Understanding Military Specification & Standard Requirements

“What does it all mean?”

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1 Introduction

The purpose of this document is to familiarize you with the Department of Defense’s use of Standards and Specifications. For a given DoD solicitation you will find most references to Standards and Specifications in SECTION C – DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK of the solicitation document. The one exception to this format is the requirements for Packaging and Marking which are contained in SECTION D.

SECTION C describes the work to be performed and the technical requirements for the deliverable items. When reading Section C: Look for requirements (are they explained, understandable, and/or ambiguous?), contradictions (between requirements as well as Section L and M), feasibility, and opportunities for differentiation between you and your competitors. Section C;

- Can contain background information about the agency issuing the solicitation.
- Purpose and objectives of the requirement.
- Addresses what the seller must do to perform the contract.
- States minimum and mandatory requirements
- Statement of work/Scope of work. This is a description and the specifications of what is wanted by the Agency Department. Usually this is in great detail.
- It may contain material, equipment and personal requirements in addition to safety quality assurance items. Also called scope of work. It can contain detailed responses, usually matrices and spreadsheets to depict the man-hours, frequency of work, etc.

The DoD solicitation document will not only call out Military Specifications and Standards, but may also reference other recognized standards like The American National Standards Institute (ANSI, /ænsi/ AN-sëe) and ASTM International, known until 2001 as the American Society for Testing and Materials (ASTM). This document will provide a brief overview of these three referenced requirements.

2 Military Specifications and Standards

2.1 Overview

A United States defense standard, often called a military standard, "MIL-STD", "MIL-SPEC", or (informally) "MilSpecs", is used to help achieve standardization objectives by the U.S. Department of Defense.
Standardization is beneficial in achieving interoperability, ensuring products meet certain requirements, commonality, reliability, total cost of ownership, compatibility with logistics systems, and similar defense-related objectives. Defense standards are also used by other non-defense government organizations, technical organizations, and industry. This article discusses definitions, history, and usage of defense standards. Related documents, such as defense handbooks and defense specifications, are also addressed.

2.1.1 Definition of document types

Although the official definitions differentiate between several types of documents, all of these documents go by the general phrase of "military standard", including defense specifications, handbooks, and standards. Strictly speaking, these documents serve different purposes. According to the Government Accountability Office (GAO), military specifications "describe the physical and/or operational characteristics of a product", while military standards "detail the processes and materials to be used to make the product." Military handbooks, on the other hand, are primarily sources of compiled information and/or guidance. The GAO acknowledges, however, that the terms are often used interchangeably. Official definitions are provided by DoD 4120.24-M, [2], Defense Standardization Program (DSP) Policies and Procedures, March 2000, OUSD (Acquisition, Technology and Logistics):

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIL-HDBK</td>
<td>Defense Handbooks</td>
<td>A guidance document containing standard procedural, technical, engineering, or design information about the material, processes, practices, and methods covered by the DSP. MIL-STD-967 covers the content and format for defense handbooks.</td>
</tr>
<tr>
<td>MIL-SPEC</td>
<td>Defense Specification</td>
<td>A document that describes the essential technical requirements for purchased materiel that is military unique or substantially modified commercial items. MIL-STD-961 covers the content and format for defense specifications.</td>
</tr>
<tr>
<td>MIL-STD</td>
<td>Defense Standard</td>
<td>A document that establishes uniform engineering and technical requirements for military-unique or substantially modified commercial processes, procedures, practices, and methods. There are five (5) types of defense standards: interface standards, design criteria standards, manufacturing process standards, standard practices, and test method standards. MIL-STD-962 covers the content and format for defense standards.</td>
</tr>
<tr>
<td>MIL-PRF</td>
<td>Performance Specification</td>
<td>A performance specification states requirements in terms of the required results with criteria for verifying compliance, but without stating the methods for</td>
</tr>
</tbody>
</table>
achieving the required results. A performance specification defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics.

**MIL-DTL Detail Specification**

A specification that specifies design requirements, such as materials to be used, how a requirement is to be achieved, or how an item is to be fabricated or constructed. A specification that contains both performance and detail requirements is still considered a detail specification.

### 2.1.2 Origins and evolution

Defense standards evolved from the need to ensure proper performance, maintainability and reparable, ease of maintenance-repair-overhaul (MRO), and logistical usefulness of military equipment. MRO may be defined as, “All actions which have the objective of retaining or restoring an item in or to a state in which it can perform its required function”. The latter two goals (MRO and logistics) favor certain general concepts, such as interchangeability, standardization (of equipment and processes, in general), cataloguing, communications, and training (to teach people what is standardized, what is at their discretion, and the details of the standards).

For example, due to differences in dimensional tolerances, in World War II American screws, bolts, and nuts did not fit British equipment properly and were not fully interchangeable. Defense standards provide many benefits, such as minimizing the number of types of ammunition, ensuring compatibility of tools, and ensuring quality during production of military equipment. This results, for example, in ammunition and food cases that can be opened without tools; vehicle subsystems that can be quickly swapped into the place of damaged ones; and small arms and artillery that are less likely to find themselves with an excess of ammunition that does not fit their bores and a lack of ammo that does.

However, the proliferation of standards also has some drawbacks. The main one is that they impose what is functionally equivalent to a regulatory burden upon the defense supply chain, both within the military and across its civilian suppliers. Almost nothing can be done according to sound case-by-case judgment, and almost everything requires constant, extensive study of the rules and verification that they are being followed "to a T". Workflows frequently pause (causing snowballing schedule delays) for reasons that are sometimes essentially trivial, and unit costs rise.

In the U.S. during the 1980s and early 1990s, it was argued that the large number of standards, nearly 30,000 by 1990, imposed unnecessary restrictions, increased cost to contractors (and hence the DOD, since the costs in the end pass along to
the customer), and impeded the incorporation of the latest technology. Responding to increasing criticism, Secretary of Defense William Perry issued a memorandum in 1994 that prohibited the use of most defense standards without a waiver. This has become known as the "Perry memo". Many defense standards were canceled. In their place, the DOD encouraged the use of industry standards, such as ISO 9000 series for quality assurance (see COTS), SAE standards such as the AS and AMS series (e.g., AS9100, AMS 2404), and others. Weapon systems were required to use "performance specifications" that described the desired features and performance of the weapon, as opposed to how those goals would be reached (that is, exactly which technology and which materials would be used). In 2005 the DOD issued a new memorandum which eliminated the requirement to obtain a waiver in order to use defense standards. The 2005 memo did not reinstate any canceled defense standards.

According to a 2003 issue of Gateway, published by the Human Systems Information Analysis Center, the number of defense standards and specifications has been reduced from 45,500 to 28,300. However, other sources noted that the number of standards just before the Perry memorandum was issued was less than 30,000, and that thousands have been canceled since then. This may be due to differences in what is counted as a "military standard".

2.2 DoD’s Single Stock Point of Information [DoD Single Stock Point (DODSSP)]

The Department of Defense Single Stock Point provides information and access to Military Specifications, Standards, and related documents prepared by or adopted by the Department of Defense. The duties of the DODSSP include electronic document storage, indexing, cataloging, maintenance, publish-on-demand, distribution, and sale of Military Specifications, Standards, and related standardization documents and publications comprising the DODSSP Collection. The ability to find and review military standards in a timely manner is essential so you can determine if commercial items can be substituted for Mil Specs. Although the DODSSP Active Collection contains over 40,000 line items, not all documents specified in Government procurements are included (e.g. engineering drawings, some Departmental documents, and a majority of all Non-Government / Industry Standards).

Document Categories in the DODSSP collection include:
- Military / Performance / Detail Specifications
- Military Standard
- DoD-adopted Non-Government / Industry Specifications and Standards
- Federal Specifications and Standards / Commercial Item Descriptions
- Data Item Descriptions
- Military Handbooks
- Qualified Products / Manufacturer's Lists (QPLs/QMLs)
- USAF / USN Aeronautical Standards / Design Standards
The Department of Defense Index of Specifications and Standards (DODISS) contain the complete list of Standardization documents in the DODSSP Collection. The information contained in this reference publication is available online to all ASSIST (see Section 2.3) subscribers. The DODISS Notice is a biweekly publication that provides up-to-date information on the DODSSP, and on changes to the DODISS.


### 2.3 Streamlining Mil Spec ASSIST

#### 2.3.1 Acquisition Streamlining and Standardization Information System (ASSIST)

**Acquisition Streamlining and Standardization Information System (ASSIST)** is a comprehensive web site providing public access to standardization documents over the Internet. Other sources of documents are listed below:

- **ASSIST**: [http://assist2.daps.dla.mil/quicksearch/](http://assist2.daps.dla.mil/quicksearch/) (access to over 100,000 digital documents related to Department of Defense standards and specs)
- **Military Databases**: [http://infodome.sdsu.edu/research/databases/military.shtml](http://infodome.sdsu.edu/research/databases/military.shtml)
- **Department of Defense**: [http://www.defenselink.mil/](http://www.defenselink.mil/)

### 2.4 ASSIST-Quick Search;

ASSIST – Quick Search provides direct access to Defense and Federal specifications and standards available in the official DoD repository, the ASSIST database. Enter your search criteria in one of the search fields to locate documents available for distribution by the DODSSP. Click on the label next to each search field block for a description and examples of search criteria.

(Please note that you can enter search criteria in more than one search field; however, Quick Search will then only find documents that satisfy all of the specified search criteria. If your search...
doesn't yield the results you expected, please try again using only one search parameter, such as the document number.)

**Document ID**

**Document Number**

**Title**

**FSC/Area**

**Status**  All  Active  Inactive  Canceled/Withdrawn

### 2.4.1.1 ASSIST Document ID Field:

The Document ID refers to the alphanumeric identifier associated with a military, federal, or non-government specification or standard. This value includes slash sheet, section, part, or volume numbers as well as revision, amendment, notice, or supplement symbols.

ASSIST Quick Search provides the ability to search against Document ID values. Partial values are accepted.

The results list returned by the search will include all documents that have a Document ID beginning with or exactly matching the search value specified.

Examples:

Use MIL-C-51 to find:

- MIL-C-5100
- MIL-C-5105
- MIL-C-5126C NOT 2
- MIL-C-5188A
- MIL-C-5191B(4) NOT 2

### 2.4.1.2 ASSIST Document Number Field

The Document Number refers to the numeric series assigned to a document. Any given Document Number may be associated with a number of different document categories such as military specifications, standards, handbooks, and bulletins as well as CIDS, Federal specifications and standards, and non-government standards.

ASSIST-Quick Search provides the ability to search against documents associated with a specific Document Number series.

The results list returned by the search will include all corresponding slant sheets, if applicable.

This search feature is particularly useful when you remember the Document Number but don't know the document prefix (e.g., MIL-C vs. MIL-PRF vs. MIL-DTL) that may have changed as a result of Acquisition Reform initiatives.

Partial values are not accepted.
Examples:

Search against 1361 to find:

MIL-I-1361C NOT 1
MIL-STD-1361A NOT 1
W-S-001361 NOT 1
QPL-1361-38
STANAG-1361 ED. 1

2.4.1.3 ASSIST Title Field:
A document title is always associated with a given specification or standard to
describe the subject or content of the document.

The DODSSP captures title information when new documents are created and
indexed in the ASSIST or when changes to existing documents include updates to
title information.

ASSIST captures up to 256 characters for document cataloging purposes and uses
titles to annually produce the DODISS Part I - Alphabetic Listing, which lists
specifications and standards alphabetically sorted by title.

ASSIST-Quick Search provides the ability to search for documents using words
found in their titles.

Partial values are accepted without use of special wildcard characters.

Examples:

Use ASBESTOS to find:

PACKING MATERIAL, BRAIDED, NON-ASBESTOS
PAPER, ASBESTOS, CORRUGATED
CLOTH, ASBESTOS (S/S BY SS-C-1783)
ASBESTOS, CRUDE (BLUE CROCIDOLITE)

2.4.1.4 ASSIST FSC / Area Field

Federal Supply Class (FSC) codes are used to group products into logical families
for supply management purposes.

The four-digit fields are used in the standardization program to group
standardization documents associated with products into logical families for
standardization management purposes.

Similarly, Standardization Areas refer to categories for engineering technologies,
disciplines, and practices that do not fall under a FSC.

The ASSIST maintains a current catalog of all FSCs and Areas to which
documents are associated.
Note that documents may also be classified within a Federal Supply Group, a two-digit code followed by 'GP', to categorize a small number of documents that can only be categorized in general, group-level terms.

ASSIST-Quick Search provides the ability to search and locate documents associated with a single FSC, FSG, or Standardization Area. Use the drop-down list provided to select from one of nearly 100 valid codes to search against.

Examples:

FSC:
- 1005 Guns through 30 mm
- 1010 Guns over 30 mm Up to 75 mm
- 1015 Guns 75 mm through 125 mm
- 1020 Guns over 125 mm through 150 mm
- 1025 Guns over 150 mm through 200 mm
- 1030 Guns over 200 mm through 300 mm

FSG:
- 30 - Mechanical power transmission equipment
- 31 - Bearings

Area:
- CMAN - CONFIGURATION MANAGEMENT
- ISDN - INTERNATIONAL STANDARDIZATION DOCUMENTS
- TCSS - TELECOMMUNICATIONS SYSTEMS STANDARDS

ASSIST is the official source for specifications and standards used by the Department of Defense and it always has the most current information. Over 111,000 technical documents are indexed in ASSIST, and the ASSIST document database houses over 180,000 PDF files associated with about 82,000 of the indexed documents. There are more than 33,000 active ASSIST user accounts and over 6,000 active Shopping Wizard accounts. Managed by the DoD Single Stock Point (DODSSP) in Philadelphia, the ASSIST-Online web site provides free public access to most technical documents in the ASSIST database. The ASSIST Shopping Wizard provides a way to order documents from the DODSSP that are not available in digital form.

ASSIST-Online is a robust, comprehensive web site used by standardization management activities to develop, coordinate, and manage defense and federal specifications and standards, military handbooks, commercial item descriptions, data item descriptions, and related technical documents prepared in accordance with the policies and procedures of the Defense Standardization Program (DSP). In addition to DoD-prepared documents, ASSIST also has U.S.-ratified international standardization agreements, such as NATO STANAGs.

ASSIST-Online lets registered users search for documents, identify standardization points-of-contact, generate numerous standard or custom reports, and request custom e-mail alerts when a preparing activity undertakes a project to develop or
modify a document, posts a draft for review and coordination, or publishes a new or revised document. There are several ways to search for documents. Depending on the criteria provided, a search will either locate a single document or report a list of documents. If a file is available for a document, an icon will appear to the left of Document ID, and both the icon and the Document ID link to a Document Details page that lists all available files in that document's revision history. Some files in the revision history may have an icon, which means the file is a warehouse item only and must be ordered using the Shopping Wizard. An icon indicates the file is subject to distribution restrictions.

ASSIST-Online includes more than documents and document metadata. ASSIST also serves as a portal and is closely integrated with other useful databases, such as the Qualified Products Database (QPD) which identifies qualified parts and sources, and the Weapon Systems Impact Tool (WSIT), which provides insight into how specifications and standards are applied across DoD systems.

All persons are required to register for an ASSIST-Online user account in order to access the system. Registration data is used by DLA Document Services, Philadelphia to establish the correct type of account and to manage subscriptions effectively.

3 American National Standards Institute (ANSI)

The American National Standards Institute (ANSI, /ænsiː/ AN-see) is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide. For example, standards ensure that people who own cameras can find the film they need for that camera anywhere around the globe. ANSI accredits standards that are developed by representatives of other standards organizations, government agencies, consumer groups, companies, and others. These standards ensure that the characteristics and performance of products are consistent, that people use the same definitions and terms, and that products are tested the same way. ANSI also accredits organizations that carry out product or personnel certification in accordance with requirements defined in international standards. The organization's headquarters are in Washington, DC. ANSI's operations office is located in New York City. The ANSI annual operating budget is funded by the sale of publications, membership dues and fees, accreditation services, fee-based programs, and international standards programs.

3.1 History

ANSI was originally formed in 1918, when five engineering societies and three government agencies founded the American Engineering Standards Committee (AESC). In 1928, the AESC became the American Standards Association
ASA). In 1966, the ASA was reorganized and became the United States of America Standards Institute (USASI). The present name was adopted in 1969.

Prior to 1918, these five founding engineering societies:

- American Institute of Electrical Engineers (AIEE, now IEEE)
- American Society of Mechanical Engineers (ASME)
- American Society of Civil Engineers (ASCE)
- American Institute of Mining Engineers (AIME, now American Institute of Mining, Metallurgical, and Petroleum Engineers)
- American Society for Testing and Materials (now ASTM International)

had been members of the United Engineering Society (UES). At the behest of the AIEE, they invited the U.S. government Departments of War, Navy (combined in 1947 to become the Department of Defense or DOD) and Commerce to join in founding a national standards organization.

According to Paul G. Agnew, the first permanent secretary and head of staff in 1919, AESC started as an ambitious program and little else. Staff for the first year consisted of one executive, Clifford B. LePage, who was on loan from a founding member, ASME. An annual budget of $7,500 was provided by the founding bodies. In 1931, the organization (renamed ASA in 1928) became affiliated with the U.S. National Committee of the International Electrotechnical Commission (IEC), which had been formed in 1904 to develop electrical and electronics standards.

### 3.2 Members

ANSI's membership comprises government agencies, organizations, corporations, academic and international bodies, and individuals. In total, the Institute represents the interests of more than 125,000 companies and 3.5 million professionals.

### 3.3 Process

Though ANSI itself does not develop standards, the Institute oversees the development and use of standards by accrediting the procedures of standards developing organizations. ANSI accreditation signifies that the procedures used by standards developing organizations meet the Institute's requirements for openness, balance, consensus, and due process. ANSI also designates specific standards as American National Standards, or ANS, when the Institute determines that the standards were developed in an environment that is equitable, accessible and responsive to the requirements of various stakeholders. Voluntary consensus standards quicken the market acceptance of products while making clear how to improve the safety of those products for the protection of consumers. There are approximately 9,500 American National Standards that carry the ANSI designation.

The American National Standards process involves:

- consensus by a group that is open to representatives from all interested parties
• broad-based public review and comment on draft standards
• consideration of and response to comments
• incorporation of submitted changes that meet the same consensus requirements into a draft standard
• availability of an appeal by any participant alleging that these principles were not respected during the standards-development process.

3.4 International activities

In addition to facilitating the formation of standards in the U.S., ANSI promotes the use of U.S. standards internationally, advocates U.S. policy and technical positions in international and regional standards organizations, and encourages the adoption of international standards as national standards where appropriate. The Institute is the official U.S. representative to the two major international standards organizations, the International Organization for Standardization (ISO), as a founding member,[8] and the International Electrotechnical Commission (IEC), via the U.S. National Committee (USNC). ANSI participates in almost the entire technical program of both the ISO and the IEC, and administers many key committees and subgroups. In many instances, U.S. standards are taken forward to ISO and IEC, through ANSI or the USNC, where they are adopted in whole or in part as international standards.

4 ASTM International

ASTM International, known until 2001 as the American Society for Testing and Materials (ASTM), is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services. The organization's headquarters is in West Conshohocken, Pennsylvania, about 5 mi (8.0 km) northwest of Philadelphia.

ASTM, founded in 1898 as the American Section of the International Association for Testing and Materials, predates other standards organizations such as BSI (1901), DIN (1917), ANSI (1918) and AFNOR (1926). ASTM has a dominant role among standards developers in the USA, and claims to be the world's largest developer of standards. Using a consensus process, ASTM supports thousands of volunteer technical committees, which draw their members from around the world and collectively develop and maintain more than 12,000 standards.

ASTM International publishes the Annual Book of ASTM Standards each year in print, Compact Disc (CD) and online versions. The online version was available by subscription and cost was based upon usage. For 2008, the complete set of books or CDs cost almost US$9000 and included 81 volumes. For 2010, the complete set of books or CDs cost almost $9700 and included 82 volumes.
4.1 History

A group of scientists and engineers, led by Charles Benjamin Dudley formed the American Society for Testing and Materials in 1898 to address the frequent rail breaks plaguing the fast-growing railroad industry. The group developed a standard for the steel used to fabricate rails. In 2001, ASTM changed its name to ASTM International to reflect global participation in ASTM and worldwide use of its standards. In 2009, a joint effort by standards development organizations AAMI, ANSI, ASTM, and DIN created a single, centralized database for medical device standards.

4.2 Standards

The standards produced by ASTM International fall into six categories:
- the Standard Specification, that defines the requirements to be satisfied by subject of the standard.
- the Standard Test Method, that defines the way a test is performed and the precision of the result. The result of the test may be used to assess compliance with a Standard Specification.
- the Standard Practice, that defines a sequence of operations that, unlike a Standard Test Method, does not produce a result.
- the Standard Guide, that provides an organized collection of information or series of options that does not recommend a specific course of action.
- the Standard Classification, that provides an arrangement or division of materials, products, systems, or services into groups based on similar characteristics such as origin, composition, properties, or use.
- the Terminology Standard, that provides agreed definitions of terms used in the other standards.

The quality of the standards is such that they are frequently used worldwide. The Annual Book of ASTM Standards covers 15 sections of interest plus a master index:
1. Iron and Steel Products
2. Nonferrous Metal Products
3. Metals Test Methods and Analytical Procedures
4. Construction
5. Petroleum Products, Lubricants, and Fossil Fuels
6. Paints, Related Coatings, and Aromatics
7. Textiles
8. Plastics
9. Rubber
10. Electrical Insulation and Electronics
11. Water and Environmental Technology
12. Nuclear, Solar, and Geothermal Energy
13. Medical Devices and Services
14. General Methods and Instrumentation
15. General Products, Chemical Specialties, and End Use Products
16. Index to all sections and volumes

ASTM Standards can be purchased as a digital library subscription or individually from ASTM and other qualified standards providers. When maintaining a large standards library, often digital subscriptions are used to simplify staying current on standards and to remain in compliance with all copyright laws. A technical library at a university may also have copies of standards to review.

4.3 Membership and organization

Membership in the organization is open to anyone with an interest in its activities. Standards are developed within committees, and new committees are formed as needed, upon request of interested members. Membership in most committees is voluntary and is initiated by the member's own request, neither by appointment nor by invitation. Members are classified as users, producers, consumers, and "general interest". The latter include academics and consultants. Users include industry users, who may be producers in the context of other technical committees, and end-users such as consumers. In order to meet the requirements of antitrust laws, producers must constitute less than 50% of every committee or subcommittee, and votes are limited to one per producer company. Because of these restrictions, there can be a substantial waiting-list of producers seeking organizational memberships on the more popular committees. Members can, however, participate without a formal vote and their input will be fully considered.

As of 2007, more than 30,000 members, including over 1100 organizational members, from more than 120 countries, include 120 members in China as of 2005. The 2011 Chairman of the Board is Catherine H. Pilarz; James A. Thomas is the President of ASTM International. ASTM International presents several awards for contributions to standards authorship, including the ASTM International Award of Merit (the organization's highest award) ASTM International is recognized by the United States Internal Revenue Service as a 501(c)(3) nonprofit organization.

4.4 Standards compliance

ASTM International has no role in requiring or enforcing compliance with its standards. The standards, however, may become mandatory when referenced by an external contract, corporation, or government.

- In the United States, ASTM standards have been adopted, by incorporation or by reference, in many federal, state, and municipal government regulations. The National Technology Transfer and Advancement Act, passed in 1995, require the federal government to use privately developed consensus standards whenever possible. The Act reflects what had long been recommended as best practice within the federal government.
- Other governments (local and worldwide) also have referenced ASTM standards
Corporations doing international business may choose to reference an ASTM standard.

5 Summary & Conclusions

The DoD solicitation document will not only call out Military Specifications and Standards, but may also reference other recognized standards like The American National Standards Institute (ANSI, /ˈænsi/ AN-see) and ASTM International, known until 2001 as the American Society for Testing and Materials (ASTM). This document provided a brief overview of these three referenced requirements and reference to sources where copies of documents may be obtained.

It is important in the review of a DoD solicitation to make sure all referenced requirements are reviewed and understood, because a company bidding to the DoD solicitation must be in compliance with these referenced specification and standards to expect to be awarded a DoD contract.