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13. ABSTRACT (Maximum 200 words)

This document has been prepared as a joint effort by the Air Force and TRW Configuration Control (Configuration control is the systematic evaluation, coordination, approval or disapproval, and implementation of all approved changes in the configuration of a Configuration Item (CI) after formal establishment of its configuration identification.), to clarify the requirements of MIL-STD-490A. The objectives are to state BMO policy, specification format interpretation, to supply a number of examples, and to furnish instructions for preparing hardware specifications. Except for those which require exact wording, the examples herein are fictitious. However, they provide a sound approach to specification writing techniques.

14. SUBJECT TERMS
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GENERAL INSTRUCTIONS FOR COMPLETING SF 298

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C	- Contract	**PR**	- Project
G	- Grant	**TA**	- Task
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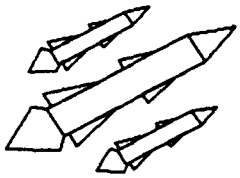
BMO-TR-94-26

BMO Document 87-06D
5 May 1993
Supersedes
10 July 1991

BALLISTIC MISSILE ORGANIZATION (BMO) HARDWARE CONFIGURATION ITEM SPECIFICATIONS MANUAL

BMO Document 87-06



5 May 1993

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FOREWORD

This document has been prepared as a joint effort by the Air Force and TRW Configuration Control (Configuration control is the systematic evaluation, coordination, approval or disapproval, and implementation of all approved changes in the configuration of a Configuration Item (CI) after formal establishment of its configuration identification.), to clarify the requirements of MIL-STD-490A. The objectives are to state BMO policy, specification format interpretation, to supply a number of examples, and to furnish instructions for preparing hardware specifications. Except for those which require exact wording, the examples herein are fictitious. However, they provide a sound approach to specification writing techniques.

To avoid duplication of text, general recommendations and policy statements are stated in Chapter 1 (e.g., *applicable documents, quality assurance provisions, etc.*), although the same rules apply to each type of specification in which the requirements occur. Chapter 2 describes the preparation of Part I of a specification. All types of hardware development specifications are discussed (i.e., Prime Item, Critical Item, and Non-Complex) within the narrative of Chapter 2. Since the format is different for each type of specification, this text will concentrate on the broadest type of specification ... the Prime Item Development Specification (Type B1 in accordance with MIL-STD-490A). Chapter 3 describes the preparation of Part II of a specification. Chapter 3 specifically addresses the format and contents of a Prime Item Product Fabrication Specification. Chapter 4 describes the preparation of some of the less used types of specifications (Non-complex and Product Function specifications). Chapter 5 describes the minimum requirements for the creation of an Addendum Specification. Chapter 6 describes the minimum requirements for approving a specification. Chapter 7 describes changes made to specifications.

For answers to questions regarding specification policy, format, or interpretation of MIL-STD-490A requirements, specification writers/reviewers are requested to contact the Air Force Configuration Management Office (MMIA).

INTRODUCTION

Part I is a performance parameter specification which sets forth performance requirements that shall be manifested in a physical hardware configuration at the conclusion of a design evolvement period, known as the development phase. Each performance requirement shall specify a quantitative value, with tolerances, that the CI must meet after subjection to formal qualification (design adequacy) testing.

Formal qualification testing is accomplished after critical design review (CDR) and signals the end of the development phase. At CDR, the contractor provides a detailed design (engineering data and preliminary fabrication specifications) intended to meet all requirements of the Part I specification. Assuming approval of the design at CDR, a complete CI is fabricated and subjected to qualification testing. The functional configuration audit (FCA) verifies that a CI has passed all functional tests and establishes a performance standard against which the production CI must be assessed.

A functional configuration audit (FCA) is the formal examination of functional characteristics' test data for a configuration item, prior to acceptance, to verify that the item has achieved the performance specified in its functional or allocated configuration identification.

A product fabrication specification comprises Part II of a two part specification as detailed in paragraph 3.1.4 of MIL-STD-490A. Under this concept, a Part I specification provides requirements for design, qualification, and the basis for the preparation of the associated Part II specification which designates the fabrication and acceptance requirements for a configuration item (CI).

The purpose of a Part II specification is to define the fabrication and acceptance requirements of a CI. Part II sets forth requirements that when verified by the inspections of Section 4, provide assurance that each and every CI delivered to the procuring activity shall exhibit repetitive and acceptable performance consistent with the requirements in the approved design established at FCA. Normally, requirements in the Part II specification will not influence the design of a CI. The Part II specification is approved prior to physical configuration audit (PCA) and forms a part of the product baseline established by successful completion of the PCA.

A physical configuration audit (PCA) is the formal examination of the "as-built" configuration of a unit of a CI against its technical documentation in order to establish the CI's initial product configuration identification.

DEFINITIONS

Some of terms used in this manual are defined as follows:

1. Acceptance - The act of an authorized representative of the government by which the Government assumes for itself, or as an agent of another ownership of existing and identified supplies tendered, or approves specific services rendered, as partial or complete performance of the contract on the part of the contractor.

2. Acceptance test - A test which verifies that the unit under test (UUT) is operating in accordance with the operational specifications.

3. Analysis - An element of inspection consisting of technical evaluation of equations, charts, graphs, circuit diagrams, engineering and test data, calculation studies and models. The analytical results may be comprised of a compilation or interpretation of existing information or derived from lower level inspections for the determination of qualitative and quantitative properties.

4. Baseline - A configuration identification document or a set of such documents formally designated and fixed at a specific time during a CI's life cycle. Baselines, plus approved changes from those baselines, constitute the current configuration identification. for configuration management there are three base lines, as follows:

   a. Functional baseline - The initial approved functional configuration identification.

   b. Allocated baseline - The initial approved allocated configuration identification.

   c. Product baseline - the initial approved or conditionally approved product configuration identification.

5. Configuration - The functional and/or physical characteristics of hardware/software as set forth in technical documentation and achieved in a product.

6. Configuration control - The systematic evaluation, coordination, approval or disapproval, and implementation of all approved changes in the configuration of a CI after formal establishment of its configuration identification.

7. Configuration identification - The current approved or conditionally approved technical documentation for a configuration item as set forth in specifications, drawings and associated lists, and documents referenced therein.

8. Configuration item (CI) - An aggregation of hardware/software or any of its discrete portions, which satisfies an end use function and is designated by the Government for configuration management. CIs may vary widely in complexity, size and type, from an aircraft, electronic or ship system to a test meter or round of ammunition. During development and initial production, CIs are only those specification items that are referenced directly in a contract (or an equivalent in-house agreement). During the operation and maintenance period, any reparable item designated for separate procurement is a configuration item.

9. Demonstration - An element of inspection consisting of showing the merits of an item by operation, movement, adjustment or display during performance of a function, to determine qualitative and quantitative properties and performance of an item.

10. Depot maintenance - Maintenance performed on material requiring major overhaul or complete rebuild of parts, subassemblies, and end items, including the manufacture of parts, modification, testing, and reclamation as required. Depot maintenance serves to support lower categories of maintenance by providing technical assistance and performing that maintenance beyond their responsibility. Depot maintenance provides stocks or serviceable equipment by using more extensive facilities for repair than are available in lower level maintenance activities.

11. Examination - An element of inspection consisting of observation and/or investigation of the physical properties of an item using standard measuring devices (such as rulers, calipers, weight measuring devices, etc). Examination is non-destructive and includes (but is not limited to) visual inspection, simple physical manipulation, gauging and measurement of an item's quantitative properties, such as tolerances, finishes and identification.

12. Form, fit and function - That configuration comprising the physical and functional characteristics of the item as an entity but not including any characteristics of the elements making up the item.

13. Functional configuration audit (FCA) - The formal verification of functional characteristics' test data for a configuration item, prior to acceptance, to verify that the item has achieved the performance specified in its functional or allocated configuration identification.

14. General purpose test equipment - Test equipment which is used for the measurement of a range of parameters common to two or more equipments or systems of basically different designs.

15. Inspection - The verification of supplies and services (including, when appropriate, raw materials, components, and intermediate assemblies) to determine whether they conform to specified requirements.

16. Interface - Those physical and functional characteristics of an item which interoperate with mateable or matchable characteristics of one or more items to perform a combined joint operation.

17. Intermediate maintenance - Maintenance which is the responsibility of and performed by designated maintenance activities for direct support of the using organizations. Its phases normally consist of calibration, repair or replacement of damaged or unserviceable parts, components or assemblies; the emergency manufacture of non-available parts and providing technical assistance to using organizations.

18. Maintainability - A characteristic of design and installation which expressed as the probability that an item will be retained in or restored to a specified condition within a given period of time, when the maintenance is performed in accordance with prescribed procedures and resources.

19. Mean time between failures (MTBF) - A measure of reliability giving the average time between failures.

20. Mean time to repair (MTTR) - The arithmetic average of time required to complete a repair activity.

21. Measuring and test equipment - All devices used to measure, gage, test, inspect, diagnose, or otherwise examine material, supplies and equipment to determine compliance with technical requirements.

22. Organizational maintenance - Maintenance which is the responsibility of and performed by using organizations on its assigned equipment. Its phases normally consist of inspecting, servicing, lubricating, adjusting and the replacing of parts, minor assemblies and subassemblies.

23. Physical configuration audit (PCA) - The formal examination of the "as-built" configuration of a unit of a CI against its technical documentation in order to establish the CI's initial product configuration identification.

24. Performance test - A test which verifies if the UUT is performing properly.

25. Performance verification - Performance testing monitored by Government personnel to verify proper performance.

26. Preventive maintenance - Tests, measurements, replacements, adjustments, repairs and similar activities carried out with the intention of preventing faults or malfunctions from occurring during subsequent operation. Preventive maintenance is designed to keep hardware and software in proper operating condition and may be performed on a scheduled basis.

27. Qualification - The entire process by which products are obtained from manufacturers or distributors, examined and tested, and then identified on a Qualified Products List (QPL).

28. Quality assurance - A planned and systematic pattern of all actions necessary to provide adequate confidence that the item or product conforms to established technical requirements and will perform satisfactorily in service.

29. Reliability - The probability that an item will perform its intended function for a specified period of time under stated conditions.

30. Special test equipment (STE) - Equipment developed for the principal purpose of maintaining quality assurance of end items development and production. Some STE may be used for depot repair.

31. Supplementary data - Information, text, schematics and logic diagrams necessary for analysis of the test program set (TPS) and UUT in the event of a problem or anomaly during the testing process. The amount and content of the supplementary data is contingent upon the capability of the ATE to store and display required information automatically.

32. Test - An element of inspection consisting of inspecting an item for functional requirements under real or simulated conditions with sufficient instrumentation for the measurement, recording and evaluation of quantitative data or predetermined performance characteristics. Test employs technical means and requires the use of external resources (such as meters, recorders, etc), under controlled conditions (usually environmental) to evaluate functional characteristics.

33. Test analysis - The examination of the test results to determine whether the device is in a "go" to "no-go" state or to determine the reasons for or location of a malfunction.

34. Test procedure - A document that described step by step the operations required to test a specific item. A test procedure can be UUT-oriented or test equipment-oriented.

35. Test requirements analysis - The examination of test requirements to determine adequacy, range of test stimuli, measurements, method of test (such as manual or automated), and type of test equipment.

36. Tolerance - The total permissible deviation of a measurement from a designated value.

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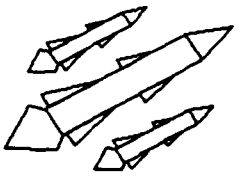
5 May 1993



CHAPTER 1
GENERAL INSTRUCTIONS FOR HARDWARE CONFIGURATION ITEM SPECIFICATIONS

CHAPTER 1

GENERAL INSTRUCTIONS FOR HARDWARE CONFIGURATION ITEM SPECIFICATIONS

I. SPECIFICATION TITLES:

In accordance with Cataloguing Handbook H4, the basic noun name for the product or service covered by the specification shall be the first part of the title. It shall also be in the singular form if the specification covers only one type of product. The title shall include the minimum number of modifiers as necessary, for distinction of the product. Modifiers shall be arranged in reverse order and separated by appropriate punctuation.

EXAMPLE
PRIME ITEM DEVELOPMENT SPECIFICATION FOR CABLE SET, TEST LAUNCH

A. **TITLE PAGES:** (See Exhibits 1 and 2)

1. The submission date is used for the draft and preliminary submittals. The approval date (CCBD date) is used for the final submittal only.

2. Specifications shall be stamped "Preliminary" or "Draft" on the title page as appropriate. Do not obscure numbering with the stamp. The "Final" submittal is not stamped.

Specification No. S-XXX-XXXXX
1/CAGE XXXXX
2/Part I of Two Parts
11 March 1986

PRIME ITEM DEVELOPMENT SPECIFICATION

FOR

[*INSERT APPROVED TITLE*]

CI 00XXXXX

DISTRIBUTION STATEMENT D: Distribution authorization to the Department of Defense and DoD contractors only - Critical Technolo , 88 May 18. Other requests shall be referred to: Department of Air Forc , Hq Ballistic Missile Organization (AFMC), Norton AFB, CA 92409-6468.

WARNING: This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, S.S.C., Sec 2751 et seq.) or executive Order 12470. Violations of those export laws are subject to severe criminal penalties.

DESTRUCTION NOTICE: Destroy by any method that will prevent disclosure of contents or reconstruction of the document.

Approved by Change Control Board Directive
dated _____.

NOTES:

1/ CAGE = Commercial and Government Entity

2/ NOT REQUIRED FOR ANY ONE-PART (e.g., *System or function specifications*) SPECIFICATION

Exhibit 1. Sample title page for a Part I specification

Specification No. S-XXX-XXXXX
CAGE XXXXX
*Part II of Two Parts
15 March 1986

PRIME ITEM PRODUCT FABRICATION SPECIFICATION

FOR

**[*INSERT APPROVED TITLE*]

CI 00XXXXX

DISTRIBUTION STATEMENT D: Distribution authorization to the Department of Defense and DoD contractors only - Critical Technology, 88 May 18. Other requests shall be referred to: Department of Air Force, Hq Ballistic Missile Organization (AFMC), Norton AFB, CA 92409-6468.

WARNING: This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, S.S.C., Sec 2751 et seq.) or Executive Order 12470. Violations of those export laws are subject to severe criminal penalties.

DESTRUCTION NOTICE: Destroy by any method that will prevent disclosure of contents or reconstruction of the document.

Approved by Change Control Board
Directive dated _____.

* NOT REQUIRED FOR ANY ONE-PART (e.g., *System or function specifications*) SPECIFICATION

** Approved title shall be the same as the Part I specification title.

Exhibit 2. Sample title page for a Part II specification

3. Contractor internal coordination stamps, company logos, CDRL numbers, contract numbers, word processor notations, etc. are not allowed on the title page.

4. Do not assign a number to this page.

B. CONTENTS: (See Exhibit 3)

1. Page numbering starts with I-i or II-i, as applicable, on the first page of the contents. The numbering consists of "I" (standing for Part I) or "II" (standing for Part II) and "i" (standing for the first page of the contents). Start numbering pages I-1, I-2, etc. or II-1, II-2, etc., as applicable, when Section one (SCOPE) is reached.

2. For single part specifications, start numbering the contents pages with "i". Start numbering text pages with "1" when Section one (SCOPE) is reached.

3. List figures and tables in separate groups following Section 6 contents listings.

4. If appendices are used, include the indented word "APPENDIX" on the last page of the contents. List appendix number, title, and date of the appendix.

5. List figures and tables of an appendix with the figures and tables of the specification.

C. IDENTIFICATION OF TEXT PAGES:

Each text page shall be identified as applicable, in accordance with the following example:

For a Part I Specification		For a Part II Specification		For a Single Part Specification
S-XXX-XXXXX 25 April 1987 Page I-7	OR	S-XXX-XXXXX 25 April 1987 Page II-7	OR	S-XXX-XXXXX 25 April 1987 Page 7

S-118-44000
30 January 1981
Page I-i

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Exhibit 3. Contents

CONTENTS

Exhibit 3. Contents (continued)

CONTENTS

Exhibit 3. Contents (continued)

CONTENTS

Exhibit 3. Contents (continued)

D. **FOREWORDS:**

Never include forewords in specifications. Attach such information in a separate letter if it contains information essential to the specification.

E. **PARAGRAPHS:**

1. Limit the number of digits in a paragraph number to seven. This does not include subparagraph identifying letters such as "a", "b", "c", etc. Identifying letters for subparagraphs shall be lower case.

2. All paragraphs and subparagraphs which are numbered in levels containing a trailing period (legal style numbering), require a title. The title should have the first letter of the first word as a capital letter. The remainder of the title should be in lower case letters. The entire title should be underlined. Paragraph and subparagraph titles and numbering should not be duplicated within the same section.

3. Itemization within a paragraph or subparagraph shall be identified by lower case letters. A title should not be given to itemized subparagraphs. If a title is used for these subparagraphs, it should not be underlined. Any further itemization within itemized paragraphs should be identified by a single level, Arabic number (ex: 1., 2., etc.). For further itemization within itemized subparagraphs, use lower case letters in parentheses (ex: (a), (b), (c), etc.), then use single level, Arabic numbers in parentheses (ex: (1), (2), (3), etc.).

4. Use the exact paragraph title referenced in MIL-STD-490. If the paragraph from MIL-STD-490 is not applicable, then the words "This paragraph is not applicable to this specification." shall follow the paragraph title.

5. Where MIL-STD-490 does not call out a specific titled paragraph and a known requirement exists for the item, use the next available unused major paragraph number without disturbing any of the required MIL-STD-490 paragraph numbering. For example: in a Type B3 specification, there is no paragraph 3.3, however, if a design and construction requirement exists for the item, a paragraph would be added entitled, "Design and construction" with a number 3.2.3. Maintain a relationship between the text of the paragraph and its title.

6. Acronym or abbreviation identification (i.e., first use of an acronym or abbreviation along with its related word group) is allowed in titles of specifications. **ALL ACRONYMS AND ABBREVIATIONS SHALL BE SPELLED OUT COMPLETELY THE FIRST TIME USED** (e.g., pounds per square inch (psi)) **NO MATTER HOW COMMON THEY ARE**. Acronyms and abbreviations should be taken from MIL-STD-12. A trailing period shall not follow the acronym or abbreviation. A listing or table of acronyms/abbreviations in Section 6 shall NOT be used in lieu of the above requirements. Symbols are not allowed in the text or titles of a specification. Symbols may be used in tables and figures, but should only be used if spacing is not sufficient to spell it out. Symbols shall not be used in notes to tables or figures.

7. Do not underline or capitalize any portion of a paragraph's or subparagraph's text for the sake of emphasis. Bold face printing and italics shall not be used for specification text or paragraph titles, except as specified in MIL-STD-490A.

F. FIGURES AND TABLES:

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

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

3. Each figure or table shall be placed following, or within the paragraph containing a reference to it. If figures or tables are numerous and their location, as indicated above, would interfere with correct sequencing of paragraphs and cause difficulty in understanding or interpretation, they may be placed in numerical sequence at the end of the specification before any appendix or index. Figures shall be placed first, then tables, in numerical sequence. Tables and figures applicable to appendices only, shall be placed in the appendix, using the same guidelines specified herein.

4. All figures shall be titled, and they shall be numbered consecutively with Arabic numerals in the order in which they are initially referenced in the specification. The number and title shall be placed below the figure. Figure numbers shall be a single Arabic numeral only. Do not use alpha characters or paragraph numbers.

5. All tables shall be numbered consecutively with Roman numerals in the order in which they are initially referenced in the specification. The number and title shall be placed above the table. Table numbers shall be a single Roman numeral only. Do not use alpha characters or paragraph numbers. The contents of a table shall be organized and arranged to show clearly the significance and relationship of the data. Data included in the text shall not be repeated in the table. Tables shall be boxed in and ruled.

6. For figures and tables applicable to appendices, see FORMAT FOR APPENDIX.

7. Specification printing shall be clear, legible, reproducible, letter quality printing. Dot matrix printing should not be used.

8. Notes may be added to tables and figures to list the paragraph numbers which reference the table or figure, or any other pertinent information.

G. **STYLE AND FORMAT:**

1. Do not feel compelled to write a lengthy specification because the CI is highly technical and complicated. Instead, approach the format and language in a logical manner with qualification and design criteria being the mainstays of the Part I, and acceptance and production criteria being the mainstays of the Part II. Be selective and use good judgement in writing the performance section of the specification.

2. **All requirements should be able to be interpreted in one way only.** Requirements should not be able to be interpreted in more than one way, as this leads to confusion and a judgement call on the part of the reader. Keep in mind that all "design" requirements reside in the Part I and do not need to be invoked in the Part II unless considered absolutely critical to acceptance testing.

3. Capitalize the words "drawing", "part number", "section", "figure", "table", etc. only when they are used immediately preceding the number of the document, section, figure or table in the text. Do not use the terms "Military Standard", "paragraph", "Recommended Standard Practice", etc. before or after document or paragraph number call outs.

II. SECTION 2. APPLICABLE DOCUMENTS:

A. General rules:

1. "APPLICABLE DOCUMENTS" is the second major section heading in a specification. As noted in MIL-STD-490, all compliance documents cited in Sections 3, 4, 5, and attached appendices of the specification shall be included. CI numbers and part numbers should not be called out in Section 2, as they are not documents. Applicable documents form a part of the specification and consequently become a part of the contract. For this reason, documents listed in Section 2 are not merely "guides" or "references", but are to be regarded the same as the text of Sections 3, 4, 5, and attached appendices. They are compliance documents. So-called "reference" documents, included for guidance or information only, may be noted in Section 6. Documents referenced in Section 6 only, shall not be called out in Section 2, but should reference the title, revision and publication date of the document in Section 6.

2. A specification shall indicate the extent to which a document is applicable. If not all of a requirement or inspection contained in an applicable document is used, or a modification to a requirement or inspection in the applicable document is necessary, the specification text shall indicate the difference with a phrase beginning with the word "except". If there are no exceptions stated for the referenced document, the entire referenced document shall be considered a requirement, regardless of the subject matter of the paragraph containing the reference. For example, if the text of a workmanship paragraph reads "Workmanship shall be in accordance with MIL-STD-454.", then all of the requirements in MIL-STD-454 are applicable, not just the workmanship requirement (Requirement 9). To limit that paragraph to just the workmanship requirement, the text must be changed to read "Workmanship shall be in accordance with MIL-STD-454, Requirement 9." OR "Workmanship shall be in accordance with the workmanship requirements of MIL-STD-454." Otherwise, all of the requirements in MIL-STD-454 shall apply to the CI. The use of documents "as a guide" (in Sections 3, 4, 5 or attached appendices) is not acceptable.

3. If a requirement, interface or test method eligible for inclusion in a specification contained in a document is reasonably brief, the words of the requirement, interface or test method shall be incorporated in the specification, and no reference made to the document.

4. When a specification refers to a requirement in an applicable document, the requirement shall be identified by title or method number, or by text abstracts which clearly identifies the requirement (e.g., *the first sentence, a series of dots, and the last sentence*). A specification should not refer to a paragraph number in an applicable document, except where there is no other way to assure clarity of the reference. The preferred method for referencing specific paragraphs or sections is to reference the title of the paragraph or section (e.g., *The requirements of MIL-STD-490 shall apply, with the exception of the requirements for preparation for delivery.*).

IN PARAGRAPHS 2.1 AND 2.2, THE COMPLETE DESIGNATION OF AN APPLICABLE DOCUMENT SHALL BE GIVEN. REVISION LETTERS, AMENDMENTS (WITH DATES OF PUBLICATION), ETC. SHALL BE INCLUDED (e.g., *"MIL-STD-810B", INSTEAD OF "MIL-STD-810"*). TITLES, PUBLICATION DATES, AND REVISION LETTERS ARE NOT SHOWN IN SECTIONS 3, 4, 5, AND ATTACHED APPENDICES. THE ENTIRE DESIGNATION SHOULD BE USED TO REFERENCE THE DOCUMENT (e.g., *"ANSI Y14.5" INSTEAD OF "Y14.5"*), IN SECTIONS 2, 3, 4, 5, AND 10.

5. Listing of references: Documents listed under Section 2 shall be identified by both date and revision letter (except contractor drawings) as occurs in the DOD Index of Specifications and Standards, and the statement of work (SOW). Referenced documents shall also indicate the supplements, amendments and notices and their publication dates as applicable, in accordance with the contract.

6. Referenced documents shall be cited as "*conforming to...*", "*as specified in...*" or "*in accordance with...*" Do not use "*per...*". When making a reference to a requirement paragraph in the specification, the word "*paragraph*" shall not be used. The reference shall be cited "*...to determine compliance with 3.X.X.*", "*...to determine conformance to 3.X.X.*" or "*...as specified herein.*" Federal, military and industry specifications, standards and handbooks shall be identified in the text only by their symbols and number. The words "*specification*", "*standard*", "*paragraph*", etc. shall not be used. In no case should the contractors name or symbol appear in the text. Also, the revision letter for the document shall appear in Section 2 only.

7. The top assembly drawing and any BMO approved specifications shall be listed under "Government documents". The corresponding Part I specification shall not be referenced in Section 2 of Part II specifications. Although the Part II of a specification may reference a paragraph in the Part I, it is intended that this cross reference is verified by a sampling inspection. The Part I cross references usually define environmental exposures.

8. Interface Control Drawings (ICDs) may be referenced in a specification. The use of ICDs should be kept to a minimum. References to ICDs must be very specific.

B. Paragraph 2.1 Government documents:

1. All Federal and Military specifications, standards, drawings, manuals, handbooks, codes, regulations, and publications may be referenced. The following opening statement shall be used:

EXAMPLE

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

2. If ICDs are called out in Section 2, paragraph 2.1 shall be presented as follows:

EXAMPLE

2.1 Government documents. The following documents of the exact issue shown form a part of this specification to the extent specified herein. Those documents not designating an exact revision shall be the latest revision of that document. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

3. Government documents referenced in Section 2 shall be referenced in the following order, with the following headings:

SPECIFICATIONS

Federal
Military
Other Government Activity

STANDARDS

Federal
Military
Other Government Activity

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

Interface Control Drawings (ICDs)

OTHER PUBLICATIONS

Manuals
Regulations
Handbooks
Bulletins
Etc.

C. Paragraph 2.2 Non-Government documents:

1. Not all Non-Government documents are "accepted" for reference in Section 3, 4, 5, or appendices to the specification. For example, unless explicitly permitted by BMO, reference shall not be made to contractor's internal documentation. Only those technical society or industry documents required to fabricate or test the CI shall be listed. Use the following wording:

EXAMPLE

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

2. Non-Government documents shall be listed in the following order, with the following headings:

SPECIFICATIONS
STANDARDS
DRAWINGS
OTHER PUBLICATIONS

3. The source shall also be listed following the major heading (ex: *as follows:*)

"STANDARDS
American National Standards Institute (ANSI)"

4. The following statement shall be placed as a footnote to Section 2:

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

5. The following statement shall be placed after the list of Non-Government documents, if applicable:

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

AS A MINIMUM, THE ENTRY MUST PROVIDE THE IDENTIFYING NUMBER, DATE, AND TITLE OF EACH DOCUMENT. ADVANCE DATES OR "TBDs" ARE NOT ACCEPTABLE IN DRAFT OR FINAL SPECIFICATIONS, BUT MAY BE USED IN PRELIMINARIES. DATES ARE EXPRESSED IN DAY - MONTH - YEAR ORDER, (e.g., *"23 AUGUST 1974"*). THE MONTH MUST BE COMPLETELY SPELLED OUT.

6. The following is an example of what Section 2 of a specification should look like:

EXAMPLE

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

Federal

QQ-P-416C 16 August 1979	Plating, Cadmium (Electrodeposited)

Military

MIL-P-9024G 6 June 1972	Packaging, Handling, and Transportability in System/Equipment Acquisition
MIL-B-81705B 15 August 1974	Barrier Materials, Flexible, Electrostatic-free, Water Vapor Proof, Heat Sealable

U.S. Air Force

S-118-41025A 29 January 1987	Peacekeeper Missile Specification

STANDARDS

Federal

FED-STD-595a 02 January 1968	Color (Requirements for Individual Color Chips)

Military

MIL-STD-129F 30 March 1973 Change 1 20 May 1974	Marking for Shipment and Storage
MS 9006C 20 June 1963	Recess, Cross, Low Torque Drive, Dimensions and Gage, Dimensions for

SAMSO-STD-77-7 10 November 1977	Standardization and Control of Parts Materials, and Processes for Missile and Support Equipment
DOD-STD-1686 02 May 1980	Electrostatic Discharge Control Program For Protection Of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices) (Metric)

OTHER PUBLICATIONS

Manuals

WSMCR 127-1 15 May 1985	Range Safety Manual

Regulations

Code of Federal Regulations CFR 49 Revised, 1 October 1981	Transportation
AFR 39-1 01 January 1982 Change 11 15 March 1987	Airman Classification Regulation

Handbooks

MIL-HDBK-5D 01 June 1983	Metallic Materials and Elements for Aerospace Vehicle Structures

DRAWINGS

U.S. Air Force

54230 4 August 1981	FTOS Kit, CI 0041030

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

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

STANDARDS

American National Standards Institute (ANSI)

ANSI/AWS D1.1-83 01 April 1983	Structural Welding Code

American Welding Society (AWS)

AWS A2.4-79 31 August 1978	Welding and Nondestructive Testing, Symbols for

DRAWINGS

Interface Control Drawings (ICDs)

ICD 25-R027M	Interface Control - Power Supply to Weapon System Control Element - Electrical

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

III. SECTION 3. REQUIREMENTS:

A. General rules:

Use the following guidelines when writing performance requirements.

1. Avoid "design solutions". Performance requirements shall be sufficiently complete (see MIL-STD-490) to allow a contractor flexibility in achieving a design or product that will exhibit required performance.

2. Requirements must state what is expected of the CI at the CI level, not the internal outputs. The specific inputs must be stated as applied conditions that exist for every output of the CI.

3. Avoid ambiguous language. The terms *"normal"*, *"usual"*, *"typical"*, *"ambient"*, *"excessive"*, *"appropriate"*, *"sufficient"*, *"detrimental"*, are not acceptable terms in specification preparation. If these terms must be used, then they must be defined in Section 6.

4. Specify in positive terms what an item is required to do, rather than what it is not required to do (e.g., *"The diameter shall be no greater than 15 inches."* or *"The diameter shall be a minimum of 15 inches."* instead of *"The diameter shall not exceed 15 inches."*). The words "shall be" make the statement positive, even when followed by "no" (*shall be no greater*), this is still a positive statement. The words "shall not be" would make it a negative statement.

5. Terminology that is not defined in the specification or in common use must be avoided.

6. The performance area of any specification must be specific in terms of what the item shall achieve. Interfaces or performance characteristics in terms of another item shall not be used to fulfill this requirement. The requirements shall be stated in terms of outputs based on the inputs.

7. If the item requires a source of power (as an input) to perform its functions throughout 3.2.1, then it is suggested that the first paragraph (3.2.1.1) be devoted to input power. (e.g., *"With the inputs of 3.1.X.X.X, 3.1.X.X.X.X, and 3.1.X.X.X.X.X, the (item) shall perform as follows:"*).

8. Do not begin a new paragraph within a paragraph. If the subject changes, assign a new paragraph number and a title. If the subject is being expanded, assign subparagraph identification (a, b, c, ... etc.).

9. Avoid writing tests or verifications into the requirements.

10. The emphatic form of the verb "shall" must be used when specifying a requirement.

11. Phrases containing *"capable"*, *"capability"*, or *"ability"* are prohibited. Text containing *"shall be capable of"* or *"shall provide for"* are also prohibited. Phrases containing *"as a guide"* or *"as a guideline"* are prohibited. Requirements containing these phrases cannot be adequately verified.

12. All numerical values shall be assigned a tolerance, expressed as a plus or minus value; as a range; as a percentage; at least; no less than; a minimum of; or equal to or less than. A tolerance shall contain the same number of decimal places as the nominal value. A double tolerance (e.g., ... *"range of 15 to 25, ±3 V"* OR *"a minimum of 12 to a maximum of 28 V"*) shall not be specified. Examples of proper tolerance callouts are as follows:

a. A minimum of 5.0 volts direct current (Vdc).

b. A maximum of 0.5 Vdc.

c. No more than 10 Vdc.

d. No less than 10 Vdc.

e. Range from 10 to 20 Vdc, inclusive.

f. 10 ± 5 Vdc.

g. 10 +5, -0 Vdc.

h. 10.50 ± 0.05 Vdc.

i. With an input varying from 1 to 10 Vdc, the output shall be equal to the input minus 10 percent.

j. 10 ± 5 Vdc, with an accuracy of ±2 Vdc.

13. Normally, performance requirements applicable to each CI submitted for individual acceptance shall permit verification at local prevailing environmental conditions. Verification of CIs may occur at natural environments, not in compliance with MIL-STD-810, if the ambient conditions are defined in the specification. Use of phrases such as *"at ambient pressure"* are not allowed, unless that ambient pressure is defined in the specification, and reference is made to that definition.

IV. SECTION 4. QUALITY ASSURANCE PROVISIONS:

A. General rules:

1. This section encompasses all inspections required to verify compliance with the requirements set forth in Sections 3 and 5. Section 4 provides the basis for the test program (although Section 4 must not be a test plan), and as such, provides a contractual instrument to reflect the agreement between customer and contractor as to what constitutes verification of requirements specified in Sections 3 and 5.

2. Scrutiny of quality assurance provisions, methods, and procedures are essential in determining the minimal criteria for success or failure of a specified CI. Excessive or unnecessary inspection can result in greatly increased costs. On the other hand, incomplete or poorly expressed inspection methods can result in lack of verification and a poorly designed or constructed CI.

3. Each and every requirement in Sections 3 and 5 must be verified in Section 4. There can be a direct one for one relationship between the two sections with each Section 4 paragraph verifying only one Section 3 requirement or one Section 5 requirement.

4. A quality conformance (verification cross reference) matrix shall also be included (see Exhibit 4) as an editorial guide. This matrix serves to guide its user to the proper Section 4 paragraph and also provides a reference to insure all requirements are verified. The quality conformance matrix is not required in the non-complex (Type B3) specifications. The matrix shall have a direct one for one relationship between Sections 3 or 5 and Section 4.

B. Paragraph 4.1.1 Responsibility for inspections:

1. This paragraph may be standardized as follows:

EXAMPLE

4.1.1 Responsibility for inspections. The contractor shall be responsible for the performance of all inspections for the [*nomenclature*] developed in accordance with this specification. Inspections shall be conducted at the contractor's facilities or the facilities of the contractor's choice with the approval of the procuring activity. The procuring activity reserves the right to witness or separately perform the specified inspections.

A PARAGRAPH ENTITLED, "QUALITY CONFORMANCE INSPECTIONS" APPEARS IN BOTH PART I AND PART II OF A SPECIFICATION. THIS PARAGRAPH TITLE, AS EMPLOYED IN BOTH PART I AND PART II, HAS BUT ONE USE: TO IDENTIFY THOSE INSPECTIONS THAT ARE NECESSARY FOR VERIFICATION OF THE SECTION 3 AND SECTION 5 REQUIREMENTS. THE TERM "QUALITY CONFORMANCE", AS USED IN THIS MANUAL, DOES NOT IN ITSELF IDENTIFY THE LEVEL OF INSPECTION, (i.e., "QUALIFICATION" OR "ACCEPTANCE"). THE DETERMINATION OF THE LEVEL OF INSPECTION CAN ONLY BE MADE IN RELATION TO THE RESPECTIVE ROLES ASSIGNED TO PART I AND PART II. THUS, IN PART I THE PARAGRAPH ENTITLED "QUALITY CONFORMANCE INSPECTIONS" ENCOMPASSES "QUALIFICATION INSPECTIONS; WHEREAS IN PART II IT ENCOMPASSES "ACCEPTANCE" INSPECTIONS.

2. Section 4 shall not incorporate by reference, information contained in the Acceptance Test Procedure (ATP). Inspections specified in Section 4 shall provide the basis for the preparation and validation of such documents.

3. The quantitative value or definitive criteria in a Section 3 or Section 5 paragraph that will be used to determine acceptability of a CI shall not be repeated or otherwise divulged in the corresponding Section 4 paragraph. In other words, do not rewrite the Section 3 requirements into the Section 4 verifications.

4. Where more than one method of inspection is used (i.e., *test and analysis*), the Section 4 paragraph should indicate what portion of the inspection is allocated to each method. Remember that if a document is called out for inspection purposes, and particular methods or sections of it are not specified, the entire document applies to the CI (including all 6 sections of the referenced document), so be specific. The Section 4 paragraph should also indicate the source of the data used for analysis.

5. This section specifies the inspections that shall be used to verify the Section 3 requirements. In this role, each paragraph requiring verification shall be as follows:

a. Based on, and clearly traceable to a requirement in Section 3 or 5, which shall be referenced in the Section 4 paragraph.

b. Indicate the element(s) of inspection to be employed in the inspection procedure, and identify the requirement to be verified by implementation of that procedure.

c. Include the narrative necessary to ensure the scope and accuracy of inspection results. An inspection paragraph should be stated as a "method", using one or more of the elements defined below and not as a detailed procedure. (A test method is defined as a generalized procedure addressed to a CI itself, with only indirect reference to detailed inspection set-ups, or actions required by inspection personnel. This detailed procedure exists in the formal acceptance test plan.)

d. The following are specific requirements for the preparation of Section 4:

(1) There should be a one-to-one relationship between a requirement in Sections 3 or 5 and the paragraph in Section 4 that is intended to verify the requirement. All requirements shall be verified. Section 4 paragraphs shall follow the same order and have the same title as the Section 3 or 5 requirements they are intended to verify.

(2) It is not sufficient to merely state that a requirement *"shall be verified by test."* In each case, general details must be included for the specification to exercise control over associated documentation. This shall not be a complicated test method. Merely state what kind of test shall be performed (ex: *"A conductivity test shall be performed..."*).

(3) If special test equipment is required, then Section 4 shall contain additional information, as follows:

(a) If the special test equipment is a CI, that equipment shall be identified by CI number.

(b) If the special test equipment is defined by a document that can be referred to in a specification, that equipment shall be identified by document number, and that document must be referenced in Section 2 or Section 6, as applicable.

(c) If neither "(a)" nor "(b)" above apply, but other identification (e.g., *model number, statement of characteristics, etc.*) of the special test equipment exists, then wording similar to the following shall be included in Section 4:

"This test shall be performed using special test equipment Model Number XXXX, produced by [*insert manufacturer's name*], or equivalent."

When this paragraph (c) applies, Section 6 of the specification shall include further identification (e.g., *nomenclature*) of the special test equipment.

V. FORMAT FOR AN APPENDIX:

A. General rules:

1. When appendices are bound with the document, figures and tables in the appendix are listed in the "CONTENTS" of the specification, with the figures and tables of the specification.

2. Appendices bound with the specification shall continue with sequential page, figure and table numbering from the specification (or previous appendix, as applicable). Figures and tables may be numbered "I-3" and "I-III" or "I.3" and "I.III" to distinguish them as belonging to the appendix. Whichever way it is done, be sure to be consistent throughout the appendix and its associated specification.

Table I. Quality conformance matrix

Section 3 Requirements	*E	*T	*D	*A	Section 4 Verification
3.2 Characteristics					4.3.2
3.2.1 Performance					4.3.2.1
3.2.1.1 General		X			4.3.2.1.1
3.2.1.2 Load			X		4.3.2.1.2
3.2.1.3 Dynamic response	X		X		4.3.2.1.3
3.2.1.4 Stage motion restraint					4.3.2.1.4
3.2.1.4.1 Restraint	X		X		4.3.2.1.4.1
3.2.1.5 Environmental control		X			4.3.2.1.5
3.2.2 Physical					4.3.2.2
3.2.2.1 Size	X				4.3.2.2.1
3.2.2.2 Weight	X		X		4.3.2.2.2
3.2.2.3 Rails	X		X		4.3.2.2.3
3.2.2.4 Tiedowns	X		X		4.3.2.2.4
3.2.2.5 Lift points	X		X		4.3.2.2.5
3.2.2.6 Transfer points		X			4.3.2.2.6
3.2.2.7 Weatherproofing		X			4.3.2.2.7
3.2.2.8 Air leakage		X			4.3.2.2.8
3.2.2.9 Pressure relief		X		X	4.3.2.2.9
3.2.3 Reliability					4.3.2.3
3.2.3.1 Operating life				X	4.3.2.3.1

*NOTE: E = Examination, T = Test, D = Demonstration, A = Analysis

Exhibit 4. Quality conformance matrix

3. Appendices under separate cover shall start page, figure and table numbering anew.

4. Any documents called out in an appendix bound with the specification shall be listed in Section 2 (or Section 6, as applicable) of the specification.

5. Exhibit 5 is for use with appendices bound with the main text. Format of appendices bound under separate cover are given in Exhibit 6 for title page and in Exhibit 7 for the first text page.

S-XXX-XXXXX
Appendix I
date
Page I-(number)

APPENDIX I

10. (*Title of appendix in all capital letters*)

10.1 Scope. This appendix ...

10.2 (*First appendix text paragraph for statement of requirements or other information relative to the appendix.*)

Exhibit 5. Sample format of an Appendix bound with main text (first text page)

S-XXX-XXXXX
CAGE XXXXX
Part I of Two Parts
date

PRIME ITEM DEVELOPMENT SPECIFICATION

FOR

(*APPROVED TITLE*)

CI 00XXXXX

APPENDIX III

(*title of appendix*)

Exhibit 6. Sample format of an Appendix bound under separate cover (title page)

S-XXX-XXXXX
Appendix III
date
Page I-1

APPENDIX III

30. (*Title of appendix in all capital letters*)

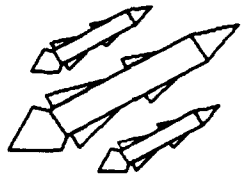
30.1 Scope. This appendix establishes the classified ...

30.2 Applicable documents. (***Applicable documents shall be added here.***)

30.2 (*First appendix text paragraph for statement of requirements or other information relative to the appendix.*)

Exhibit 7. Sample format of an Appendix bound under separate cover (first text page)

BMO Document 87-06D
5 May 1993



CHAPTER 2
INSTRUCTIONS FOR HARDWARE CONFIGURATION ITEM DEVELOPMENT SPECIFICATIONS
(PART I)

CHAPTER 2

INSTRUCTIONS FOR HARDWARE CONFIGURATION ITEM DEVELOPMENT SPECIFICATIONS (PART I)

The following text is numbered to correspond to a B1 specification. Other types of specifications share many of the same headings and paragraphs.

VI. SECTION 1. SCOPE:

A. Paragraph 1.1 Scope:

1. Use the words in the following example:

EXAMPLE

1. SCOPE

1.1 Scope. This specification establishes the performance, design, development, and test requirements for qualification of the [*insert nomenclature*] {*prime item, critical item, non-complex item (as applicable)*} configuration item (CI) 00XXXXX hereinafter referred to as the [*insert short title or acronym*].

2. Care must be exercised to maintain the original title or acronym usage throughout the entire specification.

B. Paragraph 1.2 Classification:

1. In those instances where two (or more) categories of the same configuration item (CI) will exist, and the categories will be covered by the same top assembly drawing, the differing categories may be designated as "Types". This paragraph is not intended to give specific details between the different types of items. Identification is made in Part I by calling out "Types" since no part numbers are available. Differing types have slightly different configurations and requirements. Briefly state the application of each to distinguish the difference between "Types".

EXAMPLE

1.2 Classification. The Coupling shall be of the following types as specified herein:

a. Type I. Mates to 0.250 inch (in) outside diameter tubing by welding or brazing.
b. Type II. Mates to 0.250 in outside diameter threaded tubing.
c. Type III. Mates to 0.375 in quick disconnect end fitting.
d. Type IV. Mates to 0.375 in outside diameter tubing by welding or brazing.

2. Differences between "Types" in performance or physical characteristics shall be specified in Section 3 of the specification.

VII. SECTION 3. REQUIREMENTS:

A. "REQUIREMENTS" is the third major section heading. Each paragraph in this section must follow the format and titling given in MIL-STD-490. Numbered subparagraphs may be used and titles shall be furnished for them. Titles of sections or paragraphs that are not applicable shall be followed by the exact words: "This paragraph is not applicable to this specification." Each paragraph shall follow the numbering system shown in MIL-STD-490.

B. Paragraph 3.1 Item definition:

1. This is a descriptive, nonverifiable paragraph without corresponding QUALITY ASSURANCE PROVISIONS (QA) paragraphs. Because this section (3.1) does not contain requirements, it is not written using the emphatic form of the verb (shall). This section (3.1) contains definitions and descriptions only.

EXAMPLE I

3.1 Item definition. The [*nomenclature*], located in the launcher equipment room (LERM), supports and protects launch-related operational ground equipment (OGE) from attack induced ground shock.

EXAMPLE II

3.1 Item definition. The [*nomenclature*] receives 208 volts (v), 3 phase, 400 Hertz (Hz) power and converts this alternating current (ac) power to direct current (dc) power. The [*nomenclature*] also supplies dc gyro start power during the missile startup period.

C. Paragraph 3.1.1 Item diagrams:

1. Typical content of this paragraph would be a block diagram to show functional characteristics. (See Exhibit 8 for example.) This paragraph has no corresponding QUALITY ASSURANCE paragraph.

D. Paragraph 3.1.2 Interface definition:

1. This paragraph is intended as a minimum list of external interfaces and internal interfaces, as applicable, to guide the designer. The paragraph shall indicate interfaces that must be considered for design and performance requirements. Paragraph 3.1.2 is not intended to present a design solution. The interfaces presented to the CI shall be quantified (if functional) and presented with appropriate units of measure and tolerances. The physical interfaces shall be described in the text. Figures accompanying the description, if used, shall use a minimum of dimensioning.

2. Although Section 3 of a specification is entitled "Requirements", the paragraph "Interface definition" is not within the scope of contractual requirements that are verifiable by quality assurance inspections. Therefore, interfaces between configuration items (CIs) shall not be expressed using the emphatic form of the verb (shall).

3. A specification contractually controls interfaces and maintains that control by specifying the outputs of the item being developed in paragraph 3.2. Outputs of complementary devices become interface inputs to the associated equipment.

4. The use of a reference to Interface Control Drawings (ICDs) in specifications is permitted. ICDs are graphic presentations of agreements between interfacing contractors. ICDs are under BMO control through the Interface Control Working Group (ICWG). References to ICDs within specifications should be kept to a minimum. If the applicable interface within an ICD is relatively short (in text length), then the text should be duplicated in the specification, and no reference should be made to the applicable ICD.

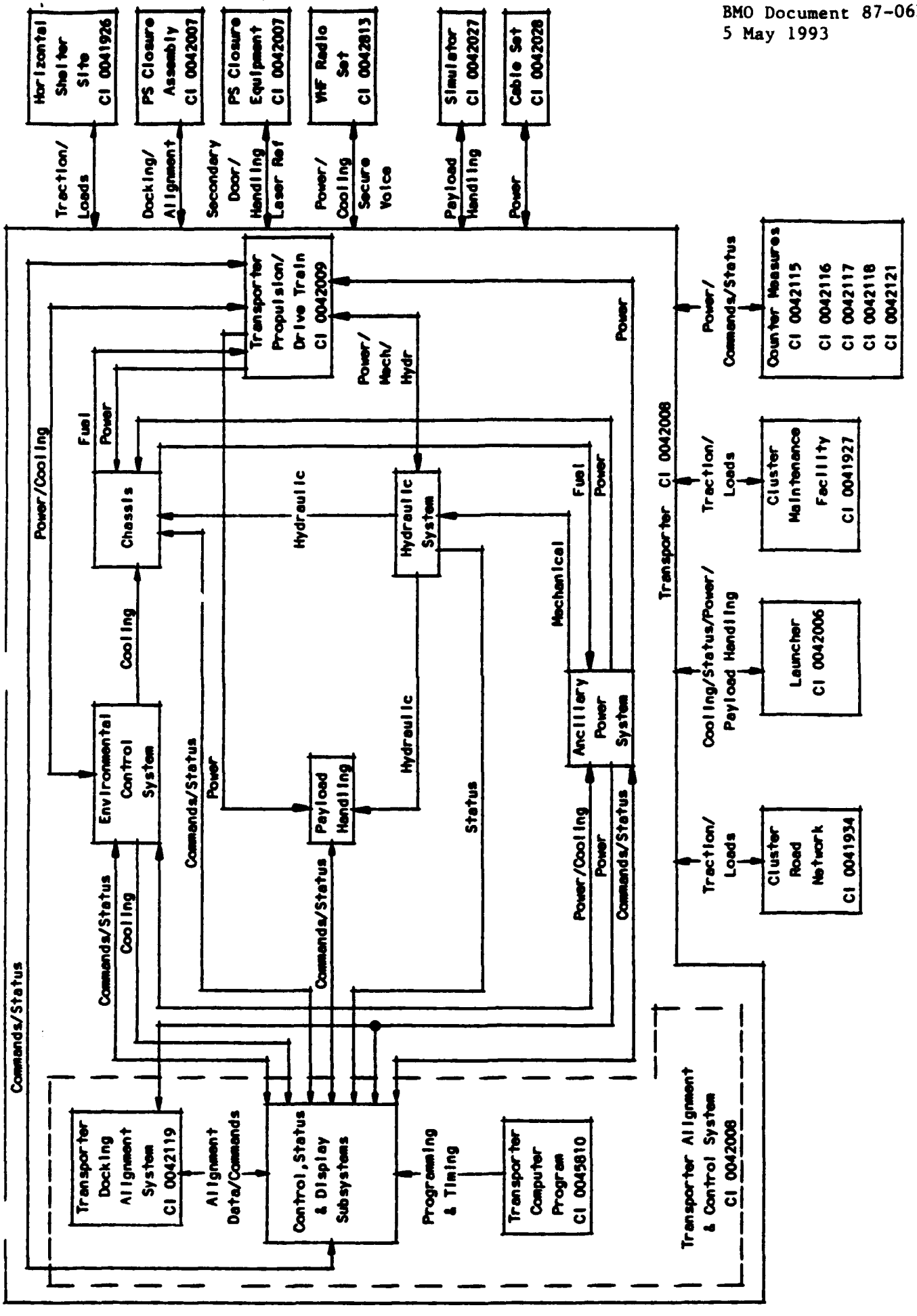


Exhibit 8. Transporter functional block diagram

5. Quite frequently, interfaces are identified between two or more CIs and those interfaces are necessary to the development specification. Do not cite the specification number of the peripheral specification. Instead, cite the CI number. This method will prevent unnecessary ECP generation because the CI numbers are not referenced in Section 2 as are the specification numbers. In some cases, a direct reference to a specification by number may be needed. Take the case where the classified nuclear environments appendix of a system specification is the same as that required for a prime item development (B1) specification. It is appropriate in this case for the B1 specification to make direct reference to the applicable appendix of the system specification, but this document and its appendix must appear in Section 2.

EXAMPLE I

3.1.2 Interface definition.

3.1.2.1 Physical.

3.1.2.1.1 Floor. The [*nomenclature*] mounts onto a floor.

3.1.2.1.2 Electrical connections. The [*nomenclature*] interconnects with cable assemblies at ac input, dc input, ac output, and power monitor and maintenance equipment.

3.1.2.2 Functional.

3.1.2.2.1 Alternating current input. The [*nomenclature*] receives the following ac input:

a. Steady-state limits as shown in Table I.

b. Transient voltage between the maximum and minimum limits as shown in Figure 2.

3.1.2.2.2 Direct current input.

3.1.2.2.2.1 Normal mode. The [*nomenclature*] receives a voltage input between 35.0 and 37.7 volts direct current (Vdc).

3.1.2.2.2.2 Emergency mode. The [*nomenclature*] receives a voltage input between 38.0 and 40.0 Vdc.

3.1.2.2.3 Power monitor. The [*nomenclature*] receives a power monitor signal as follows:

a. In the normal mode, a signal of 250 milliamperes maximum at 250 millivolts maximum.

b. In the emergency mode, a signal of zero milliamperes at +122 Vdc.

EXAMPLE II

3.1.2.2.5 Software. The [*nomenclature*] interfaces with the following software programs:

3.1.2.2.5.1 Operational ground program interface. The [*nomenclature*] interfaces with the operational ground program (CI 0042001).

3.1.2.2.5.2 Operational flight program interface. The [*nomenclature*] interfaces with the operational flight program (CI 0041020).

EXAMPLE III

3.1.2.1 Physical. The physical interfaces are as specified in 3.3 of ICD D25-14573, as applicable to the [*nomenclature*].

3.1.2.2 Functional.

3.1.2.2.1 Power inputs. The [*nomenclature*] receives the power inputs specified in 3.4.1 of ICD D25-14739, as applicable to this CI.

E. Paragraph 3.1.3 Major components list:

1. If applicable to the specification, this paragraph shall include a list of major components showing quantity, identifying number, and nomenclature for each item. If it exists, the identifying number shall be the CI number. The nomenclature shall be that which is approved for each item.

EXAMPLE

3.1.3 Major components list. The [*nomenclature*] includes the following major components:

Item Number	Nomenclature	Quantity	Identification Number
1	Attenuation shields	4	CI 0041044
2	Gear Drive	2	Part No. 863001816-2
3	Elevator	1	Not applicable

F. Paragraph 3.1.4 Government furnished property list:

1. If used, this paragraph shall provide a list of Government furnished property. The format shall be the same as shown in 3.1.3. If Air Force stock items are used, the part number shall be specified in addition to the CI number.

G. Paragraph 3.1.5 Government loaned property list:

1. If used, this paragraph shall provide a list of Government loaned property, as specified for 3.1.3. However, if Air Force stock items are used, the part number shall be specified in addition to the CI number.

H. Paragraph 3.2 Characteristics:

1. This is a paragraph heading only. No text should follow this heading.

I. Paragraph 3.2.1 Performance:

1. The text in a performance paragraph shall specify in quantitative and verifiable terms exactly how the item is expected to perform (i.e., its outputs). For each performance paragraph or subparagraph, there should be a traceable QA paragraph in Section 4 that specifies the inspection required for verification. There is no limit as to the number of performance paragraphs. However, only minimal requirements for design, and qualification of the prime item shall be included.

2. The following example illustrates several of the rules for performance requirement and corresponding verification paragraph writing.

NOTE:

FOR CONVENIENCE ONLY, IN THE EXAMPLES THAT FOLLOW, TEXT FOR SECTION 4 PARAGRAPHS IS GIVEN IMMEDIATELY FOLLOWING THE RELATED REQUIREMENTS PARAGRAPHS. IN A SPECIFICATION, THE PARAGRAPHS ARE PLACED IN THEIR RESPECTIVE SECTIONS.

EXAMPLE I
3.2.1 Performance. 3.2.1.1 Power input. 3.2.1.1.1 Voltage input. With the input voltages of 3.1.1.2, the Fuze shall perform as follows:

3.2.1.1.1.1 Power dissipation. The power dissipation shall be within the limits specified in Table I, when the acceleration levels specified therein are applied along the Fuze sensitive axis shown in Figure 1.

4.3.2.1.1.1.1 Power dissipation. To verify compliance with 3.2.1.1.1.1, the voltages specified in 3.1.1.2 or electrical equivalents, shall be applied and measured in conjunction with the following accelerations:

a. For quiescent operations, use 0.00 ± 0.28 gravity (g).

b. For full operation, use -1.0 ± 0.1 g for minimum dissipation.

c. For over range, use -200 ± 10 g and limit 200 g self-test current to 5 seconds maximum in any one minute period.

EXAMPLE II

3.2.1.5 Frequency response. The frequency response of the Ejector Module shall be flat within ±3 decibels (dB) at all frequencies up to 400 hertz (Hz).

4.3.2.1.5 Frequency response. To verify compliance with the requirements of 3.2.1.5, a -100 g electrical step input shall be applied and the frequency response shall be measured up to 400 Hz.

J. Paragraph 3.2.2 Physical characteristics:

1. Typical subparagraphs of 3.2.2 are weight, size, requirements for transport and storage, durability factors, health and safety criteria, security criteria, command control requirements, and vulnerability factors.

EXAMPLE

3.2.2 Physical.

3.2.2.1 Size. The maximum dimensions shall be as follows:

a. Vertical height shall be 13 inches (in).

b. Circumferential length shall be 199.52 in on a 31.75 in radius.

c. Radial thickness shall be 6.75 in from the 31.75 in inside radius.

3.2.2.2 Weight. The total weight shall be no greater than 28 pounds (lbs).

4.3.2.2 Physical.

4.3.2.2.1 Size. To verify compliance with 3.2.2.1, the Antenna shall be examined.

4.3.2.2.2 Weight. To verify compliance with 3.2.2.2, the Antenna shall be examined by weighing it.

K. Paragraph 3.2.3 Reliability:

1. This is a paragraph heading only. Subparagraphs, such as Service life and Mean time between failures, shall require a QA paragraph verification. A reliability requirement may be expressed in one or more of the following forms:

a. Mean time between failures (MTBF), expressed in hours.

b. Mean cycle between failures (MCBF), expressed in number of cycles.

c. Probability of success (Ps), expressed as a numeric value, ranging from "0" to "1".

EXAMPLE

3.2.3 Reliability.

3.2.3.1 Service life. The Actuator Assembly shall have a minimum service life of 15 years and a storage life of three years maximum. DC brushes shall have a minimum operating life of 1000 hours.

3.2.3.2 Countdown and flight. The countdown and flight reliability shall be a minimum of 0.99975, when performing in accordance with 3.2.1 in the environments of 3.2.5. 3.2.3.3 Mean time between failures. The Actuator Assembly shall have a minimum mean time between failures of 1000 hours.
4.3.2.3 Reliability. To verify compliance with 3.2.3.1, 3.2.3.2, and 3.2.3.3 and analysis shall be performed.

L. Paragraph 3.2.4 Maintainability:

1. This paragraph may be a heading only, with subparagraphs for breakout of time rates, maintenance skills, etc. Each paragraph, including subparagraphs, requires a QA paragraph.

EXAMPLE
3.2.4 Maintainability. 3.2.4.1 Scheduled maintenance. For intervals of less than one year, scheduled maintenance shall be limited to calibration, adjustment, station verification testing, cleaning operations and filter servicing. [*Nomenclature*] mean time to service shall be 4.0 hours. [*Nomenclature*] maximum time to service (90 percent) shall be 8.0 hours. 3.2.4.2 Accessibility. The [*nomenclature*] shall be accessible for removal and replacement without the removal of other parts or assemblies, and without performing any soldering or wire wrap operations. 3.2.4.3 Mean time to repair (MTTR). The MTTR shall be no greater than 4.0 hours. The maximum time for corrective maintenance (90 percent of all maintenance actions) shall be 48.0 hours.
4.3.2.4 Maintainability. The requirements of 3.2.4.1, 3.2.4.2, and 3.2.4.3 shall be verified by analysis and the collection, review, and evaluation of empirical fault detection and isolation data, collected at the contractor's facility.

A PARAGRAPH ENTITLED "MAINTENANCE" (3.5.1) APPEARS UNDER "LOGISTICS" (3.5). THE TWO PARAGRAPHS - MAINTAINABILITY AND MAINTENANCE - DIFFER IN THEIR APPROACH TO SPECIFIED REQUIREMENTS. MAINTAINABILITY PERTAINS TO TIME/PERFORMANCE ASPECTS INHERENT IN THE DESIGN; MAINTENANCE PERTAINS TO SERVICING PROVISIONS, METHODS, AND CONCEPTS.

M. Paragraph 3.2.5 Environmental conditions:

1. The principle objective of this paragraph is to specify only those environmental conditions, induced and natural, to which the CI will be exposed. Exposures are those environmental conditions other than factory prevailing conditions. Careful thought should be given to the environments that are included in this paragraph, since an unnecessary exposure will obviously add to the cost of quality assurance inspections. The reason for specifying environments is to show, through testing in those environments, that the performance of the CI is not affected or degraded during and after exposure. These are multiple subparagraphs, each of which require a QA paragraph.

2. Electromagnetic pulse (EMP) characteristics are included under this paragraph. EMP characteristics in Section 3.2.5 differ from EMR requirements in 3.3.2. In Section 3.2.5, EMP environments refer to those environments that the CI must be able to withstand. In 3.3.2, EMR requirements are those radiation environments the CI emits.

3. All terms used in environmental paragraphs must be defined in Section 6. (i.e., *Operating, nonoperating, basing, transportation and handling, natural, modified, induced, garrison mode, deployment-parked phase, etc.*) For this reason, environments should be consistent with the use of these terms. Keep this section as simple as possible and limit the use of the above mentioned terms as much as possible.

4. There are several approaches to use. One way is to simply state the maximum and minimum (range) environments the CI will be exposed to (see Example I).

EXAMPLE I ENVIRONMENTS

3.2.5 Environmental conditions.

3.2.5.1 Non-nuclear environments. The Actuator Assembly shall meet the requirements of 3.2.1 during and after exposure to the following environments:

3.2.5.1.1 Temperature. Temperature environments are -35 degrees Fahrenheit (deg F) to +95 deg F for a period of 1 hour, maximum.

3.2.5.1.2 Pressure. The pressure environment is 1.47 to 1.70 pounds per square inch absolute (psia).

3.2.5.2 Nuclear environment. The Actuator Assembly shall meet the requirements of 3.2.1 after exposure to the following environments:

3.2.5.2.1 Electromagnetic pulse. The electromagnetic pulse (EMP) environments are as follows:

a. EMP electric and magnetic field environments are specified in 10.3 of Appendix I.

b. EMP transient waveform is identified in Figures 4 and 5 for a maximum of 5 milliseconds on the Actuator Assembly input conductors. The EMP transient of Figure 4 appears concurrent with the loss of 60 Hz power. The transient consists of a damped sinusoid waveform with a peak voltage amplitude ranging up to the values specified in Figures 4 and 5, which decay to L/e of peak amplitude in 3 to 5 Hz. The center frequency of waveform ranges between frequency limits specified in Figures 4 and 5. The EMP input is considered as Thevenin voltage applied to the Actuator Assembly through a source impedance of 10 to 20 ohms resistance.

c. The EMP transients are specified in Figure 4.

3.2.5.2.2 Nuclear radiation. The nuclear radiation environments during the emergency (see 6.2.24) and extended (see 6.2.25) survival periods are as follows:

a. A maximum nuclear radiation environment for the emergency survival period is specified in 10.4.1 of Appendix I.

b. A maximum nuclear radiation environment for the extended survival period is specified in 10.4.2 of Appendix I.

4.2.2.6 Environmental conditions.

4.2.2.6.1 Non-nuclear environments. To verify compliance with the requirements of 3.2.5.1, the following environmental tests shall be performed:

4.2.2.6.1.1 Temperature. The Actuator Assembly shall be subjected to -35 +0, -5 deg F until temperature stabilization is reached and the tests of 4.2.2.2 shall be performed. The temperature shall be raised to +95 +0, -5 deg F until temperature stabilization is reached and the tests of 4.2.2.2 shall be performed. (Ref. 3.2.5.1.1.)

4.2.2.6.1.2 Pressure. The Actuator Assembly shall be exposed to a chamber pressure of 1.70 psia and maintained for a minimum of 5 hours. The pressure shall then be restored to prevailing conditions and the Actuator Assembly allowed to reach thermal stability. (Ref. 3.2.5.1.2.)

4.2.2.6.2 Nuclear environment. To verify compliance with 3.2.5.2, the environmental tests of 4.3.3.3 shall be performed after exposure to the following environments:

4.2.2.6.2.1 Electromagnetic pulse. Perform the following (ref. 3.2.5.2.1):

a. Using data from Appendix I, perform an analysis of the Actuator Assembly to determine the effects of EMP and electric field environments specified in 3.2.5.2.1a.

b. Operate the Actuator Assembly with rated load from a 60 Hz power source and subject the ac input lines to electrical pulses over the frequency range and levels as specified in 3.2.5.2.1b. Remove the 60 Hz power and verify transfer to the dc operation.

c. Subject the ac input lines to electrical pulses over the frequency ranges and levels as specified in 3.2.5.2.1c.

4.2.2.6.2.2 Nuclear radiation. Perform worst case analysis of the Actuator Assembly controls for both transient and permanent nuclear radiation effects for the environment specified in 3.2.5.2.2. Analyze transient effects due to gamma sources by utilizing the gamma dose rate time history specified in 10.8 of Appendix I. (Ref. 3.2.5.2.2.)

5. **THE ENVIRONMENTS SPECIFIED IN THE SUBPARAGRAPHS OF 3.2.5 ARE NOT REQUIREMENTS, BUT GIVEN EXPOSURES. THEREFORE, DO NOT STATE "VERIFY COMPLIANCE WITH..." FOLLOW EACH ENVIRONMENTAL PARAGRAPH IN SECTION 4 WITH "(Ref. 3.2.5.X)" TO SIMPLY GIVE TRACEABILITY TO THE ENVIRONMENT IN SECTION 3.**

6. **IT IS MANDATORY THAT ALL ENVIRONMENTS BE SPECIFIED AS THEY APPLY TO THE APPLICABLE CI AS A WHOLE AND NOT THE INDIVIDUAL COMPONENTS.**

7. Another way to address environments is to break down the environments into operating and nonoperating conditions. The performance requirements should be met during and after exposure to the operating environments and after exposure to nonoperating environments.

8. "Operating" is defined as a condition where a CI is in a mode which demands exercise of any or all 3.2.1 functions. "Nonoperating" is defined as a condition where a CI is exercising no 3.2.1 functions (such as in storage or transportation modes).

9. The words "operating" and "nonoperating" refer to the state of the CI, they are not definitions of particular environments where operation can or cannot occur. "Operating" and "nonoperating" should only be used as a title for separation, grouping of the environments or for addressing them in text. No other significance is required or should be assigned as this may also lead to concern as to whether the item is truly operating or passive. The only verifiable requirement is to state how the item must perform during and after exposure to the environments specified. As the environments themselves are not verified, they are not requirements, they are given exposures and do not need to be stated in the emphatic form of the verb (shall), however, the lead-in paragraph should be stated in the emphatic form of the verb (shall).

10. An additional way to address environments is in terms of natural and induced environments. Conditions are then broken down into operating and nonoperating conditions. Example II shows a further breakdown of these conditions.

EXAMPLE II ENVIRONMENTS

3.2.5 Environmental conditions. The Stage shall meet the requirements of 3.2.1 and 3.2.3 after exposure to the following nonoperating (see 6.2.24) and operating preflight (sse 6.2.25.1) environments, and during exposure to the following operating flight (see 6.2.25.2) environments.

3.2.5.1 Natural (see 6.2.23) environments.

3.2.5.1.1 Pressure. The pressure environments are as follows, with a maximum rate of change of 5.0 psia per 10 second interval.

a.	Nonoperating transportation (see 6.2.24.1)	15.5 to 2.7 psia
b.	Nonoperating storage (see 6.2.24.2)	15.5 to 9.5 psia
c.	Operating preflight	15.5 to 10.5 psia
d.	Operating flight	15.500 to 0.192 psia

3.2.5.1.2 Temperature. The temperature environments are as follows:

a.	Nonoperating	0 to 110 deg F
b.	Operating	45 to 110 deg F

3.2.5.1.3 Humidity. The humidity environments are as follows:

a. Nonoperating and operating preflight: The maximum moisture content of the air corresponds to a dewpoint of 81 deg F with the maximum ambient pressure (see 6.2.27). The maximum relative humidity is 90 percent at any temperature.

b. Operating flight: The maximum moisture content of the air corresponds to a dewpoint of 81 deg F with the maximum ambient pressure. The maximum relative humidity is 100 percent at any temperature.

3.2.5.1.4 Fungus. The nonoperating and operating preflight environment is any fungus indigenous to the continental United States that grows on nutrient organic materials including those contaminated with oil, grease, and dust.

3.2.5.1.5 Ozone. During a worst case 12 hour period, the average ozone content is 0.230 parts per million (ppm) by volume, in air, with a peak of 0.600 ppm. The annual average is 0.045 ppm.

3.2.5.1.6 Lightning. The operating flight lightning environment consists of lightning current as shown in Figure 12.

3.2.5.1.7 Sand and dust. The nonoperating and operating preflight sand and dust environment is settling dust products with diameters up to 5.0×10^{-5} inch.

3.2.5.1.8 Corrosive environment. The nonoperating and operating preflight corrosive environment is equivalent to the conditions stipulated in MIL-STD-810, Method 509.2 Salt Fog, Procedure I.

3.2.5.2 Induced (see 6.2.28) environments.

3.2.5.2.1 Acceleration. The maximum limit level Stage acceleration environments are as follows:

a. Nonoperating transportation, maximum

1.	Longitudinal	3.6 g
2.	Lateral	3.0 g

b. Operating preflight, maximum

1.	Longitudinal	3.6 g
2.	Lateral	2.5 g

c. Operating flight, maximum

1.	Longitudinal	9.0 g
2.	Any lateral direction	2.0 g

3.2.5.2.2 Shock. The shock ultimate environments (see 6.2.26) are as follows:

a. Operating preflight: A single, full sine pulse of frequency and peak equivalent rigid body response as follows:

1.	Amplitude Y axes, lateral	13 Hz, 15.0 g
2.	Amplitude Y axes, lateral	3 Hz, 12.0 g
3.	Amplitude Z axes, vertical	8 Hz, 15.0 g

b. Operating flight: See Figure 13.

3.2.5.2.3 Vibration. The ultimate vibration environments (see 6.2.26) are those that cause vibration at the mounting points of components within the envelope of the following:

a. Nonoperating: Figure 14 along any axis in the Y - Z plane.

b. Operating preflight: Vibration along any axis in the Y - Z plane for each level and duration, is as specified in Table I.

c. Operating flight: See Figures 16 and 17.

3.2.5.2.4 Acoustic. The ultimate acoustic environments (see 6.2.26) are as follows:

a. Operating preflight: The acoustic field external to the Stage is shown in Figure 18.

b. Operating flight: The acoustic field external to the Stage is shown in Figure 19.

3.2.5.2.5 Aerodynamic heating. The operating flight aerodynamic heating environment is defined in Table II.

4.2.2.5 Environmental conditions. To verify compliance with 3.2.5, the Stage shall be subjected to the performance test of 4.2.2.1 during operating flight environmental tests and after nonoperating and operating preflight environmental tests. Following each test, the test specimen shall be inspected for defects. Where an analysis is specified, this analysis shall verify that the performance requirements specified in 3.2.1 and 3.2.3 can be met after exposure to nonoperating environments and during exposure to operating environments.

4.2.2.5.1 Natural environments.

4.2.2.5.1.1 Pressure. The Stage shall be evaluated by analysis based upon data generated from component tests, which shall consist of subjecting components to four pressure cycles between prevailing ambient (see 6.2.27) and 1.5 psia. Each pressure level shall be maintained for a duration of 20 minutes. (Reference 3.2.5.1.1.a through e.)

4.2.2.5.1.2 Temperature/humidity. The Stage shall be subjected to eight temperature cycles over the temperature range of 0 to 110 deg F, followed by the Stage performance tests of 4.2.2.1. A cycle as specified herein, shall be high-to-low or low-to-high. The Stage shall be exposed to each temperature cycling extreme until the propellant has reached 110 +10/-5 deg F on the high cycle, or 0 +5/-10 deg F on the low cycle. During the high temperature cycle, the Stage shall be subjected to a humidity level of 80 percent minimum relative humidity (RH) for a minimum of 96 hours after the propellant surface temperature has reached the 110 +10/-5 deg F condition. When cycling, a maximum of 2 hours shall be allowed for removal of one conditioning temperature to application of the other conditioning temperature. (Reference 3.2.5.1.2 and 3.2.5.1.3.a and b.)

4.2.2.5.1.3 Fungus. All materials used in the Stage shall be verified by examination as being non-nutrient or having fungus protective finishes. All materials not verified as being non-nutrient (even with protective finishes) shall be subjected to the test of MIL-STD-810, Method 508.1, Procedure I. (Reference 3.2.5.1.4.)

4.2.2.5.1.4 Ozone and lightning. An analysis shall be conducted based upon data generated during laboratory and component tests. (Reference 3.2.5.1.5 and 3.2.5.1.6.)

4.2.2.5.1.5 Sand and dust. Analyses shall be conducted based upon data generated during Stage or component tests. The settling dust particles shall be in accordance with MIL-STD-810, Method 510.1, Procedure I, except that the maximum particulate size shall be 5.0×10^{-5} inch. The maximum temperature shall be 81 deg F, and the maximum wind velocity shall be 150 feet per minute. The Stage shall be outside of its shipping container. (Reference 3.2.5.1.7.)

4.2.2.5.1.7 Corrosive atmosphere. Analyses shall be conducted using data from material and component tests. (Reference 3.2.5.1.8.)

4.2.2.5.2 Induced environments.

4.2.2.5.2.1 Acceleration. An analysis shall be performed based upon data generated during laboratory and component tests. (Reference 3.2.5.2.1.)

4.2.2.5.2.2 Shock.

a. An analysis based upon data generated during laboratory and component tests, including the fatigue scatter factor of 3.3.8.7 shall be performed. (Reference 3.2.5.2.2.a and b.)

b. The Stage shall be subjected to the shock environments of 3.2.5.2.2.c followed by the performance tests 4.2.2.1. (Reference 3.2.5.2.2.c.)

c. The Stage shall be evaluated by analysis based upon component level tests. (Reference 3.2.5.2.2.d.)

4.2.2.5.2.3 Vibration.

a. The Stage shall be subjected to vibration environments, which shall include the fatigue scatter factor of 3.3.8.7 followed by the performance tests 4.2.2.1. The test duration for the hard mobile launcher (HML) missile preflight environment in Figures 14 and 15 may be shortened based on analysis using cumulative damage theory and considering the fatigue capability of the as fabricated Stage materials. (Reference 3.2.5.2.3.a and b.)

b. An analysis based on Stage component test data shall be performed. In conducting any tests, the vibration shall be applied for a duration of 60 seconds along each of the Stage X, Y, and Z axes. (Reference 3.2.5.2.3.c.)

4.2.2.5.2.4 Acoustic. An analysis shall be performed based on applying the acoustic environment to a full scale Stage for a 60 second duration. (Reference 3.2.5.2.4.a and b.)

4.2.2.5.2.5 Aerodynamic heating. An analysis shall be conducted based on physical and thermal properties derived from MIL-HDBK-5, MIL-HDBK-17 and MIL-HDBK-23, and material test results. (Reference 3.2.5.2.5.)

N. Paragraph 3.2.6 Transportability:

1. This paragraph can be a single-sentence statement (see example) or a completely developed set of requirements. A QA paragraph is required. If a specific or limited mode of transportation is required, then that mode shall be stipulated.

EXAMPLE
3.2.6 Transportability. The Processor shall be transportable by road, air or rail.
4.2.2.6 Transportability. To verify compliance with 3.2.6 an analysis based on design parameters shall be performed.

O. Paragraph 3.3 Design and construction:

1. This is a major heading with subparagraphs, each of which requires a QA paragraph. The number of subparagraphs is unlimited. Minimum requirements necessary to achieve the desired design shall be included.

P. Paragraph 3.3.1 Materials, processes and parts:

1. Subparagraphs should be set up in a logical order. First specify any necessary materials and/or material requirements. Then specify applicable processes, then parts requirements.

EXAMPLE

3.3 Design and construction.

3.3.1 Materials, processes, and parts. Materials, processes, and parts shall be selected in accordance with the requirements for the selection of electrical parts, the selection of mechanical parts, and the selection of materials and processes, from SAMSO-STD-77-7, and from the program approved parts, materials and processes (PMP) lists.

3.3.1.1 Cable Assembly. The Cable Assembly shall meet the requirements of MIL-C-45224 for Type IV cable assemblies.

3.3.1.1.1 Cable subassemblies. The Cable Assembly subassemblies shall meet the requirements of MIL-C-27500.

3.3.1.1.2 Conductors. The conductors shall meet the requirements of MIL-W-22759/13 through /19 and /32 through /42, as specified on the applicable engineering drawing.

3.3.1.1.2.1 Insulation resistance. The insulation resistance of conductors shall be a minimum of 5 megohms for American wire gauges (AWG) 22 to 16 and 1 megohm for AWG 14 and 12. Resistance shall be measured between each conductor and connector shell, any two conductors, or any conductor and its shield, where the conductor is one or more parallel insulated wires having common terminations. The insulation resistance for harness and cable assemblies shall meet the same requirements when 500 +25, -0 volts direct current (Vdc) is applied for a minimum of 5 seconds (sec) at a temperature of 60 to 80 degrees F.

3.3.1.1.2.2 Shielded conductors. Separately shielded conductors within the Cable Assembly shall maintain a minimum of 40 decibels (dB) isolation between them, over a frequency range from 10 kilohertz (kH) to 10 megahertz (MHz).

3.3.1.1.2.2.1 Shield termination. Electromagnetic shields shall be circumferentially bonded to connector backshells through the connector shells to the mating connectors. Shields covering single conductors, twisted pairs, triplets or quads of wires in the cable bundles shall coterminate with the Cable Assembly electromagnetic shield.

3.3.1.1.2.3 Dielectric strength. Harness or cable insulation dielectric shall withstand a potential of 750 volts root mean square (Vrms) minimum, at 60 ± 2 hertz (Hz) for 60 +5,-0 sec as evidenced by no current leakage in excess of 5 milliamperes (mamp) and no arc-over between each conductor and the connector shell, any two conductors, and conductors and their shields.

3.3.1.1.2.4 Cable lay. Cable Assembly subassemblies consisting of more than four conductors which terminate in connectors and are subject to flexing when mated or demated shall be fabricated with a twisted or helical lay for that portion of the Cable Assembly which is subject to movement during the connector mating and demating operation. A cable subassembly may be fabricated with a parallel or straight wire lay for that portion of the Cable Assembly which is permanently installed and which is not subject to movement after installation.

3.3.1.1.3 Electrical connectors. Electrical connectors shall be designed so that it is physically possible to interconnect one and only one correct line, wire, lead, or cable by providing keys or aligning pins and by size, location or type difference, or equivalent means. All connectors shall be clearly labeled in addition to the physical means to prevent improper connection.

3.3.1.1.3.1 Circular connectors. Circular connectors shall meet the requirements of MIL-C-38999, Series IV. Circular connectors shall be identified and assembled as specified in MIL-STD-681. Circular connectors shall be used as specified in MIL-STD-454, Requirement 10 and MIL-STD-1353. Connectors with backshells, when mated, shall have a transfer impedance whose magnitude shall be no greater than the values shown in Figure 13.

3.3.1.1.3.2 Staging connectors. The connector half surviving after stage separation shall have the electrical contacts recessed a minimum of 0.289 inch from its mating or interface plane.

3.3.1.1.3.3 Contact assignments. Contact assignments shall be made in a manner which precludes equipment damage, lack of detection of a fault condition, or flight failure in the event of shorts between contacts (or conductors) within a connector, or to allow for physical separation of circuits. All cavities shall be filled with contacts.

3.3.1.1.3.4 Backshell system generated electromagnetic pulse (SGEMP) protection. The inside surface of all backshells on the Cable Assembly shall be coated with 0.02 gram minimum per square centimeter of a low-Z (atomic number no greater than 10) material. The addition of this low-Z material shall not preclude making proper bonds between the backshell and the connector, and the cable shields and the backshell.

3.3.1.1.4 Cable SGEMP protection. The short circuit SGEMP cable response of the twisted, paired, shielded, jacketed (TPSJ) cable within the Cable Assembly, when subjected to the X-ray environments specified in Appendix IV of S-134-60020, shall be less than 40 amps per meter for each conductor.

3.3.1.1.5 Finishes. All components shall be finished in accordance with MIL-E-5400, MIL-F-7179, and MIL-S-5002.

3.3.1.1.6 Bonding. Bonding shall be as follows:

a. The maximum resistance of any single electrical bond between any two conductive elements shall be no greater than 2.5 milliohms where potential fault currents do not exceed 35 amps. Where potential fault currents are in excess of 35 amps, the maximum resistance of a single electrical bond shall be no greater than 0.075/Isc ohms, where Isc is the worst case fault current through the bond in amperes.

b. The maximum impedance of any single electrical bond shall be no greater than a value increasing log linearly from 3.5 milliohms at 1 kHz to 1.0 ohm at 50 MHz.

3.3.1.1.7 Cable layout. Cable layout design shall include no sharp bends and points of tension and shear stresses. In general, the radius of a cable bend shall be no less than 10 times the diameter of the cable; however, the following bend radii exceptions shall be used when applicable:

a. At terminals, or where suitably supported, the minimum bend radius may be reduced to three times the outside diameter of the harness.

b. If required, the harness may be enclosed in insulating sleeving and a minimum bend radius of twice the outside diameter used.

3.3.1.1.7.1 Routing and protection. Cables shall be routed or protected in accordance with MIL-W-5088 and in such a manner that they are not pinched (for example, raceway cover), walked on, used for hand holds, bent or twisted sharply or repeatedly. Cable wire bundles shall be protected from adjacent blast effects.

3.3.1.1.7.2 Slack. Slack shall be incorporated into the cables to eliminate any strain on the connectors and to allow for shock, vibration, and displacement.

3.3.1.1.7.3 Twist. Braided cable segments shall withstand 125 cycles of being twisted 0.25 radian per foot minimum with a maximum torque of 1.69 pound-feet per inch of cable diameter without degradation in electrical performance, radio frequency (RF) shielding ability, or structural integrity.

3.3.1.1.7.4 Bend. Braided cable segments shall withstand being bent 3.14 radians to a minimum radius of three diameters (3D) and 125 cycles of 1.58 radians bending to a 3D radius in any direction without degradation in electrical performance, RF shielding ability, or structural integrity.

3.3.1.1.7.5 Splices. Splices and solder sleeves shall be prohibited.

3.3.1.1.7.6 Safety wiring. Locking of threaded backshell coupling rings shall be accomplished using safety wire in accordance with MS 33540.

3.3.1.8 Flammability. In accordance with MIL-STD-454, Requirement 3 for flammability, flammable materials, nonburning and self-extinguishing shall be defined for the materials listed herein as Average Extent Burning (AEB) and Average Time Burning (ATB), with the limitations specified as follows:

a. Rigid plastics: AEB of less than 4 inches.

b. Flexible plastics: AEB of less than 15 inches.

c. Pressure-sensitive adhesive coated tapes used for electrical insulation: ATB of less than 4 seconds.

3.3.1.9 Corrosion prevention and control. Materials, processes, and protective treatments, and finishes shall assure that degradation due to corrosion does not impair Cable Assembly performance during storage or service life. Contact between dissimilar metals shall be protected against electrolytic corrosion as specified in MIL-STD-889. Electronic components and assemblies shall be protected in accordance with MIL-STD-1250.

4.2.3 Design and construction. The design and construction requirements of 3.3.1 shall be verified by examination of the Cable Assembly and its design and fabrication documentation, including process and material specifications.

Q. Paragraph 3.3.2 Electromagnetic radiation:

1. This paragraph may have subparagraphs; however, they are not mandatory. QA paragraphs are required.

EXAMPLE
3.3.2 Electromagnetic radiation. The Antenna shall meet the following requirements of MIL-STD-461, for Class A2 equipment. 3.3.2.1 Conducted susceptibility for B+ power lines. The Antenna shall meet the requirements of 3.2.1.2 when 1.0 Vrms over the frequency range of 30 Hz to 400 MHz is injected on the input B+ power lines.
4.2.3.2 Electromagnetic radiation. To verify compliance with 3.3.2 and 3.3.2.1, the Antenna shall be subjected to a conducted susceptibility test in accordance with MIL-STD-462.

R. Paragraph 3.3.3 Nameplates and product marking:

1. This paragraph should specify marking requirements for the CI and all of its parts. A QA paragraph (examination for verification) is required.

EXAMPLE
3.3.3 Nameplates and product marking. The [*nomenclature*], and all of its parts, subassemblies, assemblies, units, groups, sets and subsystems as defined in MIL-STD-280, shall be legibly and permanently marked/identified in accordance with MIL-STD-130.
4.2.2.10 Nameplates and product marking. To verify compliance with 3.3.3, the [*nomenclature*] shall be examined.

S. Paragraph 3.3.4 Workmanship:

1. The workmanship paragraph for a Type B specification should state the criteria for the CI. A QA paragraph (examination for verification) is required. The terms "in a thoroughly workman-like manner" and "in accordance with best commercial practices" are too vague to be verified and shall not be used.

EXAMPLE
3.3.4 Workmanship. The electrical/electronic systems of the [*nomenclature*] shall conform to the workmanship requirements of MIL-STD-454. The mechanical systems of the [*nomenclature*] shall be fabricated and processed using standards of workmanship consistent with the performance requirements specified herein and shall be clean and free of cracks, blemishes, defects, burrs, sharp edges, and displaced or missing parts.
4.2.3.3.4 Workmanship. The [*nomenclature*] shall be examined to verify compliance with 3.3.4.

T. Paragraph 3.3.5 Interchangeability:

1. This paragraph is used to identify the level at which the design is to result in interchangeable or replaceable parts. As stated in MIL-STD-490A, this paragraph does not relate to the interchangeability required by part number designations. When used, this paragraph requires a QA paragraph.

2. MIL-STD-454, Requirements 7 should be specified for electrical and electronic equipment and MIL-STD-280 should be specified for mechanical and combination type (both mechanical and electrical) equipment.

EXAMPLE
3.3.5 Interchangeability. Interchangeability shall be in accordance with Requirement 7 of MIL-STD-454.
4.2.3.3.5 Interchangeability. Compliance with 3.3.5 shall be verified by analysis.

U. Paragraph 3.3.6 Safety:

1. This may be heading with subparagraphs or text following the heading. QA paragraphs are required.

EXAMPLE
3.3.6 Safety. 3.3.6.1 Electrical safety. Uninsulated conductors or connectors shall be located or covered such that accidental contact or grounding is prevented. 3.3.6.2 Personnel safety. Rotating components shall be located or guarded to prevent injury to personnel or damage to the components due to accidental contact when the Elevator is installed and operating.
4.2.2.12 Safety. To verify compliance with 3.3.6.1 and 3.3.6.2, an analysis based upon established safety standards and examination shall be performed.

V. Paragraph 3.3.7 Human performance/human engineering:

1. This may be a heading with subparagraphs or text following the heading. Human factors design criteria shall be taken from MIL-STD-1472 and MIL-STD-1794, Task 207. There shall be a reference to MIL-STD-1472, and subparagraphs shall be taken from MIL-STD-1794, Task 207. QA paragraphs are required.

EXAMPLE
3.3.7 Human performance/human engineering. The [*nomenclature*] shall comply with the requirements, and design criteria specified in MIL-STD-1472.
4.3.3.7 Human performance/human engineering. Compliance with 3.3.7 shall be verified as specified in MIL-STD-1472.

W. Paragraph 3.4 Documentation:

1. The statement "This paragraph is not applicable to this specification." shall follow the title. All subtier documentation is delineated in the Statement of Work.

X. Paragraph 3.5 Logistics:

1. This is a heading with subparagraphs. Each requires a QA paragraph.

Y. Paragraph 3.5.1 Maintenance:

1. This paragraph requires a QA paragraph.

EXAMPLE

3.5 Logistics.

3.5.1 Maintenance. The Semitrailer shall be maintained as follows:

3.5.1.1 Organizational. Semitrailer organizational level maintenance shall be as follows:

a. Preoperating instructions.

b. Replacing defective lamps and fuses, tightening fittings and loose hardware, maintaining fluid levels and tire pressures, cleaning the vehicle, and performing minor corrosion control.

c. Removing and replacing a tire using common hand tools.

3.5.1.2 Intermediate. Semitrailer intermediate level maintenance shall be as follows:

a. Removing, replacing, and repairing control modules, cables, and hoses using common hand tools.

b. Checking malfunctioning systems using test equipment.

c. Performing periodic inspections and repairs to the frame, brakes, tires and wheels, suspension systems and rear steering gear using automotive maintenance equipment.

d. Repairing electrical, hydraulic, pneumatic, and load/off-load systems on the vehicle using tools, test equipment, and handling gear.

3.5.1.3 Depot. Semitrailer depot maintenance shall be those major functional level maintenance functions which cannot be performed at organizational and intermediate levels and shall be accomplished either at a depot or by depot teams dispatched to the location.

4.3.5 Logistics.

4.3.5.1 Organizational and intermediate. To verify compliance with 3.5.1.1 and 3.5.1.2, maintenance operations stated therein shall be analyzed for their applicability to that maintenance level.

4.3.5.2 Depot. To verify compliance with 3.5.1.3, the depot level maintenance operations shall be verified by analysis.

Z. Paragraph 3.5.2 Supply:

1. This paragraph requires a QA paragraph which uses analysis for verification in most instances. Examination may also be appropriate.

EXAMPLE
3.5.2 Supply. Spare and repair parts for the Antenna shall be provisioned in accordance with AFAD 71-682 requirements for reident provisioning teams.
4.2.5.2 Supply. To verify compliance with 3.5.2, an analysis utilizing existing logistics and provisioning data shall be performed.

AA. Paragraph 3.5.3 Facilities and facility equipment:

1. This paragraph is not applicable to equipment specifications.

AB. Paragraph 3.6 Personnel and training:

1. This paragraph is usually a heading. Subparagraphs to 3.6 require QA paragraphs.

EXAMPLE
3.6 Personnel and training.
3.6.1 Personnel. The Electrical Checkout Test Set (ECTS) shall be maintained at the organizational level by Missile System Analysis Specialist/Technician AFMC 443X0 and at the intermediate level by Missile Electronics Equipment Specialist/Technician AFMC 316X2G/72G as defined in AFR 39-1. 3.6.2 Training. Special ECTS training for both AFMC 442X0 and 316X2G personnel shall be required, the extent of which shall be identified in the current training/training equipment plan.
4.3.6 Personnel and training. An analysis of the ECTS design shall be performed to verify compliance with 3.6.1 and 3.6.2.

AC. Paragraph 3.7 Major component characteristics:

1. This is a heading with subparagraphs, each of which requires a QA paragraph. Performance and physical characteristics shall be specified. If needed, reliability, maintainability, environmental conditions and human performance/human engineering requirements may be specified. The requirements are for those components listed in 3.1.3, although it is not mandatory that 3.1.3 components have a corresponding 3.7 paragraph. In fact, if a major component has its own specification (in accordance with MIL-STD-490A), it should not have a corresponding 3.7 paragraph. Approved nomenclature shall be used to identify major components. The order used to specify major components should closely follow that of 3.1.3.

EXAMPLE

3.7 Major component characteristics.

3.7.1 Shock isolator performance.

3.7.1.1 Static loads. When filled with VV-D-1078 silicone fluid and the piston is within 0.25 inch of static position, each isolator shall support a static load of 8000 to 20,000 lbs.

3.7.1.2 Spring rate. With the isolator initially supporting a load of 12,000 lbs at the static position, the isolator load-stroke characteristics shall lie within the envelope specified in Figure 6. In addition, the average load-stroke curve from 2.5 ins rod retraction to 2.5 ins rod extension shall show a spring rate of 650 ± 65 pounds per inch.

3.7.2 Shock isolator physical characteristics.

3.7.2.1 Excursion limit. The isolator piston stroke relative to the piston case shall be limited to a total stroke of 36 +1, -0 ins.

3.7.2.2 Weight. The total weight of the isolator shall be no greater than 2000 lbs.

4.3.7.1 Shock isolator performance.

4.3.7.1.1 Static loads. With the shock isolator installed in a test fixture, the following test shall be performed to verify compliance with 3.7.1.1:

a. Apply a minimum load of 8000 ± 100 lbs and position the piston within 0.25 in of static location.

b. Apply a load of 20,000 ± 200 lbs and position the piston within 0.25 in of static location.

4.3.7.1.2 Spring rate. To verify compliance with 3.7.1.2 with the isolator initially supporting a 12,000 lb load and within 0.25 in from the static position, the load shall be increased and decreased to obtain a piston rod extension of 14.0 ins and a retraction of 20.0 ins. The piston rod velocity shall be less than 1 in per second. The load-stroke data shall be measured and recorded continuously during extension and retraction. The spring rate shall be determined from the average load-stroke curve from 2.5 in rod extension to 2.5 in rod retraction.

4.3.7.2 Shock isolator physical characteristics.

4.3.7.2.1 Excursion limit. To verify compliance with 3.7.2.1, the isolator piston stroke shall be measured.

4.3.7.2.2 Weight. To verify compliance with 3.7.2.2, the isolator shall be weighed.

AD. Paragraph 3.8 Precedence:

1. All requirements are of equal importance to BMO, therefore this section is not applicable and should so state.

VIII. SECTION 4. QUALITY ASSURANCE PROVISIONS:

A. Paragraph 4.1 General:

1. This paragraph is usually "standard", as shown in the following example. The exact words shown in the example may be used. Examinations, demonstrations, tests and analyses shall be the only methods of inspection.

EXAMPLE

4.1 General. Quality assurance provisions for qualification of the [*nomenclature*] shall verify compliance with the requirements of this specification.

B. Paragraph 4.2 Quality conformance inspections:

1. The arrangement of subparagraphs should follow as closely as possible the numbering arrangement of the related paragraphs in Section 3. The lead paragraph (as shown in the following example) will contain definitions for each of the types of inspections. Each inspection must be expressed in positive terms that will form the basis of a method. "An appropriate verification shall be conducted" is unacceptable; however, "An analysis shall be performed to verify compliance with the requirements of 3.2.1.X.X" is a clear statement of method.

2. When test is the verification method, it is not sufficient to merely state that a requirement "shall be verified by test". In each case, minimum specific details shall be included; as required for the specification to exercise control over associated documentation against which the test is actually performed. This shall not be a long and complicated test method. A statement of the kind of test being run shall be included.

3. The emphatic form of the verb shall be used throughout Section 4. For specific test procedures, the imperative form may be used provided the entire method is preceded by the phrase "The following tests shall be performed:" or related wording. Do not use elaborate narratives in describing verifications used in Section 4.

4. The text of a Section 4 paragraph, plus text of a corresponding requirements paragraph in Section 3, shall provide a technical basis for determining whether or not special equipment is needed to obtain complete and accurate inspection results.

5. The statement in 20.4.2 of MIL-STD-490 which states that "4.2 of a specification shall cover 'or reference' inspection requirements" shall be interpreted to mean that inspection methods specified in a government controlled (or CCB controlled) document (e.g., MIL-STD-810) may be applied by reference. The statement does not mean that inspections in a contractor's test plan, in technical orders, in source control drawings, or similar documents can be applied by reference. Inspections contained in such documents should be extracted and placed in QA paragraphs of Section 4.

6. The following example contains words that may be used verbatim.

EXAMPLE

4.2 Quality conformance inspections. Qualification inspections shall be performed on a [*nomenclature*] that is representative of the approved production design. Qualification of the [*nomenclature*] to assure compliance with the requirements of Section 3 shall be by examinations, demonstrations, tests, or analyses which shall be defined as follows:

a. Examination consists of observation and/or investigation of the physical properties of an item using standard measuring devices (such as rulers, calipers, weight measuring devices, etc). Examination is nondestructive and includes (but is not limited to) visual inspection, simple physical manipulation, gauging, and measurement of an item's quantitative properties, such as tolerances, finishes and identification.

b. Demonstration consists of showing the merits of an item by operation, movement, adjustment or display during performance of a function, to determine qualitative and quantitative properties and performance of an item.

c. Test consists of inspecting an item for functional requirements under real or simulated conditions, with sufficient instrumentation for measurement, recording and evaluation of quantitative data or predetermined performance characteristics. Test employs technical means and requires the use of external resources (such as meters, recorders, etc), under controlled conditions (usually environmental) to evaluate functional characteristics.

d. Analysis consists of technical evaluation of equations, charts, graphs, circuit diagrams, engineering and test data, calculation studies and models. The analytical results may be comprised of a compilation or interpretation of existing information or derived from lower level inspections for the determination of qualitative and quantitative properties.

C. <u>Paragraph 4.2.1 Inspection conditions</u>:

1. This paragraph, with subparagraphs, may be included in a specification to indicate general enabling conditions. Specific conditions will appear in applicable requirements/QA paragraphs. If such inclusion is unreasonably repetitious, an overall statement of conditions should be made.

EXAMPLE

4.2.1 Inspection conditions. The following conditions shall apply to the tests, examinations, and demonstrations for qualification of the [nomenclature].

4.2.1.1 Power. The [*nomenclature*] shall be supplied with an adjustable input power source which mates with ac and dc input power connectors. The dc power source shall have the following characteristics:

a. Adjustable voltage range of 26.0 to 37.7 Vdc.

b. Allowable voltage ripple of 1 percent rms maximum.

4.2.1.2 Ambient environmental conditions. Unless otherwise specified, tests shall be conducted under the following ambient conditions:

a. Temperature of 75 ± 3 deg F.
b. Relative humidity of 20 to 80 percent.
c. Barometric pressure of 1.5 to 15.0 psia.

IX. SECTION 5. PREPARATION FOR DELIVERY:

A. This is a major section heading which shall have one subparagraph (5.1 Preparation for delivery). This subparagraph (5.1) shall state that "This section is not applicable to this specification." See Chapter 3 (the Part II specification guide) of this manual for guidance in formulating Section 5 text for a product fabrication specification. Preparation for delivery is addressed only for a product specification, as no equipment is delivered against the design specification.

X. SECTION 6. NOTES:

A. This noncontractual section will usually contain 6.1 Intended use and 6.2 Definitions. Other informational material (such as formulas and equations) may be included. No additional requirements shall be placed in this section. The following is an example of Section 6. Any references in Section 3 to Section 6 paragraphs, makes that particular Section 6 paragraph part of the Section 3 requirement.

EXAMPLE

6. NOTES

6.1 Intended use. The [*nomenclature*] is intended for use as (*state actual usage of the CI*).

6.2 Definitions.

6.2.1 Equipment items. "Commercially mature" refers to a component/subassembly/equipment item that is in current competitive production and is available on the market.

6.3 Elements of inspection. Requirements are verified by measurement techniques executed in accordance with test plans/methods/procedures contained in test documents. The measurement techniques have their origin in Section 4 of a development specification, or more precisely, in Table (*add table number*) which identifies the elements of inspection that apply. In general, these elements should be regarded as approaches that give direction and forward traceability to increasingly detailed test instructions. The elements of inspection defined in 4.2 (and identified by title in the table) include, or extend the definitions found in MIL-STD-109, Quality Assurance Terms and Definitions. The definitions are discrete and, with slight variation, have been included in virtually all development specifications.

6.4 Additional applicable documents. The following documents form a part of this specification, but are considered reference documents, not compliance documents.

STANDARDS

Military

MS 9006C 20 June 1963	Recess, Cross, Low Torque Drive, Dimensions and Gage, Dimensions for

OVERVIEW FOR A PART I SPECIFICATION

The following is an overview of all the paragraphs required for a Part I specification.

1. SCOPE

1.1 Scope.

*1.2 Classification.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.2 Non-Government documents.

3. REQUIREMENTS

3.1 Item definition.

3.1.1 Item diagrams.

3.1.2 Interface definition.

3.1.3 Major component list.

3.1.4 Government furnished property list.

3.1.5 Government loaned property list.

3.2 Characteristics.

3.2.1 Performance.

3.2.2 Physical characteristics.

3.2.3 Reliability.

3.2.4 Maintainability.

3.2.5 Environmental conditions.

3.2.6 Transportability.

3.3 Design and construction.

3.3.1 Materials, processes and parts.

3.3.2 Electromagnetic radiation.

3.3.3 Nameplates and product marking.

3.3.4 Workmanship.

* Omit if not applicable.

3.3.5 Interchangeability.

3.3.6 Safety.

3.3.7 Human performance/human engineering.

3.4 Documentation.

3.5 Logistics.

3.5.1 Maintenance.

3.5.2 Supply.

3.5.3 Facilities and facility equipment.

3.6 Personnel and training.

3.6.1 Personnel.

3.6.2 Training.

3.7 Major component characteristics.

3.8 Precedence.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.

4.1.1 Responsibility for inspections.

4.1.2 Special tests and examinations.

5. PREPARATION FOR DELIVERY

6. NOTES

*10. APPENDIX I.

* Omit if not applicable.

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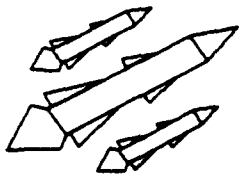


CHAPTER 3
INSTRUCTIONS FOR HARDWARE CONFIGURATION ITEM PRODUCT FABRICATION SPECIFICATIONS (PART II)

CHAPTER 3

INSTRUCTIONS FOR HARDWARE CONFIGURATION ITEM PRODUCT FABRICATION SPECIFICATIONS (PART II)

XI. SECTION 1. SCOPE:

A. Paragraph 1.1 Scope:

The SCOPE section of the specification provides general information pertaining to the extent of applicability of a configuration item (CI) and, if necessary, a brief descriptive CLASSIFICATION subparagraph. These paragraphs have no verification requirements, therefore do not use the imperative "shall" in the narrative.

Use the words in the following example:

EXAMPLE

1. SCOPE

1.1 Scope. This specification establishes the requirements for manufacture and acceptance of the [*insert nomenclature*] {*prime item, critical item, non-complex item (as applicable)*} CI 00XXXXX hereinafter referred to as the [*insert short title or acronym*].

Care must be exercised to maintain the original title or acronym usage throughout the entire specification.

B. Paragraph 1.2 Classification:

1. When approved by the procuring activity, a specification may contain two or more CI configurations, defined by a common top assembly drawing. Each configuration shall be identified as a Type I, Type II, etc., followed by a paragraph in accordance with the following example. Configuration types shall be distinguished by different part numbers in paragraph 3.3.1. When a paragraph addresses less than the total number of types specified, the paragraph shall identify the type or types addressed. It is mandatory that classification be addressed in Section 1.2 of the Part I specification prior to being addressed in the Part II.

EXAMPLE

1.2 Classification. The Tractor consists of the following types as specified herein:

a. The Type I Tractor is equipped with a 120 volt power switching mechanism and a 120 volt field power generator.

b. The Type II Tractor is equipped with a power mechanism for cargo handling.

c. The Type III Tractor is equipped with an aircraft towing mechanism.

XII. SECTION 3. REQUIREMENTS:

A. General rules:

1. All requirements in Section 3 except paragraphs 3.1 Item definition, 3.1.1 Major component list, and 3.1.2 Government furnished property list, are acceptance requirements and necessitate a corresponding Section 4 paragraph for verification. The words "This paragraph is not be applicable to this specification." may follow 3.1.1 Major component list, 3.1.2 Government furnished property list, and 3.4 Preproduction sample, if the paragraphs are not included in the specification and are not deemed essential for the acceptance of a CI.

2. Acceptance inspections shall verify that the performance inherent in the qualified CI have not been degraded by the process of manufacturing the production CI. It shall cite those requirements which must be verified on each and every CI. Acceptance requirements and corresponding inspection methods are addressed to both the physical CI and the functional "in use" characteristics of that CI. The physical characteristics of a CI are specified in the top assembly drawing. If any additional requirements for CI acceptance are not specified on the top assembly drawing, a Part II specification is not necessary (may occur in Type C3 specifications).

3. Acceptance requirements and corresponding inspection methods apply to "as manufactured," fully assembled CIs that have been produced in accordance with methods detailed on the top assembly drawing. Requirements shall not be levied against any component of a CI unless that component is installed in the CI and inspections are clearly relevant to the complete end item.

4. The classification of characteristics for acceptance is not required in Section 3 but shall be included in Section 4 where contractually required.

B. Paragraph 3.1 Item definition:

1. This paragraph shall describe the general characteristics of the CI at the CI level. The text of this paragraph shall not be in conflict with the text of 3.1 Item definition of the Part I specification.

2. Subparagraphs 3.1.1 Major component list and 3.1.2 Government furnished property (GFP) list apply only when major components and/or GFP are included in the CI. Traceability to a similarly titled paragraph in the Part I specification is required. When text for one or both of these paragraphs is justified, identification shall be complete. An example of column headings that may be used for both 3.1.1 and 3.1.2 are as follows:

EXAMPLE

Item Number	Nomenclature	Quantity	Identification Number
1	Cable Assembly	1	CI 0041070
2	Control Set, Rotational, Stage I	3	Part No. 863T0970000-9

C. Paragraphs 3.2.1, 3.3.1, 3.3.2, and 3.3.3:

1. Ordinarily, paragraphs 3.2.1, 3.3.1, 3.3.2, and 3.3.3 encompass all requirements that apply to the acceptance of a CI. Requirements applicable to the content of each paragraph are as follows:

D. Paragraph 3.2.1 Performance:

1. The performance characteristics that assure repetitive CI performance and reliability, when verified by a corresponding Section 4 acceptance paragraph, shall be included in 3.2.1. Mandatory criteria for the preparation of performance requirements are as follows:

a. Each performance requirement in a Part II specification shall be based on a requirement or requirements in the associated Part I specification, but shall not parrot the Part I requirement. Requirements in Part II may form "subsets" of a single Part I requirement. No new requirements shall be created or introduced in the Part II specification.

b. Unless destruction is allowed in a sampling plan, performance requirements verified by individual inspections shall be of a benign nature to prevent damage to the CI. For the same reason, performance requirements should be limited to the minimum required to accomplish the objective of the Part II specification.

c. Although the Part II specification may reference a paragraph in Part I, it is intended that this cross reference be limited and used only when the requirement containing the reference is verified by a sampling inspection. The Part I cross references usually define environmental exposures.

d. If verification of requirements by individual examinations will not suffice to assure repetitive CI design performance and reliability, then requirements and inspections on a CI sampling basis shall be considered for inclusion in the Part II specification. Generally, sampling inspection methods result in destruction of the CI in conjunction with environmental exposures. Use paragraph 3.4 for performance requirements that are to be verified on a sampling basis.

E. Paragraph 3.3.1 Production drawings:

1. It is mandatory that paragraph 3.3.1 be presented as follows:

"3.3.1 Production drawings. The [*nomenclature*] shall be fabricated and assembled in accordance with Drawing XXXX, Part Number XXXX-XX, and all data assembled thereunder."

2. All requirements for the fabrication, manufacture and assembly of a CI are encompassed completely in the production drawing. Each CI submitted for acceptance shall meet the requirements of 3.3.1.

3. Note that "all data assembled thereunder" as stated in 3.3.1 may include the contractor's documentation not ordinarily considered eligible for reference in a specification. When referenced as a part of a top assembly drawing, a contractor's internal documentation is placed under the procuring activity's configuration control.

4. All references in the specification text to the top assembly drawing shall address "the drawings". This reference shall be considered synonymous with the top assembly drawing. The referenced part number must be the top assembly drawing number, followed by a dash number.

5. For future changes made to assemblies where no perform e requirements are changed, but a new dash number is added, the following presentation (as applicable) shall be used:

"3.3.1 Production drawings. The [*nomenclature*] shall be fabricated and assembled in accordance with Drawing XXXX, Part Numbers XXXX-1, -2, -3, and -4, and all data assembled thereunder."

F. Paragraph 3.3.2 Standards of manufacture:

1. The requirements of 3.3.2 are satisfied by making a reference to the top assembly drawing of paragraph 3.3.1. If the need arises for stating processes or standards critical to the manufacture of the end item, they shall be included in this paragraph (see specific example). The requirements shall be of minimum number and detail to facilitate establishing inspection and the ensuing acceptance test effort.

G. Paragraph 3.3.3 Workmanship:

1. This paragraph shall specify the general requirements for workmanship which are incident to the manufacture of the item. The requirement relates to the finesse of manufacture which should be provided by the craftsman or manufacturing technique. The requirements for this paragraph shall generally cover features that can be verified by visual examination.

2. The workmanship paragraph(s) for a Type C specification shall state the criteria for the CI as a whole.

3. The phrase "Workmanship shall be accomplished in a thoroughly workman-like manner" or "Workmanship shall comply with best commercial practices" are non-verifiable requirements and shall not be used.

H. Other acceptance requirements:

1. A Part II Prime Item Product Fabrication Specification may include requirements not identified by paragraph number and title in Appendix VIII of MIL-STD-490A. Weight, Safety, Burn-in, and Production vibration are examples of acceptance requirements that may be added. Added requirements shall be identified by new paragraph numbers and descriptive titles.

2. Section 3 requirements are verified in Section 4 by individual inspections that apply to each CI. However, when sampling inspections in addition to individual inspections are required, Section 3 shall include the requirement(s) and condition(s) pertaining to both. Section 4 shall contain the sampling plan to be used.

3. The following example is an abridged excerpt from a Part II specification which meets BMO recommended specification practices. It is intended to serve only as a guide in the preparation of future specifications.

EXAMPLE

3.2 Characteristics.

3.2.1 Performance.

3.2.1.1 Radio frequency (RF). The Antenna shall perform as specified herein over the RF range specified in 10.2.2 of Appendix I, Part I.

3.2.1.2 Voltage standing wave ratio (VSWR). With a source impedance of 50 ohms, the Antenna VSWR shall be between 2.5:1.0 and 6.0:1.0 when radiating into free space.

3.2.1.3 Antenna patterns. With the Antenna mounted in a conical ground plane, as specified in the drawing, the Antenna RF radiation patterns shall meet the following requirements:

3.2.1.3.1 Plane cut. The Antenna shall be rotated about an axis mutually perpendicular to the cone axis, and about a line from the center of the Antenna aperture to the cone axis. The gain when radiating into or receiving from free space between angles of 50 to 70 degrees from the cone axis off the cone apex, shall be a minimum of -2 decibels (dB), compared to isotropic (dBi), including effects of VSWR reflection losses.

3.2.1.3.2 Conical cut, 50 degrees (deg). The beamwidth at a level of -5 dB with respect to the peak shall be 180 ±20 deg for a conical cut at 50 ±2 deg from the cone axis off the cone apex. The peak-to-peak fluctuation within this beamwidth shall be 2 dB maximum.

3.2.1.3.3 Conical cut, 70 deg. The beamwidth at a level of -5 dB with respect to the peak shall be 180 +20 deg for a conical cut at 70 +2 deg from the cone axis off the cone apex. The peak-to-peak fluctuation within this beamwidth shall be 2 dB maximum.

3.2.1.4 Power handling. The Antenna shall accept a minimum of 700 watts peak RF power, with an average power of 4.9 watts, minimum, for at least 3 minutes, with less than +20 percent change of transmitted and reflected power, when driven by a source having 50 ohms impedance.

3.3 Design and construction.

3.3.1 Production drawings. The Antenna shall be fabricated and assembled in accordance with Drawing 78D40051, for Part Number 78D40051G1, and all data assembled thereunder.

3.3.2 Standards of manufacture. The standards and processes required for the manufacture of the Antenna shall be as defined by the drawings specified in 3.3.1.

3.3.3 Workmanship. The Antenna shall be fabricated and finished in such a manner that criteria of appearance, fit and adherence to specific tolerances shall be observed. Particular attention shall be given to neatness and freedom of parts from burrs and sharp edges. The Antenna shall be clean and free of visible contamination.

3.3.4 Weight. The weight of the Antenna shall be 3.2 ± 0.3 pounds.

3.4 Preproduction sample. This paragraph is not applicable to this specification.

XIII. SECTION 4. QUALITY ASSURANCE PROVISIONS:

A. General rules:

1. The definitions of examination, demonstration, and test shall be included in Section 4.

NOTE: The use of analysis in and of itself to verify a requirement is prohibited in Part II specifications.

2. Section 4 of a Part II specification also includes a paragraph for verification of Section 5 requirements.

3. The primary objective of the Part II specification is to serve as a contractual instrument for acceptance of "good" equipment and the rejection of "bad" equipment. It should be noted that Section 3 contains values with tolerances that the test procedures must take into account and that individual acceptance, by definition, occurs at prevailing environmental conditions which do not create an environmental exposure.

B. Specific requirements:

1. Lot acceptance applies in addition to individual acceptance. The application of each type of acceptance requirement shall be clearly identified and a sampling plan provided. If special testing/examination over and above acceptance and lot acceptance is required, paragraph 4.1.2 shall be included and shall identify the special tests/examinations.

2. The statement in 80.4.2 of MIL-STD-490 to the effect that "4.2 of a specification shall cover 'or reference' inspection requirements" is interpreted to mean that inspection methods specified in a government controlled document (e.g., MIL-STD-810) may be applied by reference.

3. A quality conformance (QC) matrix is not mandatory in the Part II specification. If the contractor feels that a QC matrix will enhance the specification, it may be included.

4. Each requirement in Section 3 and Section 5 shall be verified in Section 4. Each Section 4 paragraph shall classify the requirement characteristic as critical, major, or minor in accordance with MIL-STD-109. This may be accomplished in a quality conformance matrix or in individual paragraphs. The following are BMO accepted definitions for the above mentioned characteristics:

a. Characteristic. A physical, chemical, visual, functional, or any other identifiable property of a product or material.

(1) Critical characteristic. A critical characteristic is one that judgement and experience indicate, if defective, could result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the major end item or major part thereof. A characteristic is hardness critical if the characteristic is required in order to meet the nuclear environmental requirements. Characteristics which are intrinsic to meeting the overall design requirements and which would be required independent of the nuclear environmental requirements, are not considered hardness critical.

(2) Major characteristic. A major characteristic is one other than critical, that judgement and experience indicate, if defective, could result in failure, or materially reduce the usability of the product for its intended purpose.

(3) Minor characteristic. A minor characteristic is one that judgement and experience indicate, if defective, could not materially reduce the usability of the product for its intended purpose, or is a departure from established standards having no significant bearing on the effective use or operation of the product.

When required for reference purposes in reporting inspection results, the characteristics may be numbered. When numbered, numbers shall be in accordance with the following:

1 through 99	-	Critical characteristics
101 through 199	-	Major characteristics
201 through 299	-	Minor characteristics

(See MIL-STD-109 for more information on classification of characteristics.)

5. As in the preceding Section 3 EXAMPLE, the following EXAMPLE is intended to serve only as a guide in the preparation of Section 4 as presented in Part II specifications.

EXAMPLE

4. QUALITY ASSURANCE PROVISIONS

4.1 General. Inspections of the Antenna shall be conducted to verify conformance to the requirements of Sections 3 and 5 herein. Each acceptance requirement shall be verified by one or more of the elements of inspection defined as follows:

a. Examination consists of observation of the physical properties of an item using standard measuring devices (such as rulers, calipers, weight measuring devices, etc). Examination is nondestructive and includes (but is not limited to) visual inspection, simple physical manipulation, gauging, and measurement of an item's quantitative properties, such as tolerances, finishes and identification.

b. Demonstration consists of showing the merits of an item by operation, movement, adjustment or display during performance of a function, to determine qualitative and quantitative properties and performance of an item.

c. Test consists of inspecting an item for functional requirements under real or simulated conditions, with sufficient instrumentation for measurement, recording and evaluation of quantitative data or predetermined performance characteristics. Test employs technical means and requires the use of external resources (such as meters, recorders, etc), under controlled conditions (usually environmental) to evaluate functional characteristics.

4.1.1 Responsibility for inspection. The contractor shall be responsible for the performance of all inspections specified herein. Inspections shall be conducted at the contractor's facility of the facility of the contractor's choice with the approval of the procuring activity. The procuring activity reserves the right to witness, or separately perform any of the inspections set forth herein.

4.1.2 Special tests and examinations. During regular production of the Antenna, every 50th unit produced in each production lot (see 6.3.1) shall be subjected to special testing and examination, as specified in Table I. The tests shall be sequenced as follows:

a. High temperature exposure 180 deg Fahrenheit (F)
b. High humidity exposure 100 percent relative humidity (RH)
c. Combination high temperature and high humidity exposure (180 deg F plus 100 percent RH)
d. VSWR
e. Pattern
f. Delamination (visual)
g. Delamination (destructive with magnification)
h. Hygroscopic content

4.1.2.1 Lot sample. A minimum of one Antenna shall be tested from each production lot (see 6.3.1.1) to verify conformance to the requirements of this paragraph.

Table I. Special tests and examinations

Paragraph Numbers		Special Tests & Examinations	Acceptance Inspections		Classification of Characteristics		
Requirements	Inspections		Sampling	Individual	Critical	Major	Minor
3.2.1.2	4.2.2.1.1	X	X	X	X		
3.2.1.3	4.2.2.1.2	X	X		X		
3.2.1.4	4.2.2.1.3	X	X	X	X		
3.3.1	4.2.3.1			X			X
3.3.2	4.2.3.2			X		X	
3.3.3	4.2.3.3			X			X
3.3.4	4.2.3.4			X			X

NOTE: Reference 4.1.2, 4.2.1.1, and 4.2.1.2

4.2 Quality conformance inspections.

4.2.1 Acceptance inspections. Acceptance inspections shall consist of individual inspections and sampling inspections in 4.2.1.1 and 4.2.1.2, herein. Unless otherwise specified herein, all acceptance inspections shall be made at ambient conditions as defined in MIL-STD-810.

4.2.1.1 Individual test. Each Antenna produced shall be subjected to the individual tests specified in Table I.

4.2.1.2 Sampling tests. After being subjected to the individual tests of 4.2.1.1, one out of each 50 Antennas produced shall be selected at random and subjected to the sampling tests of Table I.

4.2.2 Characteristics.

4.2.2.1 Performance.

4.2.2.1.1 Voltage standing wave ration (VSWR). To verify compliance with 3.2.1.2, the VSWR shall be measured at the Antenna in increments of 7 MHz maximum over the RF range specified in 3.2.1.1 when radiated into free space. During any mechanical environmental exposure, the VSWR shall be measured at any one frequency in the RF range.

4.2.2.1.2 Antenna pattern. To verify compliance with 3.2.1.3, the isotropic free space gain levels of the Antenna pattern shall be established. The following tests shall be conducted under the conditions of 3.2.1.1 and 3.2.1.3.

4.2.2.1.2.1 Plane cut. To verify compliance with 3.2.1.3.1, the Antenna pattern shall be continuously recorded while rotating through 360 degrees about the axis of 3.2.1.3.1.

4.2.2.1.2.2 Conical cuts. To verify compliance with 3.2.1.3.2 and 3.2.1.3.3, the Antenna pattern shall be continuously recorded while rotating through 360 degrees about the longitudinal axis at the cone axis angles specified in 3.2.1.3.2 and 3.2.1.3.3.

4.2.2.1.3 Power handling. The power specified in 3.2.1.4 shall be applied to the Antenna in the RF range of 3.2.1.1 using a pulse generator, while the pressure is maintained at prevailing pressure conditions over a period of from 3 to 5 minutes. During application of power, the transmitted and reflected power shall be monitored. After removal of power, the Antenna shall be visually examined for signs of breakdown, to verify compliance with 3.2.1.4.

4.2.3 Design and construction.

4.2.3.1 Production drawings, standards of manufacture and workmanship. Each Antenna shall be examined for compliance with the requirements of 3.3.1, 3.3.2, and 3.3.3.

4.2.3.2 Weight. To verify compliance with the requirements of 3.3.4, the Antenna shall be examined by weighing it.

4.3 Preparation for delivery. The requirements of Section 5 shall be verified by examination.

XIV. SECTION 5. PREPARATION FOR DELIVERY:

A. General rules:

1. Section 5 paragraphs in a Part II specification are requirements and shall be expressed in the emphatic form of the verb.

2. This section shall state the general requirements for preservation, packaging, packing, and package marking. If more than one level of preservation and packaging is included, the conditions for selection of levels shall be explained.

3. The specific requirements for materials to be used in preservation, packaging and packing a product shall be covered in this section, either directly or by reference to other documents.

4. This section shall contain, as a minimum, those requirements for disassembly (when necessary), cleaning, drying, preservation, packaging, packing and marking for shipment. Unless expressly excepted by BMO, preservation, packaging, packing and marking requirements shall NOT be stated "in accordance with best commercial practices", as there is no way to verify this.

B. Preservation and packaging:

1. The requirements for preservation and packaging shall cover cleaning, drying, and preservation methods adequate to prevent deterioration, provide appropriate protective wrapping, package cushioning, interior unit containers, and package identification/marking. Specialized preservation and packaging requirements shall be detailed.

C. Packing and marking:

1. The requirements for packing shall cover the exterior shipping container, the assembly of items or packages therein, necessary blocking, bracing, cushioning, weatherproofing, and marking. Package marking requirements shall be established by reference to MIL-STD-129.

EXAMPLE I

5. PREPARATION FOR DELIVERY

5.1 Preservation. Preservation shall be Levels A, B, or C, as specified herein.

5.1.1 Level A.

5.1.1.1 Cleaning. Modules shall be cleaned in accordance with MIL-P-116, Process C-1.

5.1.1.2 Drying. Modules shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservation application. No preservatives shall be used.

5.1.1.4 Unit packs. Each module shall be individually unit packed in accordance with Submethod IA-8 of MIL-P-116 in a bag or envelope conforming to MIL-B-117, Type I, Class F, Style 1. To avoid capacitor effects, each bag or envelope shall be fabricated from a continuous piece of barrier material. Cushioning shall conform to PPP-C-1842, Type III or in a supplementary container conforming to Variety 2 of PPP-C-1842, Type III or PPP-B-676 or the weather resistant class of PPP-B-636.

5.1.1.5 Intermediate packs. Unit packs no greater than 30 cubic inches in size shall be placed in intermediate containers conforming to Variety 2 of PPP-B-566 or PPP-B-676 or the weather resistant class of PPP-B-636. Intermediate containers shall be uniform in size, shape and quantities, shall be of minimum tare and cube and shall contain multiples of five unit packs, no greater than 100 unit packs. No intermediate packs shall be required when the total quantity shipped to a single destination is less than 100 unit packs or when supplementary containers are used.

5.1.2 Level B. The Level B preservation for modules shall be as specified for Level A, except that Variety 1 of PPP-B-566 or PPP-B-676 or the domestic class of PPP-B-636 may be used for the supplementary and intermediate containers specified in 5.1.1.4 and 5.1.1.5.

5.1.3 Level C. Except as specified herein, the Level C preservation for modules shall conform to MIL-STD-794 requirements for this level. Wrapping and cushioning materials shall be nonstatic generating and noncorrosive and shall not crumble, flake, powder or shed. Unless otherwise specified in the contract, the quantity per unit pack shall be at the option of the supplier.

5.2 Packing. Packing shall be Level A, B, or C, as specified herein. Exterior containers shall be of a minimum tare and cube, consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.2.1 Level A. Modules preserved as specified in 5.1.1 shall be packed in wood containers conforming to PPP-B-601, overseas type or PPP-B-621, Class 2. Closure and strapping shall be in accordance with the applicable container specification, except that metal strapping shall conform to QQ-S-781, Type I, Finish A. The requirements for Level B packing shall be used when the total quantity of a stock numbered module for a single destination does not exceed a packed volume of one cubic foot.

5.2.2 Level B. Modules preserved as specified in 5.1.2, shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirements. The requirements for box closure, waterproofing and reinforcing shall be in accordance with Method V of PPP-B-636, Appendix I.

5.2.3 Level C. Modules preserved as specified in 5.1.3, shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with PPP-B-636, Appendix I.

5.3 Marking.

5.3.1 Standard marking. In addition to any special or other identification marking required by the contract, each unit, supplementary, intermediate and exterior container shall be marked in accordance with MIL-STD-129. The complete military or contractor's type or part number, as applicable (including CAGE), shall be marked on all unit, supplementary and intermediate packs in accordance with the identification marking provisions of MIL-STD-129.

5.3.2 Special marking. In addition to the marking requirements of 5.3.1 and regardless of the level or type of packaging specified, all unit, supplementary, intermediate and exterior containers shall be marked as specified for sensitive (electrostatic discharge sensitivity) electronic devices in MIL-STD-129.

EXAMPLE II

5. PREPARATION FOR DELIVERY

5.1 Level of protection. Packaging and packing shall give Level B protection as defined by MIL-STD-794.

5.2 Method of preservation. Preservation shall be Method III in accordance with MIL-P-116. Each magnetic tape shall be individually wrapped in MIL-B-81005, Type I to give electromagnetic protection.

5.3 Packing. The electromagnetic tape shall be packed in a corrugated box conforming to PPP-B-636, Class WR, with suitable drainage to prevent moisture damage.

5.4 Marking. All containers shall be marked in accordance with MIL-STD-129, including electromagnetic warning labels.

EXAMPLE III

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall give Level B protection as defined in MIL-STD-794 or as specified by the procuring activity.

5.1.1 Unit packaging. The Delay Initiator shall be packaged in accordance with Method IC-3 of MIL-P-116. The Delay Initiator shall be wrapped in electrically conductive film before being sealed in a barrier bag conforming to MIL-B-117, Class B or C.

5.2 Packing. Packing shall be to Level B as defined in MIL-STD-794 or as specified by the procuring activity. The Delay Initiator shall be packed in accordance with 173.114 of 49 CFR.

5.3 Marking. Interior packages and exterior containers shall be marked in accordance with the appropriate requirements of MIL-STD-129 and as instructed in 173.114 of 49 CFR.

XV. SECTION 6. NOTES:

A. General rules:

1. Section 6 shall contain information of a general or explanatory nature.

2. No additional requirements shall be placed in Section 6.

a. If a requirement in Section 3 or 5 references a Section 6 paragraph, that referenced Section 6 paragraph becomes a part of the requirement.

B. Specific requirements:

1. This section shall include the following paragraphs, as applicable, in the order listed:

a. Intended use. Information contained in this paragraph shall be relative to the use of the CI covered by the specification.

b. Ordering data.

(1) Detailed information to be incorporated in invitations for bids, contract, or other purchasing documents shall be stated in this paragraph.

(2) This paragraph shall be presented as shown in the following example. Paragraph 6.2.e may be omitted, if not applicable. Paragraph 6.2.e is always applicable if the Part II specification makes reference to the Part I specification.

c. Preproduction sample, pilot model, or pilot lot (*if applicable*). If Section 3 specifies a preproduction sample, a pilot model, or a pilot lot, the necessary instructions for the arranging for its examination, test, and approval shall be stated in this paragraph, under an appropriate paragraph identification.

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

e. Definitions (*if applicable*). Any terms requiring a definition (as specified in this document) shall be defined under this paragraph identification.

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

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

h. Miscellaneous notes. Any remaining information, which would not apply to any of the above mentioned paragraphs shall be placed after the applicable above mentioned paragraphs. Each additional paragraph shall be consecutively numbered and titled.

EXAMPLE

6. NOTES

6.1 Intended use. The [*nomenclature*] is intended for use as (*state actual usage of the CI*).

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.
b. Nomenclature and part number.
c. Stock number and serialization requirements, as applicable.
d. Level of preservation, packaging, and packing and whether preservation, packaging, and packing tests are required and the extent thereof.
e. The Part I specification must be supplied and utilized for procurement purposes.

6.3 Definitions.

6.3.1 Lot. A lot is defined as specified in MIL-STD-105 and consists of all the networks.

OVERVIEW FOR A PART II SPECIFICATION

The following is an overview of all the paragraphs required for a Part II specification.

1. SCOPE

1.1 Scope.

* 1.2 Classification.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.2 Non-Government documents.

3. REQUIREMENTS

3.1 Item definition.

3.1.1 Major component list.

3.2 Characteristics.

3.2.1 Performance.

3.3 Design and construction.

3.3.1 Production drawings.

3.3.2 Standards of manufacture.

3.3.3 Workmanship.

3.4 Preproduction sample.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.

4.1.1 Responsibility for inspections.

4.1.2 Special tests and examinations.

4.2 Quality conformance inspections.

5. PREPARATION FOR DELIVERY

6. NOTES

6.1 Intended use.

* Omit if not applicable.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.
b. Nomenclature and part number.
c. Stock number and serialization requirements, as applicable.
d. Level of preservation, packaging, and packing and whether preservation, packaging, and packing tests are required and the extent thereof.
* e. The Part I specification must be supplied and utilized for procurement purposes.

* 6.3 Preproduction sample, pilot model, or pilot lot.

* 6.4 Standard sample.

* 6.5 Definitions.

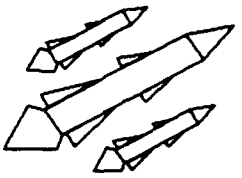
* 6.6 Qualification provisions.

* 6.7 Cross reference of classifications.

* 6.8 Miscellaneous notes.

* 10. APPENDIX I.

* Omit if not applicable.



CHAPTER 4

INSTRUCTIONS FOR OTHER MIL-STD-490A HARDWARE CONFIGURATION ITEM SPECIFICATIONS

CHAPTER 4

INSTRUCTIONS FOR OTHER MIL-STD-490A HARDWARE CONFIGURATION ITEM SPECIFICATIONS

XVI. TYPE B3 - NON-COMPLEX ITEM DEVELOPMENT SPECIFICATIONS

A. Applicability:

This type of specification is applicable to items of relatively simple design (hence the term 'non-complex') which meet all of the following criteria:

1. During development of the system or CI, the non-complex item can be shown to be suitable for its intended application by examination or demonstration.

2. Testing to verify performance is not required.

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

B. Specific requirements:

This type of specification should only contain performance and physical characteristics, as necessary to assure development of a satisfactory item. The key to this type of specification is that all performance and physical requirements must be verifiable by either EXAMINATION or DEMONSTRATION. No requirements should be verified by test or analysis. If test or analysis is required for certain verifications, then a prime item development specification (Type B1) should be written to cover the item (*see Chapter 2 for Type B1 specifications*).

OVERVIEW FOR A TYPE B3 SPECIFICATION

The following is an overview of all the paragraphs required for a Non-Complex Item Development specification.

1. SCOPE

1.1 Scope.

* 1.2 Classification.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.2 Non-Government documents.

3. REQUIREMENTS

3.1 Item definition.

3.2 Characteristics.

3.2.1 Performance.

3.2.2 Physical characteristics.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.

4.1.1 Responsibility for inspections.

4.1.2 Special tests and examinations.

4.2 Quality conformance inspections.

5. PREPARATION FOR DELIVERY

6. NOTES

6.1 Intended use.

* 6.2 Definitions.

* 10. APPENDIX I.

* Omit if not applicable.

XVII. TYPE C3 - NON-COMPLEX ITEM PRODUCT FABRICATION SPECIFICATIONS

A. Applicability:

A Type C3 specification is written for those non-complex items (as specified in XVI herein). The Type C3 specification is usually a Part II specification and should be written to specify acceptance requirements (as specified in Chapter 3 of this manual) for the piece of non-complex equipment.

B. Contents:

1. Scope. The Scope paragraph can be written one of following two ways, as applicable:

1.1 Scope. This specification establishes the requirements for manufacture and Government acceptance of the [*insert nomenclature*] non-complex item, configuration item (CI) 00XXXXX.
OR
1.1 Scope. This specification establishes the performance, design, development, test, manufacture and acceptance requirements for the [*insert nomenclature*] non-complex item, configuration item (CI) 00XXXXX.

2. Physical characteristics. When a set of manufacturing drawings is not available, this paragraph shall include, as necessary, all of the physical requirements necessary to adequately describe the item. For example:

a. Weight
b. Mounting and mating dimensions
c. Color
d. Protective coatings

When a set of manufacturing drawings is invoked, this section shall include the following statement or subparagraph:

> "The [*nomenclature*] shall be fabricated and assembled in accordance with Drawing XXXX, Part Number XXXX-XX, and all data assembled thereunder."

3. Quality assurance provisions. QA provisions must include classification of characteristics as specified in Section XVIII of this chapter.

OVERVIEW FOR A TYPE C3 SPECIFICATION

The following is an overview of all the paragraphs required for a Non-Complex Item Product Fabrication specification.

1. SCOPE

1.1 Scope.

* 1.2 Classification.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.2 Non-Government documents.

3. REQUIREMENTS

3.1 Item definition.

3.2 Characteristics.

3.2.1 Performance.

3.2.2 Physical characteristics.

3.3 Workmanship.

3.4 Qualification inspection and samples.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.

4.1.1 Responsibility for inspections.

4.1.2 Special tests and examinations.

4.2 Quality conformance inspections.

5. PREPARATION FOR DELIVERY

6. NOTES

6.1 Intended use.

* Omit if not applicable.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.
b. Nomenclature and part number.
c. Stock number and serialization requirements, as applicable.
d. Level of preservation, packaging, and packing and whether preservation, packaging, and packing tests are required and the extent thereof.
* e. The Part I specification must be supplied and utilized for procurement purposes.

* 6.3 Definitions.

* 10. APPENDIX I.

* Omit if not applicable.

XVIII. TYPE Cla - PRIME ITEM PRODUCT FUNCTION SPECIFICATIONS

A. Applicability:

A Type Cla specification is applicable to the procurement of prime items when a form, fit and function description is acceptable. Normally, this type of specification would be prepared only when a single procurement is anticipated, and training and logistic considerations are unimportant. This type of specification should contain primarily performance requirements.

B. Purpose:

A product function specification states the complete performance requirements of the product for the intended use, and necessary interface and interchangeability characteristics. It covers form, fit and function. Complete performance requirements include all essential functional requirements under service environmental conditions or under conditions simulating the service environment. Quality assurance provisions include one or more of the following inspections:

1. Qualification evaluation inspections
2. Preproduction inspections
3. Periodic production inspections
4. Quality conformance inspections

C. Contents:

A product function specification contains essentially the same requirements that a prime item development specification contains, plus those requirements applicable to a prime item product fabrication specification. Type Cla specifications are stand alone specifications, and are not written as Part II specifications to prime item development specifications. A Type Cla specification must contain both qualification and acceptance requirements, as well as Section 5 preparation for delivery requirements.

The following are explanations of those paragraphs contained in a Cla specification which are not described in Chapter 2 of this manual.

1. Paragraph 3.3.8 Standards of manufacture:

Paragraph 3.3.8 of a product function specification should be presented as follows:

> 3.3.8 Standards of manufacture. The [*nomenclature*] shall be fabricated and assembled in accordance with Drawing XXXX, Part Number XXXX-XX, and all data assembled thereunder.

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

D. Quality conformance:

1. Each requirement in Section 3 and Section 5 shall be verified in Section 4. Each Section 4 paragraph shall classify the verification as qualification and/or acceptance type verification. This may be accomplished in a quality conformance matrix, an additional table or list of paragraph numbers, or in individual paragraphs.

2. Each requirement in Section 3 and Section 5 shall be verified in Section 4. Each Section 4 paragraph shall classify the requirement characteristic as critical, major, or minor in accordance with MIL-STD-109. This may be accomplished in a quality conformance matrix or in individual paragraphs. The following are BMO accepted definitions for the above mentioned characteristics:

a. Characteristic. A physical, chemical, visual, functional, or any other identifiable property of a product or material.

(1) Critical characteristic. A critical characteristic is one that judgement and experience indicate, if defective, could result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the major end item or major part thereof. A characteristic is hardness critical if the characteristic is required in order to meet the nuclear environmental requirements. Characteristics which are intrinsic to meeting the overall design requirements and which would be required independent of the nuclear environmental requirements, are not considered hardness critical.

(2) Major characteristic. A major characteristic is one other than critical, that judgement and experience indicate, if defective, could result in failure, or materially reduce the usability of the product for its intended purpose.

(3) Minor characteristic. A minor characteristic is one that judgement and experience indicate, if defective, could not materially reduce the usability of the product for its intended purpose, or is a departure from established standards having no significant bearing on the effective use or operation of the product.

When required for reference purposes in reporting inspection results, the characteristics may be numbered. When numbered, numbers shall be in accordance with the following:

1 through 99	-	Critical characteristics
101 through 199	-	Major characteristics
201 through 299	-	Minor characteristics

(See MIL-STD-109 for more information on classification of characteristics.)

OVERVIEW FOR A TYPE C1a SPECIFICATION

The following is an overview of all the paragraphs required for a Prime Item Product Function specification.

1. SCOPE

1.1 Scope.

* 1.2 Classification.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.2 Non-Government documents.

3. REQUIREMENTS

3.1 Item definition.

3.1.1 Item diagrams.

3.1.2 Interface definition.

3.1.3 Major component list.

3.1.4 Government-furnished property list.

3.2 Characteristics.

3.2.1 Performance.

3.2.2 Physical characteristics.

3.2.3 Reliability.

3.2.4 Maintainability.

3.2.5 Environmental conditions.

3.2.6 Transportability.

3.3 Design and construction.

3.3.1 Materials, processes and parts.

3.3.2 Electromagnetic radiation.

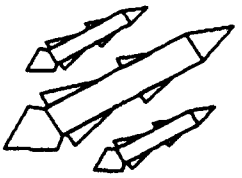
3.3.3 Identification and marking.

3.3.4 Workmanship.

3.3.5 Interchangeability.

* Omit if not applicable.

* Omit if not applicable.



CHAPTER 5

GENERAL INSTRUCTIONS FOR ADDENDUM SPECIFICATIONS

CHAPTER 5

XIX. GENERAL INSTRUCTIONS FOR ADDENDUM SPECIFICATIONS

A. PURPOSE:

An addendum to an existing configuration item specification is used to describe requirements for a new configuration item which is similar to the existing configuration item. The addendum specification creates a new CI specification. It requires the assignment of a new CI number. The basic specification plus addendum then becomes controlled and maintained as a separate and distinct specification, to be up-dated and revised as necessary, independent of changes to the basic specification from which it was created.

B. PREPARATION:

The addendum is prepared so that ready comparison can be made to the exact relationship between two items of equipment. The addendum shall make direct reference to the existing (basic) specification on a paragraph by paragraph basis, recording in the new specification, specific reference to each paragraph in the basic specification and noting each addition, deletion, or change. Where no change is necessary, the addendum shall specify the paragraph number, followed by the wording "No change". When no subparagraphs are changed within a major section, only the related major paragraphs need be listed. The paragraph numbering between the documents shall be identical, with the exception of paragraphs added to the addendum which do not have an exact counterpart in the basic specification. A specification created in this manner is a new and complete specification in every sense, with a new CI number assigned as specified in MIL-STD-483. The basic specification shall be an entry in Section 2 of the addendum specification. It shall specify the exact revision (including any SCNs) of the basic specification.

C. COVER PAGES FOR ADDENDUMS:

When an addendum is created, the cover page shall be in the format shown in Exhibit 9. All data on the addendum cover page shall refer to the basic specification used, against which the addendum is prepared. Each item of data to be entered on the cover page shall be transcribed from the title page and the specification change notice(s) (SCN) of the basic specification.

D. CHANGES TO ADDENDUMS:

The addendum and the basic specification from which the addendum was created shall have independent change cycles. An SCN to either is not automatically a change to both the basic specification and the addendum. The addendum and the basic specification are two separate documents, and any changes made to them shall require the generation of separate SCNs (one for each document).

Specification Number S-XXX-XXXXX
CAGE XXXXX
Date

ADDENDUM SPECIFICATION

This specification has been prepared as an Addendum to:
Prime Item (*Development/Product Fabrication) Specification

Specification Number

CI Number

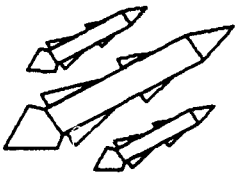
FOR

(*Approved Title*)

The exact content of specification [*insert basic specification number*] used as the basic document for this addendum is the revision referenced above plus the following specification change notices to specification [*insert basic specification number*].

*NOTE: As applicable.

Exhibit 9. Addendum specification cover page



CHAPTER 6

GENERAL INSTRUCTIONS FOR APPROVAL OF SPECIFICATIONS

CHAPTER 6

XX. GENERAL INSTRUCTIONS FOR APPROVAL OF SPECIFICATIONS

A. APPROVAL:

Approval means the Air Force and the contractor agree that the document establishes the baseline for the CI. Documents are approved at the Change Control Board (CCB) by issuance of a Change Control Board Directive (CCBD).

B. CHANGE CONTROL BOARD DIRECTIVES (CCBDs)

A CCBD identifies and stipulates those changes required to a draft specification in order to approve that specification. The CCBD is an itemized list of changes and direction to the contractor for preparation of the final specification submittal.

C. PART I SPECIFICATIONS:

Approval of a Part I specification establishes the allocated configuration baseline. The following paragraphs shall be included in all approving CCBDs for Part I specifications:

A. Specification S-XXX-XXXXX, Part I, dated {*fill in with applicable date*}, is approved by the CCB. This establishes the allocated configuration baseline.

B. The contractor shall incorporate the following comments, complete the cover page by entering the date of this CCBD in the approval block and submit the specification in final form in accordance with CDRL. The specification date of the final submittal shall be the same as the date of this CCBD.

C. The contractor shall correct administrative errors such as further procuring activity clarification, misspellings, typos, and incorrect numbering to the specification based on this directive. Before corrections are incorporated, the contractor shall contact Configuration Management MMIA for approval.

D. PART II SPECIFICATIONS:

Approval of a Part II specification is one of the steps required to establish the product configuration identification. The following paragraphs shall be included in all approving CCBDs for Part II specifications.

A. Specification S-XXX-XXXXX, Part II, dated (*fill in with applicable date*), is approved by the CCB.

B. The contractor shall incorporate the following comments, complete the cover page by entering the date of this CCBD in the approval block and submit the specification in final form in accordance with CDRL. The specification date of the final submittal shall be the same as the date of this CCBD.

C. The contractor shall correct administrative errors such as further procuring activity clarification, misspellings, typos, and incorrect numbering to the specification based on this directive. Before corrections are incorporated, the contractor shall contact Configuration Management MMIA for approval.

E. SINGLE PART SPECIFICATIONS:

Single part specifications are usually product function specifications. The same three paragraphs used for a Part II specification shall be included in the approving CCBD for a single part specification.

F. SYSTEM SPECIFICATIONS:

Approval of a System specification (Type A, in accordance with MIL-STD-490A) establishes the functional configuration identification baseline. The following paragraphs shall be included in all approving CCBDs for System specifications:

A. Specification S-XXX-XXXXX, dated (*fill in with applicable date*), is approved by the CCB. This establishes the functional configuration identification baseline.

B. BMO/TBD shall incorporate the following comments, complete the cover page by entering the date of this CCBD in the approval block and submit the specification in final form in accordance with CDRL. The specification date of the final submittal shall be the same as the date of this CCBD.

C. BMO/TBD shall correct administrative errors such as further procuring activity clarification, misspellings, typos, and incorrect numbering to the specification based on this directive.

G. **EXCEPTIONS:**

If the changes required to be made to the draft specification are very lengthy (i.e., at least one quarter (1/4) of the specification), the contractor may send in a second draft specification incorporating these changes. The second draft should have a different date from the first draft. Sometimes, deadline dates do not permit enough time for a line-by-line CCBD to be generated. In this case, comment "B" on the applicable approving CCBD shall be deleted and the following new comment "B" shall be substituted.

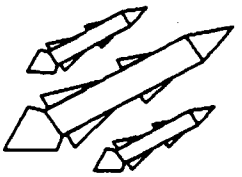
B.	The contractor shall comply with comment D below, incorporate the following comments, complete the cover page by entering the date of this CCBD in the approval block and submit the specification in final form in accordance with CDRL. The specification date of the final submittal shall be the same as the date of this CCBD.

The following new comment (comment "D") shall also be added:

D.	The final specification submitted by the contractor shall be a duplicate of Attachment 1 to this CCBD. Attachment 1, which represents the specification after incorporation of the major portion of BMO/contractor coordinated comments, was selected in lieu of paragraph by paragraph comments for ease in preparation of the final specification submittal.

H. **FINAL SPECIFICATION SUBMITTAL:**

After CCBD approval, the contractor shall submit the specification in final form by incorporating CCBD comments and changing the specification date to the CCBD date in both the approval block and the identification block. The Specification Control Engineer (SCE) will review the final specification submittal to determine conformance with the CCBD. If the final submittal does not conform with the CCBD, the SCE shall resolve any problems.



CHAPTER 7

GENERAL INSTRUCTIONS FOR SPECIFICATION CHANGES

CHAPTER 7

XXI. GENERAL INSTRUCTIONS FOR SPECIFICATION CHANGES

A. GENERAL RULES:

An approved specification may be changed in one of three different ways.

1. Supplemental CCBDs.

2. Engineering Change Proposals (ECPs)/Specification Change Notices (SCNs).

3. Revisions.

B. SUPPLEMENTAL CCBDs:

1. A supplemental CCBD identifies and stipulates those additional changes required to be made against a boarded specification, approving CCBD and/or previous supplemental CCBD. The supplemental CCBD is an itemized list of additional changes, corrections and/or directions to the contractor for preparation of the final approved specification submittal.

2. A supplemental CCBD can be written against a boarded specification, approving CCBD, and/or previous supplemental CCBDs only if the final specification has not been distributed. If the final specification has been distributed, changes to the specification must be initiated through an Engineering Change Proposal (ECP).

3. The supplemental CCBD shall include the following paragraph:

> This supplemental CCBD is issued to make the following changes to the (*applicable date*) CCBD.

4. The following paragraphs may be used, as applicable:

a. Use the following paragraph to cancel and supersede an existing CCBD or supplemental CCBD.

> This second supplemental CCBD is issued to make the following changes to the (*applicable date*) CCBD. This supplemental CCBD cancels and supersedes supplemental CCBD dated (*applicable date*).

b. Use the following paragraph to amend an existing supplemental CCBD.

> This second supplemental CCBD is issued to amend direction given in the supplemental CCBD dated (*applicable date*). Any further changes to be made to this specification shall require the submittal of an ECP. Make the following changes:

5. The following paragraph shall be included in all supplemental CCBDs:

> 1. Item B - Delete and substitute the following:
>
> "B. The contractor shall incorporate the following comments, complete the cover page by entering the date of this supplemental CCBD in the approval block and submit the specification in final form in accordance with CDRL. The specification date of the final submittal shall be the same as the date of this supplemental CCBD."

C. **FINAL SPECIFICATION SUBMITTAL:**

After supplemental CCBD approval, the contractor shall submit the specification in final form by incorporating supplemental CCBD comments and changing the specification date to the supplemental CCBD date. The SCE will review the final specification submittal to determine conformance with the supplemental CCBD. If the final submittal does not conform with the CCBD and supplemental CCBDs, the SCE will resolve any problems.

D. **ECPs/SCNs:**

NOTE: ONLY THOSE ECPs MAKING CHANGES TO SPECIFICATIONS SHALL BE DISCUSSED HEREIN.

1. An ECP identifies and stipulates those proposed Class I (as defined in MIL-STD-480/MIL-STD-973) engineering changes applicable to a CI after formal establishment of one of its Configuration baselines. These ECPs require the generation of SCNs. The SCN itemizes the exact changes to be made to the approved specification.

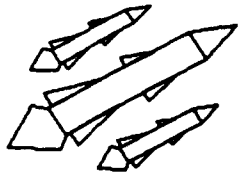
2. Class II (as defined in MIL-STD-480/MIL-STD-973) engineering changes never cause the generation of SCNs, and therefore will not be addressed in this document.

E. **REVISIONS:**

1. A specification is revised after the generation of at least one SCN (either one extensive SCN or numerous shorter SCNs) and only when the CCB directs the contractor to issue a revision. BMO CCB members or the contractor may request the CCB to authorize a revision of an approved specification.

2. The contractor shall submit the revision in final form by incorporating all outstanding SCNs, changing the specification date to the date the revision was accomplished, and rolling the revision letter. The SCE will review the final revised specification submittal to determine conformance with the SCNs. If the final revision submittal does not conform with the SCNs, the SCE will resolve any problems.

3. In the case of revisions, Part I specifications, Part II specifications and any appendices to either the Part I or Part II specification, are treated as separate documents. If one of them is revised, the other one does not require a change to the date or revision letter. Revisions to applicable appendices shall be accomplished by a change to the date of the appendix only. No revision letters or changes to revision letters are required for appendices.



CHAPTER 8

INSTRUCTIONS FOR MARKING CLASSIFIED SPECIFICATIONS

CHAPTER 8

XXII. INSTRUCTIONS FOR MARKING CLASSIFIED SPECIFICATIONS AND SCN's

A. DOCUMENT MARKING

1. All classified documents shall contain cover pages (both first and last pages) which specifies the highest level of security classification within the document (see Exhibits 10 and 11). This cover page shall also contain a control number, and the specific copy number. The receiving activity shall assign this control number and copy number.

2. Security markings shall be centered (side to side) on the cover page, shall be capital letters no smaller than 0.25 inches high, and shall be visible from the outside of the document, without the need for the document to be opened.

B. INDIVIDUAL PAGE MARKING

Each page within the classified document shall indicate the highest level of security classification at the top and bottom of the page.

C. INDIVIDUAL PARAGRAPH MARKING

Each paragraph within the classified document shall indicate the highest level of security classification contained in that paragraph. Each paragraph shall be marked with the appropriate symbol as specified in DOD 52100.1,4-202, which defines the classification of the information contained therein. The symbol shall be enclosed in parentheses.

1. A classified paragraph shall be marked as follows:

NOTE: THE FOLLOWING EXAMPLES OF CLASSIFIED PARAGRAPHS ARE FICTITIOUS. THESE PARAGRAPHS DO NOT CONTAIN ANY CLASSIFIED INFORMATION. THEY ARE MERELY TO SHOW THE READER HOW TO MARK CLASSIFIED PARAGRAPHS.

a. If the entire paragraph is classified (both text and title), the classified marking shall be placed before the paragraph title, but after the paragraph number.

EXAMPLE
3.2.5.2.1 (SRD) Airblast overpressure. The airblast overpressure environment for the Missile Launch Car (MLC) Operational Support Equipment (OSE) is 3 times 10^6 pounds per square inch (psi).

b. If the title of the paragraph is not classified, and the contents of the paragraph are classified, the highest level of security classification shall be placed before the paragraph title, but after the paragraph number. The classification for the title shall be placed before the paragraph text, but after the title.

SECRET
RESTRICTED DATA

ATOMIC ENERGY ACT 1954

**STAPLE
142 RECEIPT
HERE WHEN
TRANSMITTING**

HANDLING INSTRUCTIONS

Access to material containing Secret Restricted Data requires a final Secret clearance.

In addition to the regularly required security markings, i.e., security classification, group category, etc., the notation "Restricted Data -- Atomic Energy Act of 1954" will be affixed on all material that contains AEC Restricted Data, in the location(s) described in Security Standard Practice 2.7, "Marking Classified Material". The Espionage notation is not to be affixed on any material containing AEC Restricted Data.

This cover sheet will be used only to cover Secret Restricted Data material which has been released by the Atomic Energy Commission to the Department of Defense.

A properly completed Classified Material Receipt (Form 142) must accompany the transmittal of all SRD Material.

This Secret Restricted Data cover sheet becomes unclassified when separated from its classified enclosures.

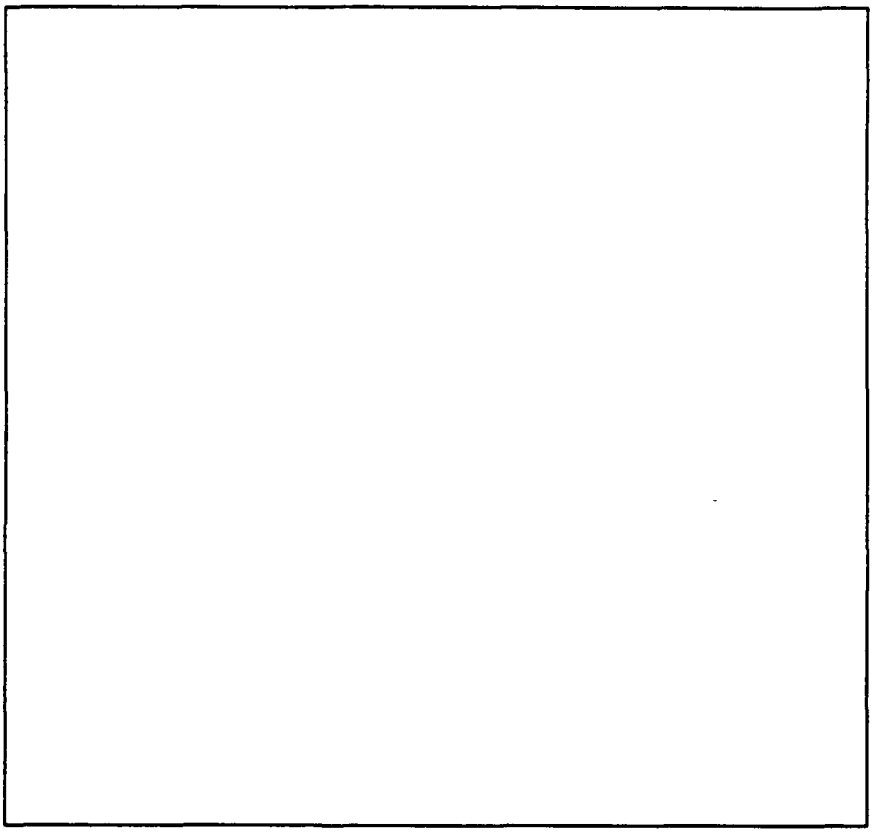
SECRET
RESTRICTED DATA

ATOMIC ENERGY ACT 1954

BMO Document 87-06D
5 May 1993

SECRET
RESTRICTED DATA

ATOMIC ENERGY ACT 1954



NOTICE-THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 AND 794. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

SECRET
RESTRICTED DATA

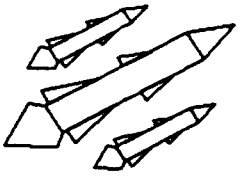
ATOMIC ENERGY ACT 1954

EXAMPLE

3.2.5.2.1 (SFRD) Airblast overpressure. (U) The airblast overpressure environment for the Missile Launch Car (MLC) Operational Support Equipment (OSE) is 3 times 10^6 pounds per square inch (psi).

c. The only exception to the requirements is when an entire page within a classified document contains no classified information. In this case, the page marking "UNCLASSIFIED" on the top and bottom of the page shall suffice, and individual paragraphs need not be marked.

2. In accordance with AFR 205-1, every effort should be made to ensure that paragraph titles are unclassified.



CHAPTER 9

GENERAL INSTRUCTIONS FOR PREPARING SCNs

CHAPTER 9

XXIII. GENERAL INSTRUCTIONS FOR PREPARING SCN's

A. SCNs

1. Changes to specifications shall be proposed by an ECP containing an SCN and issued by SCN. Separate SCNs shall be submitted as an enclosure with an ECP for each specification to be changed. SCNs so submitted shall be issued and incorporated only after approval of the ECP.

2. The SCN is a document used to propose, transmit and record changes to a specification. The SCN form (see Exhibit 12) is used as a cover sheet and letter of transmittal for the SCN. The page changes associated with an SCN shall be attached and shall constitute an integral part of the SCN.

B. PROPOSED SCNs

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

C. APPROVED SCNs

An approved SCN is used to transmit the change after approval by the CCB It also provides a summary of pages affected by all approved changes. SCNs are not cumulative insofar as transmittal of previous changes is concerned. Changes distributed with previous SCNs remain in effect unless changed or canceled by a later issue SCN. The summary (cover page) is a cumulative summary as of the date of approval of the basic specification.

D. CHANGED PAGES

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

E. SCN NUMBERING

SCN numbers shall be assigned in sequence, beginning with "1", against the original issue or current revision of a specification. Thus, when a specification is revised, the SCN numbers begin again with 1. The proposed SCN, and approved SCN shall carry the same number. Once an SCN has been approved and submitted in final form, its SCN sequence number shall not thereafter be changed or assigned to another SCN. However, SCNs may be approved out of sequence.

SPECIFICATION CHANGE NOTICE

DATE 9 MAY 1985

1. ORIGINATOR NAME AND ADDRESS BOEING AEROSPACE COMPANY P.O. BOX 3999 SEATTLE, WASHINGTON 98124	2. ___ Proposed X Approved	3. CODE IDENT 81205 5. CODE IDENT 81205	4. SPEC. NO. S-118-42135, Part I 29 MAY 1984 6. SCN NO. 1

7. SYSTEM DESIGNATION PEACEKEEPER	8. RELATED ECP NO. 80 P027-2	9. CONTRACT NO. F04704-83-C-0047	10. CONTRACTUAL AUTHORITY SA

11. CONFIGURATION ITEM NOMENCLATURE LAUNCHER SUMP PUMP SYSTEM (LSPS) (CI 0042135)	12. EFFECTIVITY WING V: SQUADRONS 1 AND 4 VAFB: LF02, LF05, LF08

THIS NOTICE INFORMS RECIPIENTS THAT THE SPECIFICATION IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS SCN BEING THOSE FURNISHED HEREWITH AND CARRYING THE SAME DATE AS THIS SCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES, COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4, CONSTITUTE THE CURRENT VERSION OF THIS SPECIFICATION.

13. SCN NO.	14. PAGES CHANGED (INDICATE DELETIONS)	*S	*A	15. DATE
1	I-1x, I-1, I-10, I-11, I-17, I-29, I-31, I-32, I-33, I-42,	X		9-5-85
	I-43, I-46, I-47, I-48	X		
	I-43a		X	

ECP NO.	SUMMARY OF PREVIOUSLY CHANGED PAGES

16. TECHNICAL CONCURRENCE (NOT APPLICABLE - SEE BLOCK 10)	APPROVAL DATE N/A

*"S" INDICATES SUPERSEDES EARLIER PAGE *"A" INDICATES ADDED PAGE

Exhibit 12. Example of an SCN

F. IDENTIFICATION AND NUMBERING OF CHANGED PAGES

1. Identification. Each changed page shall be identified by means of the specification number and the applicable revision letter. Under this number shall be entered the date of issue of the SCN, which shall agree with the date entered in the upper right hand corner of the SCN form.

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