	A.5.6.2
International standardization agreements	RI	RI				A.5.6.3
Inspection for first article		RI				A.5.6.4
Standard sample	RI				A.5.6.5	
APPENDIXES	O	O	DS	O	O	A.5.7
Software appendixes			DS			A.5.7.1
Appendix A, Software Design			DS			A.5.7.1.1
Appendix B, Source Code Listings			DS			A.5.7.1.2
Appendix C, Interface Design			DS			A.5.7.1.3
Appendix D, Database Design			DS			A.5.7.1.4
Appendixes for multiple entity specs	O	O		O	O	A.5.7.2

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CAGE Code 33333
Current Chg Ctl Auth:
CAGE Code 44444
9 March 1995

PERFORMANCE SPECIFICATION
(use the head "DETAIL SPECIFICATION", if applicable)

ITEM SPECIFICATION

FOR THE

ITEM NAME, MODIFIER, [DESIGNATOR]

Prepared for:
BUYING ACTIVITY
Any Base CA 90987-4321

Prepared by:
Design Activity Name
Street Address
Any Town OH 40678

SUBMITTED BY: [Authorizing Signature] DATE: 24 February 1995
Charles H. Smith
PROGRAM NAME Manager
Design Activity Name

APPROVED FOR USE AS
XXXXXX* BASELINE BY: [Authorizing Signature] DATE: 9 March 1995
Henrietta K. Jones, Captain, USN
PROGRAM NAME Manager
Buying Activity Name

* - Use "FUNCTIONAL" or "ALLOCATED", as applicable, for Performance Specifications; use "PRODUCT" for Detail Specifications.

FSC 1234

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FIGURE A-1. Example of cover page for a program-unique specification.

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REQUIREMENT / VERIFICATION CROSS-REFERENCE MATRIX

METHOD OF VERIFICATION

N/A - NOT APPLICABLE
1 - ANALYSIS
2 - DEMONSTRATION
3 - EXAMINATION
4 - TEST

CLASSES OF VERIFICATION

A - DESIGN VERIFICATION
B - (RESERVED - DETAIL SPEC.FICATION)
C - (RESERVED - DETAIL SPECIFICATION)

SECTION 3 REQUIREMENT	VERIFICATION METHOD					VERIFICATION CLASS			SECTION 4 VERIFICATION
	N/A	1	2	3	4	A	B	C	
3.1.3.1					X	X			4.3.2.1.1
3.1 3.2		X				X			4 3.2 2.3
					X	X			4.3 2.5.1
3.1.3.3	X								
3.1.3 1 1			X			X			4 3.2 3.1
3.1 3 1.2					X	X			4.3 2.3.2
3 1.3 1 3		X				X			4 3.2 3.5
					X	X			4.3.2.3.6
3.2	X								
3.2 1			X			X			4 3.2.6.1
3.2 2	X								
3 2 2.1		X				X			4.3 2 6.1
			X			X			4 3.2 6.3
3.2 2.2		X				X			4 3 2.6.1
			X			X			4.3 2 6.5

FIGURE A-2. Sample requirements/verification cross-reference matrix for performance specification

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REQUIREMENT / VERIFICATION CROSS-REFERENCE MATRIX

METHOD OF VERIFICATION

N/A - NOT APPLICABLE
1 - ANALYSIS
2 - DEMONSTRATION
3 - EXAMINATION
4 - TEST

CLASSES OF VERIFICATION

A - DESIGN VERIFICATION
B - FIRST ARTICLE
C - ACCEPTANCE

SECTION 3 REQUIREMENT	VERIFICATION METHOD					VERIFICATION CLASS			SECTION 4 VERIFICATION
	N/A	1	2	3	4	A	B	C	
3.1.3.1					X	X	X		4.3.2.1.1
3.1.3.2		X				X	X		4.3.2.2.3
					X	X	X		4.3.2.5.1
			X					X	4.3.2.9.5
3.1.3.3	X								
3.1.3.1.1			X			X	X		4.3 2.3.1
3.1.3.1.2					X	X	X		4.3.2.3.2
3.1.3.1.3		X				X			4.3.2.3.5
					X	X			4.3 2.3.6
3.1.3.1.4		X					X	X	4.3.2.9.1.1
					X		X	X	4 3 2.9.1.2
					X			X	4.3.2.9.1.3
3.2	X								
3.2.1			X			X	X		4.3.2.6.1
				X				X	4.3 2.9.7.1
		X						X	4.3.2.9.7.2
3 2.2	X								
3.2.2.1		X				X			4.3.2.6.1
			X			X			4.3.2.6.3
3.2.2.2		X				X			4.3.2 6.1
			X			X			4.3.2.6.5
					X			X	4.3.2.6.6
3.3.1				X				X	4 3.2.8 1
		X						X	4.3.2.8 2
				X				X	4.3.2.9
3.3.2	X								
3.3.2.1		X						X	4.3.2.10.1
3.3 2.2					X			X	4.3.2.10.2
3.3.3			X					X	4.3.2.11.1

FIGURE A-3. Sample requirements/verification cross-reference matrix for detail specification

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