

KSC-DF-107
Revision E

TECHNICAL DOCUMENTATION STYLE GUIDE

August 3, 2015

Engineering Directorate

National Aeronautics and
Space Administration

John F. Kennedy Space Center

KSC FORM 16-12 (REV. 6/95) PREVIOUS EDITIONS ARE OBSOLETE (CG 11/95)

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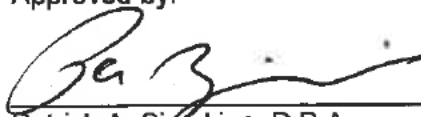


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Revision E

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Approved by:

A handwritten signature in black ink, appearing to read 'Pa 3', written over a horizontal line.

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August 3, 2015

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RECORD OF REVISIONS/CHANGES

REV LTR	CHG NO.	DESCRIPTION	DATE
		Basic issue.	February 1979
	Basic-1	Added Section V, Space Station Project Documentation Format and Preparation Guidelines.	July 1987
A		General revision incorporating Change 1.	March 1988
B		General revision incorporating Supplement 1 and the metric system of measurement.	August 1995
C		Revised all sheets to incorporate simplified document formats and align them with automatic word processing software features.	November 15, 2004
D		Revised to incorporate an export control sign-off on the covers of documents and to remove the revision level designation for NPR 7120.5-compliant project plans.	April 6, 2005
E		General revision.	August 3, 2015

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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

@	at
'	foot, minute (plane angle)*
"	inch, second (plane angle)*
°	degree (of temperature or plane angle)
ed	edition
EDC	Engineering Documentation Center
e.g.	for example
et al.	and others
etc.	and so forth
ibid	in the same place
i.e.	that is
ISBN	International Standard Book Number
ISO	International Organization for Standardization
KDDMS	KSC Design Data Management System
KSC	Kennedy Space Center
lb	pound
lbf	pound-force
lbm	pound-mass
MLA	Modern Language Association
NASA	National Aeronautics and Space Administration
PDF	Portable Document Format
SI	International System of Units
START	Standards and Technical Assistance Resource Tool
UTC	Coordinated Universal Time

- * Two meanings are shown for prime ('), double prime ("), and degree (°) because the uses and multiple meanings of these symbols are explained in 3.5.2.i, 3.16.2 m and n, and Appendix B (in the definition of [apostrophe](#)). See 3.5.2 f for guidance about assigning multiple meanings to abbreviations.

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1. INTRODUCTION

1.1 Purpose

This guide promotes writing that is clear, concise, accurate, consistent, organized, and above all, easy for the reader to understand and use.

Because the customary products of technical writing are specifically formatted documents, this guide also describes the elements that documents commonly include, the elements they should include, and how those elements should be arranged and formatted. It recognizes two broad types of documents: [formal documents](#) and [engineering documents](#).

Formal documents are those with lasting reference value across KSC organizations, programs, or projects. KSC Specifications, KSC Standards, and other documents that carry similar broad authority are examples of formal documents. Formal documents are subject to broad and rigorous review and are often invoked in KSC contracts. They are stored in the KSC Library and are available throughout NASA via the Standards and Technical Assistance Resource Tool (START) at <https://standards.nasa.gov/>. Formal documents are formatted for publication as books, with specific left-hand (even-numbered) and right-hand (odd-numbered) pages.

Engineering documents address the engineering, business, or administrative aspects of specific programs or projects. Their reference value and authority are confined to their specific programs or projects, and they are subject to program or project review. Engineering documents are primarily for KSC use but may be invoked for specific procurements. They are stored and managed as specified by the applicable program or project plan. Because of their more limited application and availability, engineering documents can be formatted more simply, without regard for book-publishing conventions.

1.2 Scope and Application

The writing and formatting conventions in this guide are those that are applied in the course of professional editing. Whether your document will be professionally edited or not, as an author, you are encouraged to consult this guide for specific writing and formatting questions and to apply its conventions when it is practical to do so.

This guide applies to KSC directorates and to contractors (to the extent specified in their contracts).

The writing conventions in this guide apply to most of the written communication prepared for or by KSC.

The formatting conventions in this guide apply to [Basic editions](#) and [Revisions](#) of [formal documents](#) and [engineering documents](#). See 6.2 for how the formatting conventions apply to [Changes](#).

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The formatting conventions **do not** apply to documents of the KSC Business Management System (Kennedy NASA Procedural Requirements, Kennedy Documented Procedures, etc.). These documents are governed by [KNPR 1470.1](#).

1.3 Conventions of This Guide

This guide is intended as a reference manual to be consulted for particular questions, rather than as a lesson to be read from start to finish. Although the goal is to treat each topic adequately in its own subsection or paragraph, cross-references to other discussions are often necessary (see 3.22.1). Cross-references to numbered locations (such as the one in this paragraph and references to appendices) are not specially formatted but are [hyperlinked](#) for online use. Hyperlinks to documents within the KSC firewall, to definitions, and to website addresses are underlined and set in blue.

This guide also offers the following resources:

- usage and spelling conventions for specific words, phrases, and symbols (some of which also appear in the body) in Appendix A,
- a glossary of grammatical, formatting, and documentation terms, with hyperlinks (blue and underlined) from instances of defined terms in the body (Appendix B),
- the postal abbreviations for states and U.S. territories (Appendix C),
- an [index](#),
- links to Microsoft Word templates for [formal documents](#) and [engineering documents](#) (see 2.2),
- links to a list of [keystroke combinations](#) for typing symbols that don't appear on standard keyboards, and
- links to files for graphics that appear on document covers (see 5.1.a, 6.2, and 6.3).

The formatting guidance assumes a certain level of skill with word processing functions and does not offer step-by-step instructions for achieving specific results. Where necessary, the formatting conventions in this guide are differentiated for formal documents and engineering documents.

2. DOCUMENTS

2.1 Applicable Documents

The following documents form a part of this document to the extent specified herein.

2.1.1 Government Documents

[KDP-KSC-P-1538](#)

NASA KSC Specifications and Standards Development
Process

ISO 80000-1 Quantities and units, Part 1: General

ISO 80000-1 can be viewed and downloaded inside the KSC firewall through the Standards and Technical Assistance Resource Tool (START) at <https://standards.nasa.gov/>.

2.2.1 Government Documents

KDP-T-5405	Basic Template for KSC Engineering Document
KDP-T-5411	Template for Formal KSC Document
KDP-T-5413	Advanced Template for KSC Engineering Document
KNPR 1470.1	KSC Business Management System Documentation
KNPR 8715.3-1	KSC Safety Procedural Requirements, Volume 1, Safety Procedural Requirements for Civil Servants/ NASA Contractors

2.2.2 Non-Government Documents

ANSI/NISO Z39.8-2005 (ISBN 1-880124-66-1)	Scientific and Technical Reports – Preparation, Presentation, and Preservation
ISBN 0-07-293653-3	The Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting, 10 th Edition
ISBN 0-226-10420-6	The Chicago Manual of Style, 16 th Edition
ISBN 0-7356-1746-5	Microsoft Manual of Style for Technical Publications, 3 rd Edition
ISBN 10-0873522974	MLA Style Manual and Guide to Scholarly Publishing, 3 rd Edition

3. GENERAL CONVENTIONS FOR WRITING AND FORMATTING

Computer spelling- and grammar-checking functions often give helpful signals about how you have spelled words or constructed sentences, but they are **not** authorities on spelling or grammar. Consider the suggestions they offer, but consult this guide (as well as other reliable references) whenever the necessary correction is not immediately obvious.

Likewise, a dictionary shows you how words are spelled and what they mean, but it doesn't guide you to the best choices for what you want to say. The fact that a word appears in a dictionary, with a particular meaning, doesn't necessarily make a word a good choice. See Appendix A for guidance on the use of some specific words and phrases.

Section 3 offers general conventions of good writing style, but is not a complete replacement for dictionaries, usage references, and professional opinions. Use this guide and other resources to tailor your style to suit your material and serve your readers.

3.1 Selecting Words and Phrases

Expressing ideas concisely and directly is most important. It shows your respect for the material and for your readers. Choose shorter words and fewer words as long as they are concise and direct. It's better to use a few more short, direct, well-arranged words than to rely on jargon or long strings of conceptual [nouns](#) that are hard to understand. Imagine how you would explain a point (orally) to people who don't know quite as much about the topic as you do. Then write it down. If you think the sentences don't sound important enough, you're probably on the right track. If you can make the sentences simpler and more direct, do so. If you don't tend to say *facilitate*, *optimize*, or *utilize* (and you probably don't), don't write them. Assume that your readers don't have much time and need to understand the material in one pass. (This is almost always the case.) Imagine yourself as those readers, and write to make their jobs easier. Don't respond to the endless examples of bad writing, even those handed down to you, by writing badly yourself. Be as critical as you can of your own writing, and whenever it is practical, have someone review your draft. See Appendix A for guidance about specific terms.

3.2 Consistency and Accuracy of Terms

Observe the following conventions for using terms consistently and accurately:

- a. Refer to the same thing by the same term throughout a document. For example, don't call the same thing a cabinet in one sentence and an enclosure in another sentence.
- b. Make the terms in the document agree with those in any corresponding engineering drawings.
- c. Make references to labels (on panels, on equipment, on signs, or in computer interfaces) identical to the actual labels.

3.3 Voice and Mood

Voice reflects the relationship between the **subject** of a sentence (that is, who does or asserts something) and the **predicate** (that is, what happens or is asserted). English has two voices: **active** and **passive**. In active voice, the subject performs the act conveyed by the **verb**, as in, for example, “The engineer completes the requisition.” The action happens to the **object**. In passive voice, the object becomes the subject, but still receives the action, as in, for example, “The requisition is completed by the engineer.” In general, active voice is the better choice when both the performer and the receiver are known and are important to identify. It’s good to notice, though, that active voice does not benefit all sentences, especially those in which the performer is either not known or not as important as the action or its receiver. Express your thoughts as directly as possible, but don’t allow them to lose their focus simply for the sake of using active voice.

Mood is the form of the **verb** that indicates how the action or state is conceived. English has three moods: **indicative**, **imperative**, and **subjunctive**. The indicative and imperative are the moods we use the most. The indicative mood makes statements and asks questions (“When switch A is in the ON position, lamp 34 lights.”), using normal verb **conjugation**. The imperative mood instructs or commands (“Remove test set from carrying case.”), using just the **infinitive** form of the verb (such as *do*, *be*, and *have*). The **subjunctive mood** is trickier and is defined in Appendix B.

3.4 *Shall, Should, Will, and Must*

Observe the following conventions in differentiating these terms:

- a. ***Shall***: Use *shall* to express a requirement that is subject to verification. For example, “The contractor shall submit a status report by close of business each Friday.” Make sure that requirements are specific and not open to interpretation.
- b. ***Should***: Use *should* to express a recommendation. For example, “This objective should be our top priority.”
- c. ***Will***: Use *will* to forecast an event or condition that is certain or highly likely. For example, “The Government will review all submittals.”
- d. ***Must***: Use *must* to describe a dependent relationship. For example, “For the installation to be completed, the computer must be restarted.”

3.5 Abbreviations

3.5.1 Types of Abbreviations

[Abbreviations](#) are shortened forms of words or phrases. They may be any of the four following types. When you refer to these shortened forms of words or phrases broadly or collectively, call them *abbreviations*.

- a. **Acronyms** are abbreviations that are pronounced as words (for example, *NASA*, *OSHA*, *laser*, and *radar*). Though there is no defining rule about how acronyms are [cased](#), the acronyms that stem from [proper nouns](#) tend to retain their capital letter, and the acronyms that stem from [common nouns](#) are more likely to be cased as common words.
- b. **Contractions** (in this sense) are usually formed by dropping some of the letters in a word or [phrase](#) (for example, *ft* for *foot*). These contractions, especially those that represent units of measure, are usually pronounced by saying the words they represent. The contractions that represent English units of measure are usually lowercased. The contractions that represent units of the International System of Units (SI), which is overseen by the International Organization for Standardization (ISO), are [cased](#) as specified in ISO 80000-1.
- c. **Initialisms** are usually formed from the initial letters of words or [phrases](#) (for example, *KSC* for *Kennedy Space Center* or *PC* for *personal computer*). Most initialisms are capitalized and are pronounced by saying the individual letters. However, most initialisms that represent units of measure are **not** capitalized and are pronounced by saying the words they represent.
- d. **Symbols** include the letters and numbers that represent elements and compounds (such as GN_2) and the typographical characters outside the English alphabet. Symbols are usually pronounced by saying the words they represent (for example, ° for *degree* in °C [for *degree Celsius*] or μ for *micro* in μm [for *micrometer*]). See [keystroke combinations](#) for how to type some of the common symbols that don't appear on the standard keyboard.

When the symbols for elements or compounds represent the elements or compounds themselves, numbers and other accompanying symbols (such as + and –) follow scientific convention for typesetting—superscript, subscript, or normal position—depending on meaning. For example, when gaseous nitrogen is described as running through a pipe, it is abbreviated as “ GN_2 .” When an element or compound is part of the name of a system or subsystem, all characters in the symbol are set full-size, as in, for example, “the GN_2 subsystem.” The symbols for elements or compounds are sometimes pronounced by saying the name of the element or compound (such as saying “argon” instead of saying the letters *A* and *r*) and other times by saying the individual letters and numbers.

The letters that combine with symbols are most often part of the International System of Units (SI), which is overseen by the International Organization for Standardization (ISO). SI units are [cased](#) as specified in ISO 80000-1.

3.5.2 Use of Abbreviations

Observe the following conventions in determining when and how to use abbreviations:

- a. Make sure that a term warrants being abbreviated. You don't need to abbreviate a term that appears only a few times, unless the abbreviation replaces a long, cumbersome phrase or unless your readers are likely to recognize the abbreviation faster than they would recognize the term.
- b. In general, and always for KSC Specifications and KSC Standards, call out an abbreviation, in [parentheses](#), after the first appearance of the term it represents (but also see 3.5.2.c). The abbreviation may be used thereafter.
- c. Wherever possible, avoid calling out an abbreviation in the title of a document, section, subsection, figure, or table. Instead, wait until the next appearance in running text.
- d. At their first appearance in the body, repeat the callouts for abbreviations that appeared in the foreword, preface, acknowledgment, or executive summary.
- e. If you think it will be a service to your readers, repeat the callout for an abbreviation (especially a less familiar one) that has not appeared for many pages.
- f. Don't assign multiple meanings to a single abbreviation in a document.
- g. Be cautious in coining an abbreviation. Avoid applying a well-established abbreviation to a new term. It is unreasonable to expect your readers to disregard a strong association and link a new term to the abbreviation.
- h. Unless space is extremely tight (for example, in a table), don't abbreviate the names of days, months, states, or U.S. territories (except for [D.C.](#) in *Washington, D.C.*). Where necessary, use the two-letter postal abbreviations for states or U.S. territories shown in Appendix C. When you abbreviate days, months, states, or U.S. territories, **don't** include those abbreviations in the list of abbreviations.
- i. Use abbreviations for units of measure **only** with numerical values or as labels for table columns or graph axes. In expressing ranges and series of measured quantities with abbreviated units, show the abbreviation with each quantity. Also see 3.16.2.
- j. Be sure to use foreign abbreviations (such as [e.g.](#), [i.e.](#), and [etc.](#)) correctly. See the entries for these and other foreign abbreviations in Appendix A for more guidance. Always include foreign abbreviations in the list of abbreviations (see 5.7).

3.5.3 Abbreviations Not Called Out

Observe the following conventions for abbreviations that are not called out in text:

- a. Except in KSC Specifications or KSC Standards, you don't need to call out *Kennedy Space Center* or *National Aeronautics and Space Administration* anywhere in the text of documents intended primarily for KSC use, but list both abbreviations in the list of abbreviations (see 5.7). Don't call out *U.S.* in text when it stands for [United States](#) (see Appendix A), and don't include *U.S.* in the list of abbreviations.

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- b. Many document numbers (such as *NASA-STD-5005*) include characters that identify attributes of the document, such as its type or the organization responsible for it. In the context of document numbers, these characters are not treated as abbreviations. When you write a document number, **never** write the attributes that such characters represent. For example, **never** write “National Aeronautics and Space Administration (NASA) Standard (STD) 5005.” Unless such characters serve as true abbreviations elsewhere in the document—**not** just in document numbers—**don’t** include them in the list of abbreviations (see 5.7).
- c. Symbols for elements, compounds, and units of measure can sometimes be awkward to call out in text. In scientific or technical documents (other than KSC Specifications or KSC Standards) intended for experts, you may use such symbols and other well-understood abbreviations without callout in text, but see 5.7.c.
- d. Symbols for commonly understood mathematical operators (such as +, −, ±, and ×), the dollar symbol (\$), and the percent symbol (%) are **not called out** in text and **are not included** in the list of abbreviations.
- e. Abbreviations for foreign words or phrases (such as *e.g.*, *i.e.*, and *etc.*) are **not called out** in text but **are included** in the list of abbreviations.
- f. The abbreviations for *Page* and *Pages* (*p.* and *pp.*, respectively) are **not called out** in text and **are not included** in the list of abbreviations. See 3.22.1.g.

3.5.4 Plurals of Abbreviations

In general, form the plurals of abbreviations, **except** those for units of measure, by adding just a lowercase *s*, rather than an [apostrophe](#) and a lowercase *s* (’*s*). Abbreviations for units of measure are always singular, regardless of the value.

3.5.5 Possessives of Abbreviations

In general, form the possessives of abbreviations by adding an [apostrophe](#) and a lowercase *s* (’*s*).

3.5.6 Articles with Abbreviations

3.5.6.1 Definite Article

Whether to use the [definite article](#) (*the*) with an abbreviation depends on the type of abbreviation and its function in the sentence. Nevertheless, what sounds most natural is usually the best solution. Trust your ear, but consider the following conventions:

- a. When an [acronym](#) represents a [singular noun](#) that functions as a [subject](#) or [object](#) and that cannot be made plural (often an office or department, such as *NASA* or *OSHA*), *the* is usually omitted, as in, for example, “NASA launches spacecraft from KSC,” and “The requirements are aligned with the standards of OSHA.” (Notice that *the* would have been essential if *National Aeronautics and Space Administration* and *Occupational Safety and Health Administration* had been used instead of the

acronyms.) Be open to exceptions, though, such as *FAR* for *Federal Acquisition Regulation*. We tend to add *the* to *FAR* when it stands alone.

- b. When an [initialism](#) represents a [singular noun](#) that cannot be made [plural](#) (often an office or department, such as *DOT* or *DOL*) and that functions as a [subject](#) or [object](#), *the* is usually added, as in, for example, “The DOT met with representatives of the DOL.”
- c. When either an [acronym](#) or an [initialism](#) functions as an [attributive noun](#) (as in, for example, *U.S. taxes* or *NASA programs*), *the* is usually omitted when the assertion applies to all instances within the context (as in, for example, “U.S. taxes finance NASA programs.”) When the assertion does not apply to all instances, adding *the* can highlight the limits of the assertion. Such sentences often include a qualifying [clause](#), as in, for example, “This applies to the NASA programs that involve international space agencies.”

3.5.6.2 Indefinite Articles

Use the customary pronunciation of the abbreviation to determine which [indefinite article](#) to use: *a* or *an*.

- a. Use *a* before an abbreviation (or any word) that begins with a consonant sound. For example, write “a RID” (an [acronym](#) pronounced as “rid”) or “a GSE requirement (an [initialism](#) pronounced by saying each letter).
- b. Use *an* before an abbreviation (or any word) that begins with a vowel sound. For example, write “an ANSI standard” (an [acronym](#) pronounced as “an·sē”) or “an LRU” (an [initialism](#) pronounced by saying each letter).

3.5.7 Periods, Spaces, and Mixed Cases with Abbreviations

Observe the following conventions for [periods](#), spaces, and mixed cases with abbreviations:

- a. Write most [initialisms](#) and [contractions](#) without [periods](#) or spaces, but because exceptions exist, follow the guidance of the authority that presides over the particular abbreviation. The organization’s website is often a good source. Noteworthy exceptions are *Certificate of Compliance* (or *Certificate of Conformance*), which is usually abbreviated as *C of C*; *Page* and *Pages*, which are abbreviated as *p.* and *pp.*, respectively; and *United States*, which is always abbreviated as *U.S.*
- b. With the exception of *inch*, **don’t** add a [period](#) to abbreviations of units of measure. The use of a period is essential for avoiding a miscue between the abbreviation of *inch* and the word *in*, as in the following: “Use a 3 in. test strip in the first run. Increase the length to 4 in. in the second run.” Omit the [period](#) in abbreviations of *square inch* or *cubic inch* as *in²* and *in³*, respectively.
- c. Try to reflect mixed-case abbreviations (those that combine uppercase and lowercase letters) accurately. Try to avoid starting a sentence with an abbreviation that begins with a lowercase letter.

3.6 Contractions

Contractions (for example, *it's* for *it is* or *it has*; *don't* for *do not*; *doesn't* for *does not*; *isn't* for *is not*; and *won't* for *will not*) are **not forbidden** in technical or business writing. A few well-placed contractions can help your material sound as if a person wrote it—always a worthy goal. But too many contractions can make your message sound too casual.

3.7 Pronouns

3.7.1 Use of Pronouns

English depends heavily on personal and demonstrative **pronouns**, and they have a place in business and technical writing. Frequently repeating long names (and even some abbreviations) or referring to yourself as *the author* can make your writing sound tedious and stiff. The judicious use of personal pronouns can help show your readers that you are invested in your message. Use personal pronouns when they sound natural and help your writing flow smoothly, but always make sure your readers will understand who or what each pronoun represents—its **antecedent**. Consider the following in determining how to best use pronouns:

- a. The **first-person singular pronouns** (*I, me, myself, my, and mine*) rarely appear in business or technical writing, which tends to convey a collective or organizational viewpoint. An exception may occur in a preface, foreword, acknowledgment, or entire document written by and credited to one person.
- b. The use of **first-person plural pronouns** (*we, us, ourselves, our, and ours*) is often effective when a group or organization (such as members of a committee or representatives of a directorate, division, or branch) is not only a subject of the material, but also its author. Another acceptable time to use first-person plural pronouns is when a team or committee reports its actions or findings.
- c. The use of **second-person pronouns** (*you, yourself, yourselves, your, and yours*) is essential when you command or instruct your readers or when you advise them or explain actions or concepts that they will be directly involved in. When you command or instruct (in an **imperative sentence**), you are addressing your readers directly, but without calling them by name. The understood **subject** of the sentence is *you*. When you advise your readers or explain things they should do (in a **declarative sentence** such as this one), the readers are the natural subject of the sentence, and the natural way to refer to your readers or to address them is to call them *you*. Notice that second-person pronouns appear throughout this guide.
- d. The use of **third-person pronouns** (*he, him, himself, his, she, her, herself, hers, it, itself, its, they, them, themselves, their, and theirs*) and demonstrative pronouns (*this, these, and those*) is essential in business and technical (or any kind of) writing. Don't make a sentence more complicated just to avoid these pronouns. Also see 3.7.2.

3.7.2 Agreement Between Possessive Pronouns and Their Antecedents

English lacks a possessive [pronoun](#) for someone of unstated gender—a word to use instead of *his* or *her*. This shortcoming (about which much has been written and debated) can result in awkward sentences that break the conventions of number agreement between possessive pronouns and their [antecedents](#) (the nouns they refer back to). This disagreement is worth fixing because it can divert your readers’ attention from your message. Some options have been suggested (such as using *his or her*, using *his/her*, using *his* in all cases, alternating between *his* and *her*, and using *their*), but none of these have widespread acceptance among everyday writers, professional writers, and language experts. Consequently, if you use one of these options, you are likely to distract (or even annoy) a few of your readers. (See examples and explanations in 3.7.2.a and 3.7.2.b.) Until writers and language experts widely agree on a solution, the best approach is to avoid the problem by using [plural antecedents](#) and *their*. (See the example and explanation in 3.7.2.c.)

- a. “Each employee shall inform their supervisor.” (Common in speech but better avoided in writing: The plural possessive pronoun [*their*] disagrees with the singular antecedent [*employee*].)
- b. “Each employee shall inform his or her supervisor.” (Correct, but awkward: The singular antecedent [*employee*] requires two singular, gender-specific, possessive pronouns [*his* and *her*].)
- c. “All employees shall inform their supervisors.” (Good choice: The plural antecedent [*employees*] takes the plural possessive pronoun [*their*] and prevents the need to specify gender.)

3.8 Attributive Nouns

3.8.1 Excessive Consecutive Nouns

[Attributive nouns](#) act as [adjectives](#) and modify the [nouns](#) they precede. English is full of attributive-noun phrases, and they are indispensable for how we talk and write. When attributive-noun phrases are at their best, they convey ideas quickly and economically, as in “test design” and “review board.” Both are obviously better than “design for the test” and “board to review” when the ideas stand alone. But when lots of nouns stack up, they can weaken your message and obscure your point, as in “test design option review board.” Use short attributive-noun phrases that are easy to grasp quickly, but in general, after the third consecutive noun, consider using one or two well-placed [prepositional phrases](#) (as in “a board **for reviewing** test design options”) or [infinitive phrases](#) (as in “a board **to review** test design options”). Varying the dominant [part of speech](#) can help keep your message alive and your readers awake.

3.8.2 Singular vs. Plural Attributive Nouns

[Attributive nouns](#) are most often [singular](#), whether the notions they represent are singular or [plural](#). Everyday concepts illustrate this point well:

“A cookie (attributive noun) jar holds more than one cookie.”

“A car (attributive noun) dealership offers more than one car.”

We understand that the singular attributive noun has plural capability. But there are exceptions in everyday English (such as *sports page* and *sales clerk*) and in engineering and business (such as *requirements document*, *systems engineering*, *communications network*, and *workers' compensation*). If you wonder whether to make a particular attributive noun singular or plural, make it singular.

3.9 Compound Words and Phrases

English is full of compound words and phrases. Compounds combine words, often in different [parts of speech](#), to act as a unit and perform a single function in a sentence. Some compounds are written as separate words (such as the [noun](#) *ground support equipment*), some are written as solid words (such as the noun *workstation*), and some are hyphenated (such as the [verb](#) *to leak-test* and the [adjective](#) *cost-effective*). Some compound nouns started as separate words, then became hyphenated words, and finally became solid compounds. How to treat a compound depends largely on the parts of speech of the individual words and on the function that the compound performs. But exceptions exist, simply because they can. So why bother trying to compound correctly? Because correct compounding will eliminate an opportunity for misunderstanding, and because correct compounding is less distracting than incorrect compounding.

English usage manuals often devote long chapters to compounding. This guide does not attempt to treat the subject exhaustively, but to offer general conventions in the following subsections.

3.9.1 Compound Nouns

3.9.1.1 Nouns Combined with Adverbs

There are no absolute rules for compounding [nouns](#) with [adverbs](#). The addition of an adverb can yield *setup* and *start-up*, *countdown* and *sit-down*, *checkout* and *time-out*, and *liftoff* and *sign-off*—each of which is correct. Some other adverbs combine with nouns more predictably:¹

- a. *In*, *on*, *between*, *together*, and *through* attach to most nouns via a hyphen, as in a *check-in*, a *follow-on*, a *go-between*, a *get-together*, and a *walk-through*. A notable exception is a *breakthrough*.

¹ William A. Sabin, *The Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting*, 10th ed., (Boston: McGraw-Hill/Irwin, 2005), 218-219.

- b. *Over, back, away, about, around, and by* attach to most nouns solidly, as in a *turnover*, a *rollback*, a *breakaway*, a *turnabout*, a *turnaround*, and a *standby*.

For more help, consult a recent dictionary. If the compound noun you want to use is not there, look for compounds of similar construction, and apply the pattern you find. Don't rely solely on the word processing program's spell-checking function for guidance in compounding. Also see 3.9.4 and specific words in Appendix A.

3.9.1.2 Process Nouns

Process nouns combine a [noun](#) and a [gerund](#)—the form of a [verb](#) that ends in *-ing* and that functions as a noun (such as *word processing*, *fund-raising*, and *recordkeeping*). As these examples show, the words that make up process nouns can be separate, [hyphenated](#), or solid, without exhibiting a reliable pattern. Many process nouns start as separate words, become hyphenated, and finally become (and stay) solid. For more help, consult a recent dictionary. If the process noun you want to use is not there, look for compounds of similar construction, and apply the pattern you find. Don't rely solely on the word processing program's spell-checking function for guidance in compounding. Also see 3.9.4 and specific words in Appendix A.

3.9.1.3 Phrasal Nouns

A phrasal [noun](#) combines words from other [parts of speech](#) (not nouns) to convey a single idea. Phrasal nouns are less common in business and technical writing because of their more casual tone, but when they appear, it is because they convey an idea instantly, in only two or three words. Most phrasal nouns are hyphenated. Examples include a *go-ahead*, a *win-win*, and *know-how*.

3.9.2 Compound Verbs

Most compound [verbs](#) consist of a [noun](#) or an [adjective](#), followed by a verb, and most are either solid (*to handpick*, *to highlight*) or hyphenated (*to air-condition*, *to dry-clean*). Nouns customarily [modify](#) only other nouns, and adjectives customarily modify only nouns. Attaching a noun or an adjective to a verb solidly or through hyphenation allows the noun or adjective to do what neither of these parts of speech customarily does—modify a verb. It's important to make sure that you are using the compound as a verb. For example, “Because you want *air conditioning* (an attributive-noun phrase [see 3.8]), you *will be air-conditioning* (a verb) your house.” For more help, consult a recent dictionary. If the compound verb you want to use is not there, hyphenate the compound verb. Don't rely solely on the word processing program's spell-checking function for guidance in compounding. Also see 3.9.4 and specific words in Appendix A. If you're still in doubt, hyphenate the compound verb.

3.9.3 Compound Adjectives

Compound [adjectives](#) result when we transform and shorten longer adjective [phrases](#) or [clauses](#), often changing the order of the words and their [parts of speech](#). We constantly speak and write compound adjectives in all kinds of communication. Here are a few examples:

Fully Expanded

an inspection with 10 points
components that have been tested in the field
an atmosphere that is free of ammonia

Compounded

a 10-point inspection
field-tested components
an ammonia-free atmosphere

The value of compound adjectives is obvious. They help us apply complex distinctions to [nouns](#) (or noun phrases) without spending a lot of words.

Compound adjectives have more diverse and complicated patterns than the other types of compounds, but they have a single function: to [modify](#) a [noun](#). They can consist of combinations of nouns, [adverbs](#), other adjectives, [verbs](#) (including [participles](#)), and [phrases](#). And they can appear before the noun or after the noun. But to a large extent, they can be treated methodically according to pattern and position. When they come before a noun, compound adjectives are most often hyphenated, sometimes solid, and occasionally separate words. The solid or hyphenated construction emphasizes the union of the compound and helps prevent a reading miscue. Table 1 shows the major patterns that compound adjectives follow, how they should appear before the noun and (where applicable) after the noun, and of course, some exceptions.² To treat countable quantities acting as adjectives, see 3.16.1.a(3). To treat measured quantities acting as adjectives, see 3.16.2.a(4).

Table 1. Patterns of Compound Adjectives

Pattern	Before Noun	After Noun	Exceptions and Notes
Adjective + Noun The pattern holds for comparative and superlative adjectives.	a <i>long-term</i> gain a <i>higher-tech</i> solution	gain is <i>long-term</i> ; gain is for the <i>long term</i> solution is <i>higher-tech</i> ; solution uses <i>higher tech</i>	Exceptions: <i>commonsense</i> alternative <i>freshwater</i> source <i>lightweight</i> gear <i>heavyweight</i> equipment <i>real estate</i> agent <i>high school</i> teacher Some adjective-noun compounds are already solid words. Some adjective-noun compounds are well recognized as separate words.

² William A. Sabin, *The Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting*, 10th ed., (Boston: McGraw-Hill/Irwin, 2005), 224-240.

Pattern	Before Noun	After Noun	Exceptions and Notes
<u>Noun</u> + <u>Noun</u>	<i>ground support</i> system		Nouns that build progressively after preceding nouns tend to be separate. Also see 3.9.1.
	<i>launch pad</i> repairs		
	<i>input-output</i> device	device for <i>input and output</i>	When the nouns are equally ranked and a shared idea is implied, the nouns tend to be hyphenated.
	<i>time-space</i> problem	problem of <i>time and space</i>	
<u>Noun</u> + <u>Adjective</u>	<i>fiber-optic</i> cable	cable is <i>fiber-optic</i> ; cable made of <i>optical fiber</i>	Beware of <u>suffixes</u> that look like adjectives, such as in <i>worldwide</i> , <i>waterproof</i> , <i>noteworthy</i> , and <i>yearlong</i> . See 3.9.4.
	<i>camera-ready</i> page	page is <i>camera-ready</i> ; page is <i>ready for the camera</i>	
<u>Noun</u> + <u>Participle</u> The pattern holds for the participles of regular <u>verbs</u> (those ending in <i>-ed</i> , <i>-ing</i> , and <i>-en</i>) and participles of irregular verbs (such as <i>build</i>).	<i>vacuum-jacketed</i> cable	cable is <i>vacuum-jacketed</i>	Exceptions: <i>handheld</i> device <i>handwritten</i> note <i>homemade</i> product <i>timesaving</i> method
	<i>time-consuming</i> plan	plan is <i>time-consuming</i>	
	<i>labor-driven</i> budget	budget is <i>labor-driven</i> ; budget is <i>driven by labor</i>	
	<i>custom-built</i> device	device is <i>custom-built</i>	
<u>Adjective</u> + <u>Participle</u> The pattern holds for <u>comparative</u> and <u>superlative</u> adjectives. The pattern also holds for the participles of regular <u>verbs</u> (those ending in <i>-ed</i> , <i>-ing</i> , and <i>-en</i>) and the participles of irregular verbs (such as <i>make</i>).	<i>half-consumed</i> supply	supply is <i>half consumed</i>	Beware of adjectives that end in <i>-ly</i> , such as <i>costly</i> and <i>friendly</i> . When one of these combines with a participle that indicates one of the noun's attributes (especially how it looks, sounds, smells, tastes, or feels), the resulting compound is hyphenated, as in <i>costly-sounding</i> alternative and <i>friendly-sounding</i> voice.
	<i>longer-lasting</i> finish	finish is <i>longer-lasting</i> ; finish <i>lasts longer</i>	
	<i>highest-ranking</i> officer	officer is <i>highest-ranking</i> ; officer has the <i>highest ranking</i> ; officer <i>ranks highest</i>	
	<i>ready-made</i> solution	solution is <i>ready-made</i>	
<u>Adjective</u> + <u>Noun</u> (-ed) The pattern holds for <u>comparative</u> and <u>superlative</u> adjectives.	<i>low-pitched</i> sound	sound is <i>low-pitched</i>	Although these nouns that end in <i>-ed</i> look like verbs, they aren't—because the subject can't perform what, at first glance, looks like an action: a sound can't pitch, and a good can't price.
	<i>higher-priced</i> goods	goods are <i>higher-priced</i>	
<u>Adverb</u> (-ly) + <u>Participle</u> The pattern also holds for the participles of regular <u>verbs</u> (those ending in <i>-ed</i> , <i>-ing</i> , and <i>-en</i>) and the participles of irregular verbs (such as <i>cut</i>).	<i>newly approved</i> project	project is <i>newly approved</i>	These compounds are always separate words. Contrast these with the <u>Adjective + Participle</u> pattern and the <u>Adverb (no -ly) + Participle</u> pattern.
	<i>clearly alarming</i> fact	fact is <i>clearly alarming</i>	
	<i>completely hidden</i> detail	detail is <i>completely hidden</i>	
	<i>freshly cut</i> lawn	lawn is <i>freshly cut</i>	

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Pattern	Before Noun	After Noun	Exceptions and Notes
<u>Adverb</u> (no -ly) + <u>Participle</u> The pattern holds for <u>comparative</u> and <u>superlative</u> adverbs. The pattern also holds for the participles of regular <u>verbs</u> (those ending in -ed, -ing, and -en) and the participles of irregular verbs (such as <i>know</i>).	<i>much-needed</i> revisions	revisions are <i>much needed</i>	Exceptions: <i>upcoming</i> <i>widespread</i> Participles of <i>go</i> : <i>ongoing</i> , <i>outgoing</i>
	<i>ever-changing</i> number	number is <i>ever changing</i>	
	<i>long-forgotten</i> method	method was <i>long forgotten</i>	
	<i>well-known</i> exception	exception is <i>well known</i>	When the participle does not function as a verb after the noun, the compound remains hyphenated after the noun.
	<i>better-behaved</i> sample	sample was <i>better-behaved</i> ; sample <i>behaved better</i>	
	<i>clear-cut</i> violation	violation is <i>clear-cut</i>	
<u>Participle</u> + <u>Adverb</u> The pattern holds for all participles.	<i>well-known</i> author	author was <i>well known</i>	These compounds are hyphenated before the noun and separated after the noun.
	<i>filled-up</i> tank	tank is <i>filled up</i>	
	<i>scaled-down</i> project	project was <i>scaled down</i>	
	<i>checked-in</i> document	document was <i>checked in</i>	
	<i>checked-out</i> system	system was <i>checked out</i>	
<u>Verb</u> + <u>Verb</u>	<i>agreed-upon</i> solution	solution was <i>agreed upon</i>	After the noun, hyphenate the compound when it acts as an adjective. Separate the compound when it acts as a verb.
	<i>plug-and-play</i> device	device is <i>plug-and-play</i> ; device we can <i>plug and play</i>	
	<i>find-and-replace</i> routine	routine is <i>find-and-replace</i> ; routine to <i>find</i> (something) and <i>replace</i> (it with something)	
<u>Verb</u> + <u>Adverb</u>	<i>cut-and-paste</i> step	step is <i>cut-and-paste</i> ; step to <i>cut and paste</i> text	After the noun, hyphenate the compound when it acts as an adjective. Separate the compound when it acts as a verb. If the compound becomes a noun (as in, for example, “Block all pop-ups.”), see 3.9.1.1.
	<i>read-only</i> disc	disc is <i>read-only</i> ; disc allows you to <i>read only</i>	
	<i>pop-up</i> menus	menus that <i>pop up</i>	
<u>Verb</u> + <u>Noun</u>	<i>drop-down</i> lists	lists that <i>drop down</i>	Exceptions: <i>turnkey</i> system <i>lackluster</i> response After the noun, hyphenate the compound when it acts as an adjective. Separate the compound when it acts as a verb.
	<i>take-home</i> software	software is <i>take-home</i> ; software is to <i>take home</i>	
	<i>take-charge</i> approach	approach is <i>take-charge</i> ; approach is to <i>take charge</i>	

Pattern	Before Noun	After Noun	Exceptions and Notes
Phrasal Adjective	<i>as-built</i> drawing	drawing shows the hardware <i>as-built</i> (how it was built); the report shows the hardware <i>as built</i> (as having been built)	Hyphenate <i>as-built</i> when it means how something was built, except when words come between <i>as</i> and <i>built</i> . When it means whether something was built, use separate words.
	<i>in-house</i> design	design was <i>in-house</i> ; it was designed <i>in house</i>	
	<i>in-service</i> test	test is <i>in-service</i> ; system is tested <i>in service</i>	
	<i>off-the-shelf</i> product	product is <i>off-the-shelf</i> (commercially available)	
	<i>on-the job</i> training	training is <i>on the job</i>	
	<i>on-time</i> delivery	delivery is <i>on time</i> ; delivered <i>on time</i>	
	<i>state-of-the-art</i> technology	technology is (or reflects the) <i>state of the art</i>	
	<i>up-to-date</i> information	information is <i>up to date</i>	

3.9.4 Prefixes and Suffixes

[Prefixes](#) and [suffixes](#) are groups of letters that affix or attach to [base words](#) to change their meaning. A prefix attaches to the beginning of the base word, and a suffix attaches to the end of the base word. Most prefixes and suffixes attach to the base word solidly, without [hyphens](#), but there are exceptions. Provide

Sometimes it's easy to overlook [prefixes](#) and [suffixes](#) when they are also words in their own right, such as the prefixes *counter* and *post* and the suffixes *like*, *proof*, and *worthy*. Dictionaries usually have a separate entry for a word that serves as a prefix or a suffix. Sometimes a dictionary will identify the word with *comb form* (or *c.f.*) for combining form. Another way to help tell whether a word is acting as a prefix or suffix is to listen to yourself say the potential prefix or suffix and the [base word](#). We tend to say base words with prefixes or suffixes with less intermediary pause than we give to separate words.

Observe the following conventions for whether to [hyphenate](#) words with prefixes or suffixes:³

- a. Generally, **don't hyphenate** prefixes or suffixes that attach to base words in the following patterns:
 - (1) prefixes that end with consonants (such as *counter*, *non*, *over*, *post*, and *sub*),

³ William A. Sabin, *The Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting*, 10th ed., (Boston: McGraw-Hill/Irwin, 2005), 240–244.

- (2) prefixes that end with vowels (such as *pre*, *co*, and *semi*) and base words that begin with a different letter (as in *prelaunch*, *copilot*, and *semiannual*),
 - (3) prefixes that end and base words that begin with *e* (as in *reenter* and *preexisting*), **except** for *de-emphasize*, *de-energize*, *de-escalate*, and their derivatives, or
 - (4) suffixes, regardless of their initial letter (such as *hood*, *less*, *like*, *proof*, *wide*, and *worthy*), **unless** they cause a letter to appear three times in a row (for example, instead of *shellless*, write *shell-less*).
- b. Generally, **hyphenate** prefixes or suffixes that attach to base words in the following patterns:
- (1) prefixes that end and base words that also begin with *a* (as in *intra-articular*), with *i* (as in *anti-inflammatory*), or with *o* (as in *co-owner*), **except** for *cooperate*, *coordinate*, and their derivatives,
 - (2) prefixes added to phrases that are already hyphenated, when the prefix modifies the already-hyphenated phrase (as in *non-load-bearing wall*),
 - (3) prefixes and suffixes added to proper nouns (for example, *non-American*), or
 - (4) suffixes that cause a letter to appear three times in a row (for example, instead of *shellless*, write *shell-less*).

3.9.5 Suspending Hyphens

When multiple [hyphenated adjectives](#) (see 3.9.3) or [prefixed](#) words (see 3.9.4) have a common [base word](#) and they either are arranged as [items in a series](#) (see 3.10) or show a range, the base word is sometimes shown for only the last item. In such a case, a [suspending hyphen](#) follows each item that does not show the base word,⁴ as in the following examples:

- “short- and long-term objectives,”
- “single-, double-, and triple-insulated panes,”
- “a 5- to 10-step procedure,” and
- “pre- and posttest briefings.”

Use suspending hyphens **only** when it is clear that the base word applies to each item. Otherwise, repeat the base word with each item.

⁴ William A. Sabin, *The Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting*, 10th ed., (Boston: McGraw-Hill/Irwin, 2005), 240.

3.10 Items in a Series

Two or more grammatical constructions that function in parallel within a [sentence](#)—whether [subjects](#), [verbs](#), [objects](#), [phrases](#), [clauses](#), or [modifiers](#)—are called *items in a series*. The previous sentence contains simple items in a series: “subjects, verbs, objects, phrases, clauses, or modifiers.” The items in this series are easy to recognize because all of them are unmodified [nouns](#). But when the items contain punctuation marks, have different modifiers, or include [appositives](#), they can be harder for your readers to separate and understand quickly. The following subsections discuss the varying characteristics of items in a series and how you can present the items more accurately and clearly.

NOTE

Never use the [ampersand](#) (&) in place of *and* between words in running text. Use the ampersand **only** in an abbreviation.

3.10.1 Simple Items

The next-to-the-last item in a simple [series](#) is customarily separated from the last item by a [conjunction](#) such as *and*, *or*, or *nor*. When there are only two simple items, the conjunction alone adequately separates the items. When there are three or more simple items, [commas](#) (often called [serial commas](#) or [Oxford commas](#) in this construction), in addition to the conjunction, are necessary to adequately separate all the items—even the last two. Though the inclusion of a comma between the last two items is not always necessary in informal writing, it is important in technical and business writing. (For information about how the presence of [enumerators](#) affects punctuation of items in a series, see 3.11.2.)

The following examples demonstrate how [commas](#) adequately separate relatively simple items in a running paragraph without [enumerators](#):

More clear: The color designations are red, white, and blue. (There are three distinct designations. Notice the final [comma](#) between the next-to-the-last item [*white*] and the [conjunction](#) [*and*].)

Less clear: The color designations are red, white and blue. (Are there three designations or two—one using red and one using both white and blue?)

3.10.2 Complex Items

As is true for items in a simple series (see 3.10.1), the next-to-the-last item in a complex series is customarily separated from the last item by a [conjunction](#) such as *and*, *or*, or *nor*. When any of the items in a series already contain [commas](#) or when more distinction is needed to separate the items and avoid confusion, [semicolons](#) are placed between all the items—even the last two. (For information about how the presence of [enumerators](#) affects punctuation of items in a series, see 3.11.2.)

The following examples demonstrate how [semicolons](#) are necessary in order to adequately separate complex items (especially, when any of the items contain [commas](#)) in a running [paragraph](#) without [enumerators](#). (Also see 3.11.2.1, [Note](#).)

More clear: The cable jackets are patterned in red, white, and blue; yellow and green; or orange and black. (There are three distinct patterns.)

Less clear: The cable jackets are patterned in red, white, and blue, yellow and green, or orange and black. (How many patterns are there? Even though the [conjunctions](#) are placed correctly, most readers will not feel confident in their interpretation.)

3.10.3 Inconsistently Modified Items

It is common for only some items in a simple [series](#) (3.10.1) or in a complex series (3.10.2) to be [modified](#)—whether by clauses, prepositional phrases, or single words—and equally common for items in a single series to be modified in different ways. The following situations illustrate how these variables require your attention in order to help your readers tell quickly which modifiers apply to which items:

- a. **Single [adjectives](#) that precede [nouns](#)** can easily produce uncertainty when they precede the first item. The series in the first sentence of the preceding paragraph (“whether by clauses, prepositional phrases, or single words”) was originally written as “whether by single words, prepositional phrases, or clauses.” The idea was to list the items in the order of increasing grammatical complexity. But would that order have made it clear to all readers that *single* was meant to [modify](#) only *words* and not *prepositional phrases* or *clauses*? Probably not. Because clarity was not certain and because the order of increasing grammatical complexity was not important, the modified item was moved to the end. When it is important to preserve a particular order (such as a logical or dependent sequence), do so, and emphasize each item by repeating the word or words that can signal the parallel structure. In the example, the [preposition](#) *by* is the word that can signal the parallel structure. Applying this technique to the original series would produce “whether by single words, by prepositional phrases, or by clauses.” Note also that using enumerators (see 3.11.2) is always an effective way of presenting modified items clearly.
- b. **[Clauses](#), [prepositional phrases](#), and single [adverbs](#), which usually follow the words they [modify](#)**, can easily produce uncertainty when they follow the last item. Consider the following series, whose last item is modified by a prepositional phrase: “The component was built, tested, and validated **in the field**.” It’s clear that the order of the items is logical and should be preserved. But were all three actions completed in the field? Let’s assume that the following scenarios are accurate and that the details are important to express:
 - (1) “The component was built **in the shop**, tested **in the laboratory**, and validated **in the field**.” This treatment applies a [prepositional phrase](#) to each item and keeps all three items parallel.

- (2) “The component **was built and tested in the shop and was validated in the field.**” This treatment combines the items (*built* and *tested*) that share a [prepositional phrase](#). Repeating the helping [verb](#) *was* emphasizes the [parallel structure](#) of the (now) two items: *was built and tested* as the first item and *was validated* as the second item. In this treatment, no [commas](#) or [semicolons](#) are necessary.
- c. **A combination of differently [modified](#) items** can also produce uncertainty, as in the following example: “The design team reviewed 48 requirements, completed drawings, and discrepancies that needed immediate attention.” Were there 48 requirements, or did the number of requirements, completed drawings, and discrepancies total 48? Did everything need immediate attention or just the discrepancies? Let’s assume that the following scenarios are accurate:
 - (1) “The design team reviewed 48 requirements, **the** discrepancies that needed immediate attention, and **the** completed drawings.” This treatment uses the definite [article](#) (*the*) to distinguish the completed drawings and the discrepancies from the 48 requirements and to prevent readers from misinterpreting *completed* as a [verb](#). Changing the order makes it clear that only the discrepancies needed immediate attention.
 - (2) “The design team reviewed **a combined total of** 48 requirements, ~~completed~~ drawings, and discrepancies, **all of which** needed immediate attention.” The addition of “a combined total of” emphasizes the total effort, and the deletion of *completed* prevents readers from misinterpreting *completed* as a [verb](#). The addition of “all of which” and the [comma](#) creates a [clause](#) that more clearly [modifies](#) all three items.

3.10.4 Appositives in Items

We often specifically identify or further explain a term (whether a word or a phrase) immediately after its appearance with an [appositive](#), as in, for example, “Changes shall be approved by the Review Board chair, the division chief, before they are implemented.” In the example, *division chief* is the appositive of (identifies) the *Review Board chair*, and because this appositive (*division chief*) isn’t essential for the meaning of *Review Board chair* to be clear, it is set off in [commas](#). The meaning is usually clear when a term and its appositive stand alone, as they do in the example, but when such a term and its appositive are part of a [series of items](#), it can be hard to tell an appositive from a true item. In such a case, always enclose the appositive in [parentheses](#), and keep it in the same, separately punctuated item with its term, as in, for example, “Changes shall be approved by the Review Board chair (the division chief), the project manager, and the lead engineer before they are implemented.” See 3.11.2.2 and 3.11.2.3 for guidance on punctuating items in a bulleted or enumerated list.

3.11 Parallel Construction

[Parallel construction](#) is the grammatical expression and visual arrangement of related thoughts (whether in the form of [sentences](#), [clauses](#), [phrases](#), or individual words) in a consistent way. Consistent expression and arrangement make it easier for your readers to recognize how your thoughts are related and to keep the relationship in mind as they read. Think of the related thoughts as [items in a series](#) (see 3.10)—a series that may be arranged as part of a running paragraph (see 3.11.2.1), as a bulleted or enumerated list (see 3.11.2.2 and 3.11.2.3), as the titles of sections or subsections at a given outline level (see 5.8), or to some extent, as data in a table (see 3.18.z). Notice the parallel construction of grammatical expressions and the visual arrangement of related thoughts in the following subsections.

3.11.1 Parallel Grammatical Expression

Observe the following conventions to construct parallel grammatical expressions:

- a. Use the same grammatical unit for all the items in the series:
 - (1) all [complete sentences](#) or all [independent clauses](#) or
 - (2) all [phrases](#), individual words, or [subordinate clauses](#).
- b. Use the same structure for all the sentences or independent clauses:
 - (1) all statements,
 - (2) all commands, or
 - (3) all questions.
- c. Use the same overall [part of speech](#) for all the [phrases](#), individual words, or [subordinate clauses](#):
 - (1) all [nouns](#),
 - (2) all [verbs](#),
 - (3) all [adjectives](#), or
 - (4) all [adverbs](#).

3.11.2 Parallel Visual Arrangement

The most effective visual arrangement for items in a particular series depends on (1) how numerous, long, or complex the items are, (2) whether any of the items introduce subordinate items, (3) whether any of the items will be cited elsewhere, and (4) how your readers can most easily see, understand, and use the items. The following subsections describe the arrangements and explain their conventions.

3.11.2.1 Items in Running Paragraphs

When the [items in a series](#) (1) are few, (2) are in a single sentence, (3) have no subordinate items, and (4) will not be cited elsewhere, they are best arranged in the running [paragraph](#) where they occur. The conventions for punctuation explained in 3.10 apply to such items, but if you want to further distinguish the items, you can enumerate them as is illustrated in the previous sentence. Enumerate such items with Arabic numbers enclosed in [parentheses](#). Keep the [enumerator](#) on the same line with its item. Place a [nonbreaking space](#) between the enumerator's closing parenthesis and the word that follows it. See [keystroke combinations](#) for how to type a nonbreaking space.

If a [phrase](#) or [clause](#) applies to all the items, place the phrase or clause before the first item. Don't add a phrase or clause after the last enumerated item unless the phrase or clause applies to only the last item.

If a bulleted or enumerated [paragraph](#) contains items that would also benefit from being bulleted or enumerated, extend the list and apply the next subordinate bullet or enumerator. See 3.11.2.2 and 3.11.2.3. Don't enumerate items within a running paragraph that is already an item in a bulleted or enumerated list.

NOTE

[Enumerators](#) (including bullets) thoroughly distinguish items in a series, whether those items are enumerated in a paragraph or in a vertical list (see 3.11.2.2 and 3.11.2.3). Enumerators clearly show the number of items and where each item begins and ends. When enumerators are used, [commas](#) sufficiently separate the items. [Semicolons](#) are unnecessary.

3.11.2.2 Outline Structure of Bulleted or Enumerated Lists

a. Bulleted Lists

A bulleted list uses a pattern of simple symbols—bullets—to identify related items and illustrate their relationship. It is effective for simple items that are not cited elsewhere in the document and that are not likely to need ordered identifiers (enumerators—see 3.11.2.2.b) for reference. Although three bulleted levels are provided, if multiple levels are necessary, strongly consider using an enumerated list (see 3.11.2.2.b). Observe the following conventions, and see the example in Figure 1 for the formatting and outline structure of bulleted lists:

- (1) Always have at least two items at each level.
- (2) Keep the first bulleted item at each level on the same page with the text (paragraph, heading, or higher-level bulleted item) that introduced it.

- (3) Apply a different style of bullet to each outline level. The default bullet styles applied by the word processing program (most likely a round and filled bullet [•] for the first level, a round and open bullet [○] for the second level, and a square and filled bullet [▪] for the third level) are suitable.
- (4) Indent each level progressively from the left margin (see Figure 1), and space evenly between items.

- **First-level bulleted item:** Round, filled bullet left-aligned 0.37" from the left margin; text left-aligned 0.62" from the left margin.

An item at any level can have multiple paragraphs, but only the first paragraph is bulleted.

- **Second-level bulleted item:** Round, open bullet left-aligned 0.62" from the left margin; text left-aligned 1.00" from the left margin.
 - **Third-level bulleted item:** Square, filled bullet left-aligned 1.00" from the left margin; text left-aligned 1.37" from the left margin.

Figure 1. Outline Structure of Bulleted List

b. Enumerated Lists

An enumerated list uses an alternating pattern of letters and numbers—[enumerators](#)—to identify related items and illustrate their relationship. It is effective for simple or complex items and allows you to direct your readers to specific items, by enumerator, from anywhere in the document. Observe the following conventions, and see the example in Figure 2 for the formatting and outline structure of enumerated lists:

- (1) Always have at least two items at each level.
- (2) Keep the first enumerated item at each level on the same page with the text (paragraph, heading, or higher-level enumerated item) that introduced it.
- (3) Apply the pattern of enumeration shown in Figure 2.
- (4) Indent each level progressively from the left margin (see Figure 2), and space evenly between the items.
- (5) Don't place multiple, separately enumerated lists within a discretely numbered section. As an example, see 5.10, where a short bulleted list prevents the confusion of having two items identified as 5.10.a and two items identified as 5.10.b.

- a. **First-level enumerated item:** Lowercase letter with period right-aligned 0.50" from the left margin; text left-aligned 0.62" from the left margin.
- An item at any level can have multiple paragraphs, but only the first paragraph is enumerated.
- If the first level exceeds 26 items, enumerate the extra items as follows: aa., bb., etc.
- (1) **Second-level enumerated item:** Arabic number enclosed in parentheses left-aligned 0.62" from the left margin; text left-aligned 1.00" from the left margin.
- (a) **Third-level enumerated item:** Lowercase letter enclosed in parentheses left-aligned 1.00" from the left margin; text aligned 1.37" from the left margin.
- (i) **Fourth-level enumerated item:** Lowercase Roman numeral enclosed in parentheses right-aligned 1.62" from left margin; text left-aligned 1.87" from left margin.

Figure 2. Outline Structure of Enumerated List**3.11.2.3 Grammatical Structure of Bulleted or Enumerated Lists**

Bulleted and enumerated lists have two main components: the introductory text and the corresponding items. For items that can be introduced and listed without intervening titles or headings, the grammatical relationship between the introductory text and the corresponding items determines how the items are cased (see 3.12) and how the introductory text and items are punctuated. Therefore, an effective way to determine this relationship (and consequently the formatting) is to write the content as a running paragraph and then arrange the material vertically, without changing the capitalization or punctuation.

Table 2 shows how three combinations of introductory text and items are formatted in bulleted and enumerated lists. A fourth combination is explained immediately after the table.

Table 2. Three Combinations of Introductory Text and Corresponding List Items

Material in Running Paragraph	Material in Vertical List
Intro = Sentence. Items = Sentences. The first list is introduced by a complete sentence, ending with a colon: In this case, the items are complete sentences. That means that every item at this level consists of one or more complete sentences.	The first list is introduced by a complete sentence, ending with a colon: a. In this case, the items are complete sentences. b. That means that every item at this level consists of one or more complete sentences.
Intro = Sentence. Items = Words, phrases, or subordinate clauses. The second list is introduced by a complete sentence, whose essence or examples are stated as words, phrases, or clauses: ones that are not complete thoughts, ones that are cased as phrases, and ones that are punctuated as items in a series.	The second list is introduced by a complete sentence, whose essence or examples are stated as words, phrases, or clauses: <ul style="list-style-type: none"> ones that are not complete thoughts, ones that are cased and punctuated as phrases, and ones that are punctuated as items in a series.
Intro starts a sentence. Items complete the sentence. The third list needs the introductory text to begin a sentence and the items to complete the sentence.	The third list needs <ul style="list-style-type: none"> the introductory text to begin a sentence and the items to complete the sentence. Note: Here, the introductory text is grammatically incomplete within the logical context. That's why it has no end punctuation. It depends on the items in the list to complete the grammatical proposition.

The fourth combination of introductory text and list items cannot be arranged in a single initial paragraph. The introductory text is a complete sentence, and the list items are titles for other paragraphs, as is illustrated by this sentence and the following:

a. **Logical Order and Inclusion**

- (1) Order the items so your readers can quickly understand the logic. Where necessary, explain the logic of the order in the introductory text.
 - (a) Alphabetize simple items that are equally ranked and that don't involve a sequence.
 - (b) In general, order explanations from broad to specific points.
 - (c) If the items are instructions, present them in the order the users will perform the operation. (See 3.21.2. Although it specifically addresses instructions for computer interfaces, its conventions can also apply to other lists of instructions.)
- (2) Always have at least two items at a level.

b. **Parallel Grammatical Expression and Visual Arrangement**

- (1) **Parallel grammatical expression:** Use the same type of sentences at a given level (that is, use all statements, all commands, or all questions), especially for the opening sentence of each item.
- (2) **Parallel visual arrangement:** If you use titles as items at a given level, use titles for all items at that level. You could also use inline headings, as shown in this subordinate item, as long as you use them for all items at that level in that list.

3.12 Casing

Casing is the application of initial uppercase (capital) or lowercase (small) letters to nouns based on their type (proper or common) and to other parts of speech based on purpose and context.

For the casing of abbreviations, see 3.5.1. For the casing of proprietary names, see 3.13. For the casing of e-mail addresses, see 3.14. For the casing of website addresses, see 3.15. For casing in the list of abbreviations, see 5.7. For the casing of some specific terms, see Appendix A.

3.12.1 Sentence Case

Sentence case applies to running text (to sentences or parts of sentences in paragraphs). Observe the following conventions for capitalization in running text:

- a. Capitalize the first word of the sentence.
- b. Capitalize proper nouns—the names of people and organizations, proprietary names (see 3.13), and other nouns that represent specific systems, subsystems, or structures (such as *Launch Complex 39A* and *External Tank*). **Do not** treat occupational titles as proper nouns, but see 3.12.1.c.

- c. Capitalize an occupational title **only** when it immediately precedes a person's name, without an intervening [comma](#) (as in, for example, *Chief Jones*, but *John Jones, chief of operations*, or *chief of operations, John Jones*).
- d. Capitalize the following words as shown below:
 - (1) *Agency*, when it represents NASA,
 - (2) *Center*, when it represents a NASA Center,
 - (3) *Federal* or *Government*, when it represents the U.S. Federal Government,
 - (4) *Orbiter*, when it represents a spacecraft of the Space Transportation System,
 - (5) *Orion*, when it represents a spacecraft of the Space Launch System,
 - (6) *Shuttle* or *Space Shuttle*, when it represents the Space Transportation System, and
 - (7) *Space Launch System*.
- e. Don't capitalize a [common noun](#), such as *ground support equipment*, unless it starts a sentence.
- f. Don't capitalize a term simply because its [abbreviation](#) is capitalized.

3.12.2 Title Case

Title case applies to the titles of documents, sections, subsections, figures, and tables. Observe the following conventions for capitalization in titles, and see Figure 3 for examples of correct title casing:

- a. If any part of a hyphenated word is capitalized, capitalize all the parts of the word.
- b. Always capitalize the following categories of words:

<ul style="list-style-type: none"> (1) first and last words, (2) nouns, (3) verbs (excluding the particle <i>to</i> when it is used to form an infinitive), (4) pronouns, 	<ul style="list-style-type: none"> (5) adjectives, (6) adverbs, (7) interjections, and (8) conjunctions or prepositions with five or more letters.
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NOTE

An exception to 3.12.2.b(8) occurs in a title that contains multiple logically parallel conjunctions or prepositions, of which at least one has five or more letters. In such a title, capitalize all the logically parallel conjunctions or prepositions. See Figure 3.

- c. Capitalize an [article](#) (*a*, *an*, or *the*) **only** when it is the first word, when it is the last word, or when it represents itself as a word. (When a word represents itself as a word, it functions as a [noun](#).)

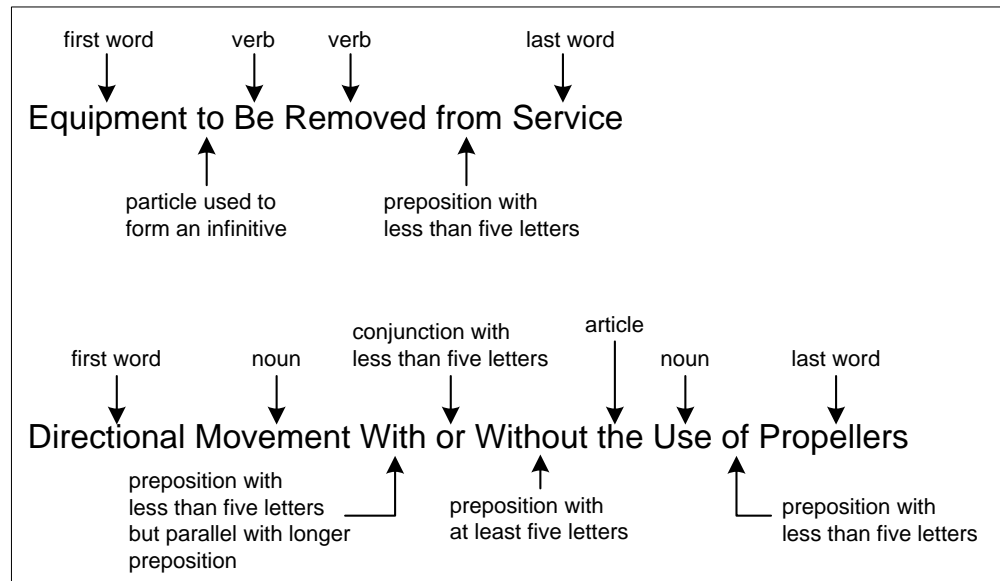


Figure 3. Examples of Correct Title Casing

3.13 Proprietary Names

A trade name, copyrighted name, or other brand name identifies a proprietary product. Observe the following conventions in writing about proprietary products:

- Mention a proprietary product **only** to report findings related to the specific product or to require the product. Otherwise, use the name of the generic device, material, or commodity.
- When a proprietary product is specifically required or is a principal in the work reported, capitalize the name of the proprietary product.
- Don't show the trademark (™), copyright (©), or registered (®) symbol after the name of a proprietary product. It is unnecessary except in advertisements for a competing product.

3.14 E-Mail Addresses

Observe the following conventions in showing e-mail addresses:

- Try to use consistent [casing](#) for e-mail addresses, especially for those reflecting names. Although e-mail addresses are not case-sensitive and may be written in lowercase, it may be helpful to your readers if you apply normal capitalization to those e-mail addresses that contain people's names ([proper nouns](#)).
- To prevent confusion of an e-mail address with surrounding punctuation, apply distinctive formatting or a [hyperlink](#) (usually a combination of color for on-screen use and underlining for paper use), as in the following (nonlinked) example: "Direct inquiries to [John.Doe@nasa.gov](#)."

- c. Always try to fit an e-mail address on a single line. If you must break an e-mail address across two lines, break before the *at* symbol (@) or before a dot. **Never** insert a [hyphen](#) into an e-mail address to indicate a line break.
- d. Make sure that e-mail addresses are accurate at document release.
- e. Make sure that [hyperlinked](#) e-mail addresses are functional in the files for release (word processing files and static files [such as Portable Document Format (PDF) files]).

3.15 Website Addresses

Observe the following conventions in showing website addresses:

- a. Show all letters in website addresses as lowercase.
- b. To prevent confusion of a website address with surrounding punctuation, apply distinctive formatting or a [hyperlink](#) (usually a combination of color for on-screen use and underlining for paper use), as in the following (nonlinked) example: “Visit us at <http://ourhomepage.com>.”
- c. Always try to keep a website address on a single line. If you must break a website address across two lines, break after the double [slash](#) but before a single slash, dot, underscore, [hyphen](#), or any other punctuation mark. **Never** insert a hyphen into a website address to indicate a line break.
- d. Make sure that website addresses are accurate at document release.
- e. Make sure that [hyperlinked](#) website addresses are functional in the files for the document (word processing files and static files [such as Portable Document Format (PDF) files]).

3.16 Numbers

3.16.1 Countable Quantities

A countable quantity represents a **number** of things that we can count individually, such as parts, desks, people, and computers. It consists of a count and the name of the thing being counted. Though most counts are [integers](#) only, some can be partial, for example, those that show how many times something happens (such as “four cycles” or “one-half turn”) or degrees of comparison (both positive [for example, “three times the size of”] and negative [for example, “half the size of”]). See 3.16.2 for how to treat measured quantities.

Observe the following conventions in showing countable quantities:

- a. Make the name of the thing being counted [singular](#) or [plural](#) as follows:
 - (1) When the count is one or when the count is less than one but greater than zero, make the name [singular](#), as in, for example, “One anomaly was expected,” and “One-half turn is sufficient.”

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- (2) When the count is zero or greater than one (whether an [integer](#) or a mixed number), make the name [plural](#), as in, for example, “One and a half turns are necessary to close the valve completely,” and “One anomaly was expected, three causes were suggested, but zero nonconformances were found.” Notice that it is equally correct and often more natural-sounding to replace *zero* with *no*, as in “...but no nonconformances were found.” Also make such names plural when they are abbreviated (see 3.5.4).
- (3) When a count (of any number) and the name of the thing being counted combine and act as an [adjective](#) to [modify](#) a [noun](#), make the name [singular](#) and [hyphenate](#) the count (whether written in numbers or words) to the name, as in, for example “a three-person job” and “a 10-step process.”
- b. When a countable quantity is the [subject](#) of a [sentence](#) or [clause](#), [conjugate](#) the associated [verb](#) to agree in number with the name determined in 3.16.1.a. The example in 3.16.1.a(2) illustrates correct conjugation.
- c. Write counts of zero through nine in words, but also see 3.16.1.e.
- d. Write counts of 10 or greater in numbers, **unless** they start a sentence or title.
- e. If a sentence contains multiple countable quantities in a category and if any of those counts are 10 or greater, write all the counts in numbers, as in the following example:

“Of the four new offices, one has 6 employees, one has 12 employees, and the other two have 10 each.”

The example contains two categories of countable quantities: offices and employees. All the office counts are less than 10, so all are written as words. At least one of the employee counts is 10 or greater, so all are written as numbers.
- f. Avoid starting sentences or titles with counts of 10 or greater, especially sentences or titles that also contain counts of less than 10 in the same category.
- g. In running text, use a [comma](#) to separate thousands from hundreds in [integers](#) of five digits or more (not counting any numbers to the right of a decimal point). That is, use a comma in 10,000 but **not** in 9999. See 3.18.w for guidance on showing numbers in tables.
- h. Don’t repeat a count that is written in words as a number in [parentheses](#). That is, write, for example, “Run the test four times,” **not** “Run the test four (4) times.”
- i. Keep a count written as a number on the same line with the name of the thing being counted. If the countable quantity is a modifier, join the count and the name with a [nonbreaking hyphen](#) (as in, for example, “a 10-step process”). In all other situations, separate the count and the name with a [nonbreaking space](#). See [keystroke combinations](#) for how to type nonbreaking hyphens and nonbreaking spaces.

3.16.2 Measured Quantities

A measured quantity represents an **amount** of something that we consider as a whole (such as time, temperature, area, or volume), even though we might be able to count the parts that make up the whole. It consists of a value (an [integer](#), a portion thereof, or a mixed number, whether shown as a decimal or as a fraction) and a unit of measure. See 3.16.1 for how to treat countable quantities. See 3.16.6 for how to treat short mathematical expressions in running text. See 3.16.7 for how to treat display equations.

Observe the following broad conventions for showing measured quantities:

- a. Make the unit of measure [singular](#) or [plural](#) as follows:
 - (1) When a value is less than 1 but greater than 0 and the unit is written fully (not abbreviated), make the unit [singular](#), as in the following (but also see 3.16.2.j):
 “Cut each strip 0.5 inch wide.”
 - (2) When a value is 0 or greater than 1 and the unit is written fully (not abbreviated), make the unit [plural](#) as in the following:
 “Reduce the temperature to 0 degrees Fahrenheit.”
 “Cut each strip 3.5 inches wide.”
 - (3) Write all abbreviated units as [singular](#).
 - (4) When a value (of any amount) and the unit combine and act as an [adjective](#) to [modify](#) a [noun](#), make the unit [singular](#). When the unit is written fully (not abbreviated), join the value and the unit with a [nonbreaking hyphen](#). When the unit is [abbreviated](#), separate the value and the unit with a [nonbreaking space](#). See the following examples, but also note 3.16.2.l, m, and n:
 “The 4-day mission was a success.”
 “The 8 ft board is not suitable.”
 See [keystroke combinations](#) for how to type nonbreaking hyphens and nonbreaking spaces.
- b. In general, [conjugate](#) the associated [verb](#) as [singular](#), as in the following examples:
 “Consequently, 2 weeks is being added to the schedule.”
 “We thought that 10 feet was a significant increase in height.”
- c. Write values in numbers, unless they start a sentence or title.
- d. Try to avoid starting sentences or titles with values.
- e. When the value is written in words, **don’t** [abbreviate](#) the unit of measure.
- f. In running text, use a [comma](#) to separate thousands from hundreds in [integers](#) of five digits or more (not counting any numbers to the right of a decimal point). That is, use a comma in 10,000 but **not** in 9999. See 3.18.w for guidance on showing numbers in tables.

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- g. When the value and unit stand alone and function as a noun, separate the value and unit (whether written fully or abbreviated) with a [nonbreaking space](#). See [keystroke combinations](#) for how to type a nonbreaking space. **Don't** place a unit [abbreviation](#) directly against a value, **except** as indicated in 3.16.2.m and n.
- h. Repeat the unit (whether abbreviated or written fully) with values in a series and values in a range, whether the measured value stands alone as a [noun](#) or [modifies](#) a noun, as in the following examples:
 - “Durations of 3 s, 5 s, and 10 s were recorded,” **not** “Durations of 3, 5, and 10 s were recorded.”
 - “Lengths varied from 3.8 ft to 4.2 ft,” **not** “Lengths varied from 3.8 to 4.2 ft.”
 - “The panels are mounted at 3 ft and 6 ft intervals, respectively,” **not** “The panels are mounted at 3 and 6 ft intervals, respectively.”
- i. Don't repeat a value that is written in words as a number in [parentheses](#). That is, write, for example, “Two weeks is being added to the schedule,” **not** “Two (2) weeks is being added to the schedule.”
- j. When a value less than 1 is written as a decimal, use a 0 as the [integer](#) before the decimal (as in “0.1”), **except** for those values that can never exceed 1: coefficient of correlation, probability, and caliber.
- k. Write factors and ratios as numbers, as in the following examples:
 - “increased by a factor of 3,”
 - “a 3:1 ratio,”
 - “a ratio of 3:1,”
 - “a 3-to-1 ratio,” or
 - “a ratio of 3 to 1.”
- l. Separate a temperature value from its symbol and scale with a [nonbreaking space](#), as in the following examples:
 - “32 degrees Fahrenheit or 32 °F,”
 - “20 degrees Celsius or 20 °C,” **but**
 - “100 kelvin or 100 K.”

NOTE

A kelvin is a unit, **not** a scale, and therefore does not exist in degrees. When written fully, the unit is lowercased. Its abbreviation is “K.” **Do not** write “degrees Kelvin,” “degrees kelvin,” or “°K.”

See [keystroke combinations](#) for how to type a nonbreaking space and the degree symbol.

- m. Place the symbols for plane angle directly after and against the value: degree (°), minute (′), and second (″). The symbols for minute and second of plane angle are the prime and double prime, respectively. **Don't** use an [apostrophe](#) or [quotation mark](#) (curly or straight) for minute or second of plane angle. See [keystroke combinations](#) for how to type these symbols.
- n. Place the symbols for foot (′) and inch (″) directly after and against the value. The symbols for foot and inch are the prime and double prime, respectively. **Don't** use an [apostrophe](#) or [quotation mark](#) (curly or straight) for foot or inch. See [keystroke combinations](#) for how to type these symbols.
- o. Place the symbol for magnification (×)—the multiplication sign, not the letter *x*—directly after and against the number that indicates the power of magnification, as in, for example, “10×.”
- p. Don't allow any part of a value ([integer](#) or fraction) and its unit (whether abbreviated or written fully) to break across two lines. Keep the entire value and unit together with a [nonbreaking space](#) (or [nonbreaking hyphen](#) when appropriate, as explained in 3.16.2.a(4)). See [keystroke combinations](#) for how to type nonbreaking hyphens and nonbreaking spaces.
- q. When dual measurement scales (metric and English) are shown, first show the metric measurement, and then show the English equivalent in [parentheses](#) (or in [brackets](#) [] if the metric measurement is already parenthesized). See the following examples:

“Keep the top margin at 25.4 mm (1.0 in.).”

“Keep all margins consistent (25.4 mm [1.0 in.]).”

Continue to observe the conventions for calling out abbreviations of units of measure (see 3.5.2, 3.5.4, and 3.5.7). When dual measurements are used, show them consistently for all applicable measurements in the document. Also see 5.1.a(3)(a) regarding the use of measurement indicators on the cover.
- r. Try to write values consistently throughout the document, using either decimals or fractions. But **don't** change traditional nomenclature or actual data just to achieve overall consistency. For example, if a document contains measurements taken as decimal values but also identifies tools or materials traditionally sized with fractions, reflect each instance in the expected number style.

3.16.3 Fractions

Observe the following conventions in showing fractions:

- a. To indicate an inexact portion of a countable quantity (see 3.16.1) less than one, write the fraction in words, and place a [nonbreaking hyphen](#) between the numerator and the denominator (for example, “processing time was reduced by two-fifths” and “accuracy increased by one-half”). See [keystroke combinations](#) for how to type a nonbreaking hyphen. Notice that with inexact portions, you can almost always reduce *one-half* to just *half*. Also notice that round percentages may be a better choice for identifying widely varying portions of a single thing.

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- b. In a purely mathematical context or one that is highly technical or instructive (such as steps in a procedure), write the fraction in numbers, as in, for example, “Turn the dial $\frac{3}{4}$ revolution clockwise.” But see 3.16.3.c.
- c. In an expression constructed as “<a fraction> *of* <something>,” always write the fraction in words (for example, “one-half of the employees,” or “three-quarters of the affected subsystems”). Notice that with inexact portions, you can almost always reduce *one-half* to just *half*. Also notice that round percentages may be a better choice for identifying widely varying portions of a single thing.
- d. Use a consistent style for fractions written in numbers. **Don’t** mix fractions set as individual, full-size characters (such as 1/2) with fractions set as single characters (such as $\frac{1}{2}$). See [keystroke combinations](#) for how to type some of the more common fractions as single characters.
- e. Write mixed numbers as follows:
 - (1) For a fraction set as individual, full-size characters, separate the [integer](#) and the numerator with a [nonbreaking space](#) (for example, 5 $\frac{1}{2}$). See [keystroke combinations](#) for how to type a nonbreaking space.
 - (2) For a fraction set as a single character, write the mixed number without a space (for example, 5 $\frac{1}{2}$). See [keystroke combinations](#) for how to type some of the more common fractions as single characters.

3.16.4 Percentages

Observe the following conventions in showing percentages:

- a. Write percentage values as numbers, followed immediately by the percent symbol (%), **unless** the percentage starts a sentence or title.
- b. Try to avoid starting sentences or titles with percentages.
- c. When the value is written in words, replace the percent symbol with the word *percent*, as in, for example, “Eighty percent of the budget is for labor,” **not** “Eighty % of the budget is for labor.”
- d. **Don’t** repeat a percentage that is written in words as a number and symbol in [parentheses](#). That is, write, for example, “Eighty percent of the budget is for labor,” **not** “Eighty percent (80%) of the budget is for labor.”
- e. **Don’t** use the percent symbol or the word *percent* without a value, **except** as a label in a table column or a graph axis.
- f. Repeat the percent symbol or the word *percent* with values in a series and values in a range. That is, write, for example, “Responses of 25%, 38%, and 48% were recorded,” and “Ten percent to twenty percent of the samples show promise.”
- g. **Don’t** call out the percent symbol as an abbreviation in text or include the symbol in the list of abbreviations.

3.16.5 Money

Observe the following conventions in showing amounts of money:

- a. Write amounts of money as numbers, preceded immediately by the dollar symbol (\$), unless the amount starts a sentence or title.
- b. Try to avoid starting sentences or titles with amounts of money.
- c. When the amount of money is written in words, omit the dollar symbol and spell out *dollars*, as in, for example, “One thousand dollars is budgeted for travel.”
- d. **Don’t** repeat an amount of money that is written in words as a symbol and number in [parentheses](#). That is, write, for example, “One thousand dollars is budgeted for travel,” **not** “One thousand dollars (\$1000) is budgeted for travel.”
- e. **Don’t** use the dollar symbol without a value, **except** as a label in a table column or a graph axis.
- f. For a large, round sum, use the abbreviation for thousand (K), million (M), or billion (B) where it will help your readers comprehend the amount quickly.
 - (1) Avoid using these abbreviations with values that exceed two decimal places.
 - (2) Set the abbreviation directly after the value, as in, for example, “\$1.6M.”
 - (3) Always repeat the abbreviations for these multiples, when applicable, for each [item in a series](#) and for values on both sides of a range. In a series, write, for example, “The cost decreased \$8K, \$6K, and \$2K in each of the last three quarters, respectively,” **not** “The cost decreased \$8, \$6, and \$2K in each of the last three quarters, respectively.” In a range, write, for example, “The budget increased from \$100K to \$150K,” **not** “The budget increased from \$100 to \$150K.”
 - (4) **Don’t** use abbreviations for these multiples without a value, except as a label in a table column or graph axis.
 - (5) **Don’t** call out these abbreviations in text or tables, but include them in the list of abbreviations (see 5.7).
- g. **Don’t** call out the dollar symbol in text or include the symbol in the list of abbreviations.

3.16.6 Mathematical or Chemical Expressions in Running Text

Observe the following conventions in showing mathematical or chemical expressions in running text, and see [keystroke combinations](#) for how to type [nonbreaking spaces](#) and some mathematical symbols that don’t appear on the standard keyboard (such as the multiplication sign [×], the minus sign [−], the plus/minus sign [±], and the middle dot [·]):

- a. Place short mathematical or chemical expressions (ones that can be kept on a single line) in the running text, as long as they will not be cited. See 3.16.7 for displaying longer mathematical or chemical expression and those that will be cited.

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- b. When you repeat any part of a display equation in running text, replicate the character formatting from the display equation.
- c. **Don't** allow mathematical or chemical expressions to interrupt the grammatical structure of the sentences in which they occur. Therefore, apply normal punctuation conventions to mathematical or chemical expressions in running text.
- d. To show area dimensions in running text, write, for example, "a 5 mm by 10 mm area." **Don't** use the letter *x* in place of *by*. In a table, where space may be tight, *by* may be replaced with the multiplication sign (\times).
- e. To express a purely mathematical value in running text, write, for example, " 4.2×10^6 " or " $4.2 \cdot 10^6$." Place a single [nonbreaking space](#) between the operation sign and any numbers. Don't use the letter *x* in place of the multiplication sign.
- f. To indicate positive or negative numbers, place the plus sign (+) or the minus sign (−) directly before the number.

NOTE

A hyphen is **not** a minus sign. See [keystroke combinations](#) for how to type a true minus sign.

- g. Use "±" instead of "+/−" when it applies to a single value, and place the symbol directly before the number. See [keystroke combinations](#) for how to type a plus/minus sign.
- h. Show all variables in [italics](#).
- i. Show all numerals, chemical symbols, trigonometric terms, and any other intervening text in [roman](#) (nonitalic) type.
- j. Show vectors in [bold](#).
- k. Don't call out or otherwise define the symbols for mathematical operators in text or include them in the list of abbreviations.

3.16.7 Display Equations

A display equation is appropriate for a mathematical or chemical expression that is longer than just a few characters, has more than one vertical level, or will be cited elsewhere in the text. Each display equation occupies its own [paragraph](#) and is identified by an Arabic number, from a single series that continues through the [body](#) of the document and the [appendices](#). The equation number is enclosed in [parentheses](#) at the right margin and is aligned at the vertical center of the display equation. Eq. (1) is an example of a properly formatted display equation.

$$P_{walls}(i) = k(T_{out}(i) - T_{in}(i)) \quad (1)$$

where $P_{walls}(i)$ is the power flow, k is the building's effective thermal conductivity, $T_{out}(i)$ is the temperature outside the building, and $T_{in}(i)$ is the temperature inside the building.

Observe the following conventions in showing display equations:

- a. Whenever possible, compose display equations in an equation editing component of a word processing program or in a separate equation program. This allows more control and accuracy in formatting.
- b. Show all variables in [italics](#).
- c. Show all numerals, chemical symbols, trigonometric terms, and any other intervening text in [roman](#) (nonitalic) type.
- d. Show vectors in [bold](#).
- e. Although a display equation should be a complete sentence or part of a complete sentence, **don't** apply normal sentence punctuation to a display equation itself.
- f. If a display equation ends a sentence, use proper punctuation for the portion of the sentence that precedes the display equation. In the preceding example, Eq. (1) begins the sentence, and a compound [clause](#) (which begins with *where* and defines the variables) completes the sentence. That's why *where* is not capitalized. The variables could also be defined in a vertical list.
- g. If a mathematical expression extends beyond a single line of type, break the expression before an operator (such as +, −, or ×) or after a final [parenthesis](#), [bracket](#), or other enclosing symbol.⁵
- h. If a chemical expression extends beyond a single line of type, break the expression after an arrow, and left-align the runover with the last element of the previous line.⁶
- i. Try to keep all parts of a sentence that contains a display equation on the same page.
- j. **Don't** call out or otherwise define the symbols for mathematical operators in text or include them in the list of abbreviations.

3.16.8 Dates

Observe the following conventions in showing dates:

- a. Unless space is tight (for example, in a table), spell out the names of days of the week and months. When you abbreviate days or months, **don't** include them in the list of abbreviations.
- b. Write full dates in “Month day, year” format (for example, July 8, 2015), and **don't** place a leading zero before a single-digit day.
- c. Write years as four digits.
- d. For a full date, place a [comma](#) between the day and year.
- e. When a full date occurs before the end of a sentence, also place a [comma](#) after the year.

⁵ ANSI/NISO Z39.18-2005, *Scientific and Technical Reports – Preparation, Presentation, and Preservation*, (Bethesda, Maryland: NISO Press), 37.

⁶ Ibid.

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- f. When only a month and year are shown, **don't** separate them with a [comma](#).
- g. Use [nonbreaking spaces](#) to prevent any parts of a date (whether a full date or just a month and year) from breaking across two lines of text. See [keystroke combinations](#) for how to type a nonbreaking space.
- h. When dates are shown only in numbers, use the following format: mm/dd/yyyy.
- i. In dates, use ordinal numbers for days **only** in such an expression as “the 4th of July” or “on the 15th and the 30th.” For example, write “July 4,” **not** “July 4th”; and write “June 21, 2014,” **not** “June 21st, 2014.” See 3.16.9 for general guidance on the use of ordinal numbers.

3.16.9 Ordinal Numbers

[Ordinal numbers](#), whether written in words or numerals, indicate position, sequence, or rank. Examples are *first*, *second*, *third*, and *fourth*. All ordinal numbers carry one of the following [suffixes](#): *-st*, *-nd*, *-rd*, or *-th*. Observe the following conventions for ordinal numbers:

- a. Write *first* through *ninth* as words, unless they are used in parallel with higher ordinal numbers. For example, write “the 9th and 10th iterations,” **not** “the ninth and 10th iterations.” The edition numbers in 2.2 illustrate this exception.
- b. Write 10th and higher ordinal numbers in numerals, unless they start a sentence or title.
- c. Try to avoid starting sentences or titles with ordinal numbers of *tenth* or higher.
- d. Apply a consistent style to the suffixes—either full size (as in *10th*) or superscript (as in *10th*)—of ordinal numbers written in numerals.
- e. When an ordinal number is written in numerals, acts as an [adjective](#), and immediately precedes a [noun](#) (as in, for example “the 10th iteration”), use a [nonbreaking space](#) between the ordinal number and the noun to keep the two words from breaking across lines. See [keystroke combinations](#) for how to type a nonbreaking space.
- f. When an ordinal number and a [cardinal number](#) [modify](#) the same [noun](#), always put the ordinal number first. For example, write “the first three options,” **not** “the three first options.”
- g. See 3.16.8.i for guidance on using ordinal numbers in dates.

3.17 Figures and Their Titles

A figure can be a photograph, diagram, drawing, sketch, graph, chart, or the like, **but not a table with live data**—even if the table is graphical as opposed to typeset. An exception occurs when a picture of a table containing only sample data is included solely as an illustration, as is done in 5.3 (see Figure 10 and Figure 11).

NOTE

See 3.21.1 for specific conventions about including screenshots in instructions about computer interfaces.

Figures are generally more effective when they are placed along with the text they illustrate, whether that text is in the [body](#) or in an [appendix](#).

Observe the following conventions for figures and their titles:

- a. Introduce each figure individually or as part of a range of figures, before its appearance.
- b. Place each figure as soon after its introduction as good page layout will permit. Where necessary in order to achieve a good page layout, place additional paragraphs between the introducing paragraph and the figure (filling excessive white space that wasn't large enough for the figure).
- c. Center each figure between the left and right margins.
- d. Crop figures closely.
- e. Whenever possible, size the figure to fit comfortably within the side margins for the prevailing page layout (usually a portrait area 6.5 inches wide by up to 9 inches high on a letter-size page). When the figure requires more width, consider the document type ([formal](#) or [engineering](#) [see 1.1, 4.1, and 4.2]) and how the document will be used most often—online or as a hard copy—and then format the page or the figure as follows:
 - (1) If the document will be used mostly online, format the page as a [landscape](#), with the [header](#) and [footer](#) along the longer dimension. This will keep the figure oriented correctly for on-screen viewing.
 - (2) If the document will be used mostly as a hard copy, keep the [portrait](#) format, with the [header](#) and [footer](#) along the shorter dimension, and rotate the figure and title 90 degrees to the left, to lead from the left. This will preserve the overall page layout of the document or book. The reader will rotate the hard copy 90 degrees to the right to view the figure.
 - (3) For a [formal document](#) requiring an oversize page (17 inches wide by 11 inches high) in order to accommodate a particularly wide figure, place the figure on a right-hand (odd-numbered) page, and return to a letter-size page (8.5 inches wide by 11 inches high) on the next unaffected right-hand (odd-numbered) page.

- (4) For an [engineering document](#) requiring an oversize page (17 inches wide by 11 inches high) in order to accommodate an oversize figure, place the oversize figure on a new page, and return to a letter-size page on the page that follows the end of the oversize figure.
- (5) For both types of documents, apply the guidance in 3.17.p if an oversize figure occupies multiple sheets.
- f. In documents that are likely to be printed, limit the use of color to those figures that need it to convey information.
- g. Make the style of callouts (text and arrows applied to graphics) consistent for all figures. Use Arial type for text, and make the [casing](#) (see 3.12) consistent. Make sure that the text is large enough to be read easily in the final layout, that text and arrows contrast sufficiently with the background, and that they don't obscure important features of the figure.
- h. Make the text in graphics consistent (for terminology, spelling, abbreviations, spacing, and punctuation) with the running text.
- i. If any values in a graphic are 10,000 or greater, place a [comma](#) between the thousands and hundreds of all values. If no value in a graphic is 10,000 or greater, **don't** place a comma in any value in the graphic.
- j. Center the figure label, number, and title in a single [paragraph](#) **below** the figure, and allow a comfortable space between the figure and the title—usually 6 to 12 points.
- k. Keep the figure and its title [paragraph](#) on the same page.
- l. Set the title [paragraph](#) in bold, 11-point Arial type.
- m. Capitalize the label "Figure," and apply a simple series of Arabic numbers (1, 2, etc.), from the first figure in the [body](#) to the last figure in the last [appendix](#). See 5.4.3.d(1) about labeling and titling figures in an executive summary.

NOTE

Figure numbers that include the section number and that restart the sequential number with each new section (as in, for example, "Figure 1-2") are acceptable but can make the word processing file more difficult to prepare and manage, especially when there are figures in an [appendix](#).

- n. Separate the figure number from the title with a [period](#) and a space.
- o. Give each figure a unique title, expressed as a [noun](#) phrase and set in title case (see 3.12.2), as is done for all the figure titles in this guide. Don't use end punctuation.
- p. Whenever possible, use multiple, separately numbered figures rather than a single multisheet figure. Multisheet figures often depict the same thing but from different views. In such cases, different views can be indicated in the titles, thereby allowing separately numbered and titled figures. When a multisheet figure is unavoidable, use

the same figure number and title for each instance, and append the following to each title “(Sheet X of Y),” where X is the sequential sheet and Y is the total number of sheets. List only the first sheet of the multisheet figure in the list of figures.

- q. If a centered figure title requires multiple lines, apply manual line breaks—**not new paragraphs**—at natural points, so that the resulting lines increase in length progressively. Remove any spaces around these manual breaks.
- r. If a list of figures will **not** be included in the [front matter](#) and if more text is necessary in order to effectively identify any of the figures, treat all the figure titles as follows: Express the titles as full sentences, and use sentence case (see 3.12.1). Use the same overall sentence structure for all the title sentences. Left-align the title paragraph at the left edge of the figure image, break the text even with the right edge of the figure image, and align the runover text with the left edge of the figure image. Set the label, number, and [period](#) in **bold** type, and set the rest of the paragraph in plain [roman](#) type.

3.18 Tables and Their Titles

A table is appropriate for displaying one or more pieces of data for one or more items in a category. That means that a table should have multiple columns. If the information does not require multiple columns, consider displaying the items in a bulleted or enumerated list (see 3.11.2.2 and 3.11.2.3).

A consistent format for all the tables in a document is important. Original, typeset tables are preferred over images of tables from other sources, especially scans, but see 3.18e(2). Original typesetting allows better control so that all the tables can be formatted as consistently as possible.

Tables are generally more effective when they are placed along with the text they support, whether that text is in the [body](#) or in an [appendix](#).

Observe the following conventions for tables and their titles:

- a. Introduce each table individually or as part of a range of tables, before its appearance.
- b. Place each table as soon after its introduction as good page layout will permit. Where necessary in order to achieve a good page layout, place additional paragraphs between the introducing paragraph and the table (filling excessive white space that wasn't large enough for the table).
- c. Center each table between the left and right margins.
- d. Size the rows and columns to accommodate the necessary data. In general, keep cell margins narrow to accommodate long text strings.

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- e. Whenever possible, size the table to fit comfortably within the side margins for the prevailing page layout (usually a [portrait](#) area 6.5 inches wide on a letter-size page). When the table requires more width, consider the document type ([formal](#) or [engineering](#) [see 1.1, 4.1, and 4.2]) and how the document will be used most often—online or as a hard copy—and then format the page or the table as follows:
 - (1) If the document will be used mostly online, format the page as a [landscape](#), with the [header](#) and [footer](#) along the longer dimension. This will keep the table oriented correctly for on-screen viewing.
 - (2) If the document will be used mostly as a hard copy, keep the [portrait](#) format, with the [header](#) and [footer](#) along the shorter dimension, and rotate the title and an image of the finished table 90 degrees to the left, to lead from the left. This will preserve the overall page layout of the document or book. The reader will rotate the hard copy 90 degrees to the right to read the table.
 - (3) For a [formal document](#) requiring an oversize page (17 inches wide by 11 inches high) in order to accommodate a particularly wide table, start the table on a right-hand (odd-numbered) page, and return to a letter-size page (8.5 inches wide by 11 inches high) on the next unaffected right-hand (odd-numbered) page.
 - (4) For an [engineering document](#) requiring an oversize page (17 inches wide by 11 inches high) in order to accommodate a particularly wide table, start the table on a new page, and return to a letter-size page on the page that follows the end of the table.
- f. In documents that are likely to be printed, limit the use of color to those tables that need it to convey information.
- g. Center the table label, number, and title in a single [paragraph](#) **above** the table, and allow a comfortable space between the title and the table—usually 6 to 12 points.
- h. Make sure that the table begins on the same page as its title [paragraph](#).
- i. Don't allow only a few rows of a table to appear at the bottom of a page.
- j. Set the table title [paragraph](#) in bold, 11-point Arial type.
- k. Capitalize the label "Table," and apply a simple series of Arabic numbers (1, 2, etc.), from the first table in the [body](#) to the last table in the last [appendix](#). See 5.4.3.d(1) about labeling and titling tables in an executive summary.

NOTE

Table numbers that include the section number and that restart the sequential number with each new section (as in, for example, "Table 1-2") are acceptable but can make the word processing file more difficult to prepare and manage, especially when there are tables in an [appendix](#).

- l. Separate the table number from the title with a [period](#) and a space.

- m. Give each table a unique title, expressed as a [noun](#) phrase and set in title case (see 3.12.2), as is done for all the table titles in this guide. Don't use end punctuation.
- n. If a centered table title requires multiple lines, apply manual line breaks—**not new paragraphs**—at natural points, so that the resulting lines increase in length progressively. Remove any spaces around these manual breaks.
- o. If a list of tables will **not** be included in the [front matter](#) **and** if more text is necessary in order to effectively identify any of the tables, treat all the table titles as follows: Express the titles as full [sentences](#), and use sentence case (see 3.12.1). Use the same overall sentence structure for all title sentences. Left-align the title [paragraph](#) at the left edge of the table, break the text even with the right edge of the table, and align the runover text with the left edge of the table. Set the label, number, and [period](#) in [bold](#) type, and set the rest of the paragraph in plain [roman](#) type.
- p. Don't repeat the table title in the top row of the table.
- q. When a table extends beyond a page, repeat the column heads **but not** the title [paragraph](#).
- r. Don't allow a row to break across pages.
- s. Set column heads in bold Arial type, no larger than 11 points. If any tables in the document require smaller type for column heads, apply that smaller size to all column heads in the document. Align the column heads consistently, but see 3.18.u. Indicate common units of measure by their [abbreviations](#) in [parentheses](#) at the end of the column head.
- t. Set table data in Times New Roman type, no larger than 11 points. Make sure that the type for the data never looks larger than the type for the column heads. Where necessary in very tight tables (especially in large tables in appendices), reduce the type further, and consider a narrower font (such as Arial Narrow).
- u. In a table where space is tight and where a column head is substantially wider than the data in the column, rotate the text in the column head 90 degrees to the left so that the text reads sideways from bottom to top. Align the rotated text at its new left margin.
- v. Make sure that words in column heads and data cells wrap only at syllables.
- w. Align all related numbers in a column according to place value, and where the integrity of the data will permit it, show the same number of decimal places throughout the column. If any values in the table are 10,000 or greater, also use a [comma](#) to separate thousands from hundred in all values. If no value in a table is 10,000 or greater, **don't** place a comma in any value in the table.
- x. When a cell entry requires a note, flag the end of the entry with a superscript indicator (either a lowercase [roman](#) letter in sequence [^a, ^b, etc.] or a symbol from a series [for example, *, †, ‡, §, ¶]). Because of their potential to be mistaken for exponents or other mathematical notations, don't use numbers as note indicators in tables. Assign note indicators in the table from left to right, top to bottom. Place the notes in a row (usually borderless) at the end of the table. First address any general notes to the table as a whole. Then address notes to specific cells. Keep at least two data rows on the same page as the note row in order to help your readers understand the relationship between

the notes and a multipage table at a glance. If it is important for readers to see general notes or a key on each page of a long table, consider placing the notes or key as the first row—above the column heads—and repeating this row and the column heads on each page of the table. The table in Appendix A uses this technique.

- y. Keep lines and borders consistent and as simple as possible for all tables in the document. A single stroke in a consistent weight (usually 0.5 point or 1.0 point) is recommended for all lines and borders, though it is acceptable to use heavier weights for outside borders or to emphasize differences in adjacent rows or columns.
- z. Observe the conventions of [parallel construction](#) discussed in 3.11 for an effective display of data, which relies heavily on structure and visual consistency.

3.19 Writing and Formatting Definitions

Definitions are optional in most documents, but they can be valuable to your readers. See Appendix B for examples of well-written and well-formatted definitions.

Observe the following conventions in writing and formatting definitions:

- a. Consider applying distinctive formatting or a [hyperlink](#) (usually a combination of color for on-screen use and underlining for paper use) to a defined term where it appears in the [body](#). You don't have to hyperlink every instance of a defined term. But in order for the technique to be useful, you should format or hyperlink the defined term at least once within your readers' normal field of view.
- b. Define only terms that appear in the [body](#) or in an [appendix](#) and terms that the reader must understand in order to fully comprehend other definitions.
- c. Don't define commonplace terms unless they are used in uncommon ways.
- d. **Don't** include a term in a glossary or in a short list of definitions in the [body](#) simply to introduce an [abbreviation](#). Instead, use the list of abbreviations (see 5.7) or a callout in the body.
- e. **Don't** capitalize the term unless it is a [proper noun](#).
- f. For the terms, use the [singular](#) for [nouns](#) (for example, *connector*, **not** *connectors*) and the [infinitive](#) or most basic form of the present [tense](#) for [verbs](#) (for example, *cavitate*, **not** *cavitates* or *cavitated*).
- g. Try to word the defining phrase so it could replace the term in a sentence and remain grammatically correct. That is, use the same [part of speech](#) for the term and the defining phrase. This can be difficult when you want to define an [adjective](#), such as *critical*. It can be natural to define such an adjective in the context of the [noun](#) it modifies, such as "a function that, if lost or improperly performed, could result in a Level 4 or 5 effect." When it is clearer to define such an adjective this way, define the modified noun instead of the adjective. For this example, that means defining *critical function* instead of *critical*.
- h. Because the definition is a phrase, **don't** capitalize the first word of the definition, **unless** it is a [proper noun](#).

- i. Make the defining phrase as practical as possible. The practice of not using any part of the term in its definition is not always effective, especially when the purpose is more to distinguish something than to absolutely define it. For example, when we define *ground support equipment*, we are not trying to explain what *equipment* means, but to distinguish ground support equipment from other types of equipment. Therefore, it is fine to repeat part of the term (in this example, *equipment*) in a defining phrase that is meant to distinguish.
- j. If you are quoting definitions from another source (for example, from standards of the Occupational Safety and Health Administration), cite the source. Because such a source is likely to be an [applicable](#) or [reference document](#), you can show the document number (or the title of a book or an unnumbered document) in [parentheses](#) at the end of the defining phrase. Also see 3.22.2.
- k. End the defining phrase (and any parenthetical source [see 3.19.j]) with a [period](#). This makes it easier to add examples or supplemental information (as complete [sentences](#)) after the defining phrase but in the same [paragraph](#).
- l. Place definitions where your readers can find them easily (such as within a glossary placed [1] immediately after the list of abbreviations, [2] in an early section, or [3] in an [appendix](#)), and direct your readers to that location early in the document. If the document requires only a few definitions, place them near the first instance of their respective terms.
- m. Unless you have a logical reason to do otherwise, alphabetize the entries by term in a glossary or in a short list in the [body](#). If you don't alphabetize by term, explain the logic of your order in an introductory [paragraph](#), and in this circumstance, arrange the entries in an enumerated list (see 3.11.2.2.b).
- n. If you present the definitions in an alphabetized list within the body or within a glossary, simply align the entries at the left margin, without bullets or [enumerators](#).
- o. Make the term stand apart visually from its definition. A good practice is to show the term in **bold** type (followed by a [colon](#), also in bold type) and the definition in plain [roman](#) type. If the term has an [abbreviation](#), place the abbreviation in [parentheses](#) between the term and the colon. If the definition begins on the line below the term, omit the colon, but start the term and its definition on the same page.

3.20 Warnings, Cautions, and Notes

A **warning** gives critical information about an operating procedure or practice that, if not strictly observed, may injure or kill someone.

A **caution** gives important information about an operating procedure or practice that, if not strictly observed, may damage or destroy equipment.

A **note** gives additional information about an operating procedure, a practice, or a condition that should be emphasized, such as important distinctions or inclusions, with the goal of reducing misinterpretation, rework, delay, or additional cost.

Observe the following conventions for writing and formatting warnings, cautions, and notes:

- a. Place the title and statement of a warning, caution, or note immediately after the paragraph to which they pertain—the subject [paragraph](#).
- b. Keep the following on the same page: the end of the subject [paragraph](#); the title of the warning, caution, or note; and the statement of the warning, caution, or note.
- c. If any combination of warnings, cautions, or notes applies to the same subject [paragraph](#), place the warning first, then the caution, and then the note.
- d. Keep statements of warnings, cautions, and notes short and concise, but complete.
- e. Double-space between the subject paragraph and the title **WARNING**, **CAUTION**, or **NOTE**.
- f. Set the title in bold, 11-point Arial type and in all caps. Underline the title and center it over the statement [paragraph](#). Double-space between the title and the statement paragraph.
- g. Indent the statement from both margins in a block-style [paragraph](#) (no extra indentation of the first line). Double-space between the statement and the material that follows it.
- h. Set the statement in 12-point Times New Roman type.
- i. If multiple warnings, multiple cautions, or multiple notes apply to the same subject paragraph, show the title in [plural](#) and number the statements, beginning with 1.

3.21 Treatment of Computer Interfaces

The following subsections guide you in how to discuss and represent computer interfaces in KSC technical documents, **not** in how to design computer interfaces. These conventions align with those from the *Microsoft Manual of Style for Technical Publications, Third Edition*.

3.21.1 Screenshots

Observe the following conventions for screenshots:

- a. Whenever possible, include screenshots of relevant windows, menus, and dialog boxes.
- b. Crop screenshots closely, and provide enough image size and resolution to allow users to understand and follow your instruction easily.
- c. Present screenshots in the order that users will encounter the windows, menus, or dialog boxes.
- d. If numbering and titling the screenshots will make the series of instructions easier to follow, apply the conventions of 3.17 to all screenshots in the series. If all the screenshots in a series immediately follow their respective instructions, are easy to identify, and are not cited later, don't number or title any of the screenshots in the series.

3.21.2 Expression and Order of Instruction

Observe the following conventions in general discussions of computer interfaces and specific instructions to users:

- a. Present instructions and explanations in the order that users will perform the operation.
- b. Express instructions as commands (see 3.3).
- c. Place multistep operations in an enumerated list (see 3.11.2.2.b).
- d. Keep explanations and notes separate from instructional steps.
- e. In explaining navigation, follow the path the user will take (for example, from window to menu, and then from menu selection to dialog box). Direct the users through the necessary navigation and then to perform the necessary actions (for example, “Click the **Home** tab, and then click **Format Painter**,” not “Click **Format Painter** on the **Home** tab.”).
- f. Show the names of windows, tabs, groups, dialog boxes, commands, selection options, and other features exactly as they appear in the interface. If the labels in the user interface are not capitalized consistently, apply title case (see 3.12.2). Omit trailing punctuation and the character underscoring that denotes keystroke combinations. As long as the directions are clear, omit generic descriptors after the names of windows, dialog boxes, and other command features—**except** *box*, *list*, *check box*, and *tab*. Show labels and descriptors consistently.
- g. Set the names of features and any command keys (**enter**, **alt**, **shift**, **delete**, etc.), in bold type.
- h. Set placeholders for user input in italics (for example, “Type *password*.”).
- i. If you are providing mouse and keyboard instructions, give mouse instructions first.
- j. If it is important to show multiple ways of performing an operation, separate the options clearly. Make sure that alternatives cannot be interpreted as consecutive actions.

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3.21.3 Specific Terms for Computer Interfaces

Table 3 provides notes and instructions for the use of specific terms in discussions of computer interfaces.

Table 3. Specific Terms for Computer Interfaces

Use These Terms	Avoid These Terms	Notes
<i>available</i>	<i>active</i>	Use <i>available</i> for describing an option that can be selected.
<i>clear</i>	<i>deselect, unselect</i>	Use <i>clear</i> for cancelling a selected checkbox or dialog box option.
<i>click, select</i>	<i>click on, choose, pick</i>	Use <i>click</i> or <i>select</i> for selecting menus, tabs, list items, buttons, or dialog box options with the left mouse button. Use <i>select</i> for selecting check boxes with the left mouse button.
<i>dialog box</i>	<i>property sheet</i>	Use <i>dialog box</i> for identifying any level of command window that appears after a selection.
<i>double-click</i>		Use <i>double-click</i> for opening a folder or file.
<i>point to</i>		Use <i>point to</i> for navigating and opening submenus.
<i>press</i>	<i>depress</i>	Use <i>press</i> for keyboard operations.
<i>right-click</i>		Use <i>right-click</i> for selecting icons, folders, files, or other features, whose resulting options (usually listed in a context menu) will be acted upon.
<i>type</i>	<i>enter</i>	Use <i>type</i> for keyboard input. Use <i>enter</i> only when there is no chance of confusion.
<i>unavailable</i>	<i>gray, grayed out, inactive</i>	Use <i>unavailable</i> for describing an option that cannot be selected.
<i>under <name>, in the <name> area</i>	<i>in the <name> group box</i>	Use <i>under</i> for directing the user to an outlined group of controls in a dialog box.

3.22 References to Other Material

3.22.1 Material in the Current Document

Referring to specific locations in your document helps your readers find the information they need. To that end, careful use of the cross-reference feature of the word processing program can help you keep internal references accurate while you're preparing the document. Furthermore, such automated cross-references and even specially formatted [hyperlinks](#) can make the document substantially more useful online. Make sure that all [references](#) are accurate and that automated ones remain functional in the word processing file and in any static files (such as Portable Document Format [PDF] files) that may be [released](#). Also see Appendix A, [reference](#), about phrasing.

Observe the following conventions when you refer to material in the current document in running text:

- a. **Numbered section:** To refer, for example, to the sixth section as a whole, write “see Section 6,” or “as discussed in Section 6.” Don’t add the title of the section or such a phrase as “...of this document.” Capitalize *Section* when it identifies a specific instance. Keep the label (*Section*) and the number on the same line by placing a [nonbreaking space](#) between the two. See [keystroke combinations](#) for how to type a nonbreaking space.
- b. **Numbered subsection:** To refer to a subsection (a second-level or lower section), write the subsection number only (for example, “see 6.1”). Don’t add the title of the subsection or such a phrase as “...of this document.”
- c. **Enumerated item:** To refer to an enumerated item in a vertical list (for example, the item you are reading now), write the subsection number, a [period](#), and then the [enumerator](#), as in “see 3.22.1.c.” In this example, **don’t write** “see 3.22.1, Item c,” or “see Item c in 3.22.1.”
- d. **Figure or table:** Introduce each figure and table before its appearance. To refer to a figure or table, write, for example, “see Figure 1,” or “as shown in Table 2.” Don’t add the title of the figure or table or such a phrase as “...of this document.” Capitalize *Figure*, *Table*, and their [plurals](#) when these labels identify specific instances. Keep the label (*Figure*, *Table*, or their plurals) and the number on the same line. When you make these references with the word processing program’s cross-reference feature, it is pointless to insert a [nonbreaking space](#) manually between the label and number, except as the final step in preparing a document for [release](#). When automatic cross-references are updated, nonbreaking spaces are overwritten with regular spaces. See [keystroke combinations](#) for how to type a nonbreaking space.

NOTE

Occasionally, it may serve your readers to mention a figure or table that is better placed later in the document, probably in a section or [appendix](#) devoted to the subject of the figure or table. When you cite such a later figure or table, first identify the section or appendix and then the figure or table in [parentheses](#), as was done in 3.17 to direct you to 5.3 (Figure 10 and Figure 11).

- e. **Appendix:** Introduce each [appendix](#) before its appearance. To refer to an entire appendix, write, for example, “See Appendix A.” If a reference to an appendix subsection is needed, write, for example “see A.1.” Don’t add the title of the appendix or such a phrase as “...of this document.” Capitalize *Appendix* when the label identifies a specific instance. Keep the label (*Appendix*) and the letter on the same line. When you make these references with the word processing program’s cross-reference feature, it is pointless to insert a [nonbreaking space](#) manually between the label and letter, except as the final step in preparing a document for [release](#). When automatic cross-references are

updated, nonbreaking spaces are overwritten with regular spaces. See [keystroke combinations](#) for how to type a nonbreaking space.

- f. **Equation:** To refer to an equation, write, for example, “see Equation (1)” or “as shown in Eq. (8).” The equation number itself is enclosed in [parentheses](#). Don’t add such a phrase as “...of this document.” Capitalize *Equation* or *Eq.* when the label identifies a specific instance. Keep the label (*Equation* or *Eq.*) and the number on the same line. When you make these references with the word processing program’s cross-reference feature, it is pointless to insert a [nonbreaking space](#) manually between the label and letter, except as the final step in preparing a document for [release](#). When automatic cross-references are updated, nonbreaking spaces are overwritten with regular spaces. See [keystroke combinations](#) for how to type a nonbreaking space.
- g. **Page:** For consistency, when you refer to a page in the current document, capitalize *Page* or *Pages* when the label identifies specific instances. An alternative is to abbreviate *Page* as *p.* and *Pages* as *pp.* (Note that [periods](#) are used.) Don’t call out either abbreviation in text or include either in the list of abbreviations. Don’t add such a phrase as “...of this document.” Keep the label (whether written fully or abbreviated) and the page number on the same line by placing a [nonbreaking space](#) between the label and the page number. See [keystroke combinations](#) for how to type a nonbreaking space.

3.22.2 Material from Other Sources

Apart from including short [quotations](#) or [paraphrases](#) (see 3.22.2.4), don’t republish the content of another document (in whole or in part) in your document. Though it may be tempting to include such reference material for the sake of completeness or for the convenience of your readers, your readers are not served by the inclusion of potentially outdated material. Identifying the edition or date of the original publication does **not** make the practice acceptable. Simply citing [applicable documents](#) is a better way of invoking their content.

An exception may be necessary when the content considered for reproduction is not easily accessible. However, material on the Internet is considered easily accessible.

3.22.2.1 Identification of Applicable or Reference Documents

[Applicable documents](#) are sources whose authority you invoke in your document. [Reference documents](#) offer information that relates to but is not essential for understanding your subject. Reference documents may or may not be mentioned in your document. (Also see 5.10.)

NOTE

In KSC Specifications and KSC Standards,
reference documents are typically cited as guidance.

Observe the following conventions when you cite an applicable document in text or direct your readers to a reference document:

- a. If your document contains a list of sources (whether in the second section [see 5.10] or in a bibliography), identify a numbered document by its document number only—even if that document also has an International Standard Book Number (ISBN). Keep all parts of the document number on the same line by replacing regular hyphens with [nonbreaking hyphens](#) and by replacing regular spaces with [nonbreaking spaces](#). See [keystroke combinations](#) for how to type nonbreaking hyphens and nonbreaking spaces.
- b. If your document **does not** contain a list of sources (as could be the case for a spreadsheet of requirements), identify a numbered document first by its document number. Keep all parts of the document number on the same line by replacing regular hyphens with [nonbreaking hyphens](#) and by replacing regular spaces with [nonbreaking spaces](#). See [keystroke combinations](#) for how to type nonbreaking hyphens and nonbreaking spaces. Place a [comma](#) after the document number, and then show the full title (not an abbreviated title) in [italics](#). If the sentence continues after the title, place a comma after the title.
- c. Identify a book or other unnumbered publication by its title, and set the title in [italics](#). **Don't** refer to books in text by their International Standard Book Numbers (ISBNs).
- d. If you are writing a legally binding document, such as a contract, procurement specification, statement of work, or performance work statement, specify the edition or revision level of each [applicable document](#). **Otherwise, don't** specify editions or revision levels of applicable documents.

3.22.2.2 Identification of Specific Material in Applicable or Reference Documents

Observe the following conventions when you invoke specific material from an [applicable document](#) or direct your readers to specific material in a [reference document](#):

- a. Be as specific as you can in identifying a particular location (section, figure, table, etc.) in another source.
- b. First identify the document number (or the title of a book or an unnumbered document), and then identify the particular location, as in, for example, “see KSC-DF-107, Table 2.”
- c. If the sentence continues after the identification of the source, separate the final location from the rest of the text with a [comma](#), as in, for example, “KSC-DF-107, Table 2, lists the acceptable forms of...”
- d. Keep all parts of a document number on the same line by replacing regular hyphens with [nonbreaking hyphens](#) and by replacing regular spaces with [nonbreaking spaces](#). See [keystroke combinations](#) for how to type nonbreaking hyphens and nonbreaking spaces. Apply the same convention to the labels and identifiers of figures, tables, and [appendices](#) from other sources.

3.22.2.3 Identification and Placement of Explanatory Comments

An explanatory comment provides additional information that might divert your readers' attention from your point if you include that information where the relevant word or phrase appears. Explanatory comments are not the same as warnings, cautions, or notes (see 3.20). The text to which the comment applies is usually marked with a superscript number or symbol after the closing punctuation mark of the sentence. The explanatory comment itself can appear as a [footnote](#) at the bottom of the page or as an [endnote](#) at the end of the section or document.

3.22.2.4 Identification, Placement, and Formatting of Footnotes, Endnotes, Citations, and Bibliographies

The reference data for a [quotation](#) or [paraphrase](#) takes one of three forms: a [footnote](#) at the bottom of the page, an [endnote](#) at the end of the section or document, or a [citation](#)—a [parenthetical](#) identification in the text. For footnotes and endnotes, a superscript number or symbol marks the quotation or paraphrase, whereas a citation itself marks the quotation or paraphrase. The citation functions of word processing programs are easy to use. After you enter the reference data for the [bibliography](#), according to the types and style you choose (for example, Microsoft Word 2013 offers 17 reference types [such as books and journal articles] and 12 reference styles [such as those from *The Chicago Manual of Style* and the *MLA Style Manual and Guide to Scholarly Publishing*]), you can generate the citation automatically. Footnotes and endnotes are just as acceptable as citations for providing reference data, but they must often be constructed either through an add-on program or as a separate, manual step. The reference data in footnotes, endnotes, or citations can be condensed or abbreviated in various ways, as long as the full data for each reference also appears in a [bibliography](#), which is usually the last piece of material in the document—but before an index.

Choose a consistent style for formatting [footnotes](#), [endnotes](#), and [bibliographies](#) (such as that from *The Chicago Manual of Style* [which was used for the footnotes in this guide] or the *MLA Style Manual and Guide to Scholarly Publishing*), but notice that the punctuation of footnotes or endnotes may differ from the punctuation of bibliographies for a given style.

Observe the following conventions for identifying [quotations](#) and [paraphrases](#) in text:

- a. When the sentence contains only one quotation or paraphrase, place the citation or the identifier for the footnote or endnote (usually a superscript number or symbol) after the closing punctuation mark of the sentence, as long as misunderstanding is unlikely. Notice, however, that misunderstanding can occur if you [quote](#) or [paraphrase](#) the work of another but also express your own findings or conclusions in a single sentence. In such a case, place the citation or identifier immediately after the last word of the quotation or paraphrase.
- b. When the sentence contains multiple quotations or paraphrases or when a citation or identifier at the end of the sentence could be misleading, observe the following conventions:
 - (1) When the last word of the quotation or paraphrase is inside [parentheses](#) or [brackets](#), place the citation or identifier inside the parentheses or brackets.

- (2) When the last word of the quotation or paraphrase comes before the end of a sentence but **not** inside [parentheses](#) or [brackets](#), place the citation or identifier directly after the last word but also after any trailing punctuation mark, **except a dash or colon**.

4. OVERALL FORMATTING CONVENTIONS FOR DOCUMENT TYPES

This section describes the overall formatting conventions for two broad types of document: [formal documents](#) (see 1.1 and 4.1) and [engineering documents](#) (see 1.1 and 4.2). Document type affects how some specific document elements are formatted. See Section 5 for guidance on formatting specific document elements.

Table 4 shows the margins and [header/footer](#) offsets suitable for pages of formal documents and engineering documents.

Table 4. Margins and Header/Footer Offsets for Document Pages

Page	Top Margin		Bottom Margin		Inside/Left Margin		Outside/Right Margin		Header/Footer Distance	
	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)
Cover	27.9	1.1	25.4	1.0	25.4	1.0	25.4	1.0	12.7	0.5
Signature page	27.9	1.1	30.5	1.0	25.4	1.0	25.4	1.0	12.7	0.5
All other pages	25.4	1.0	25.4	1.0	25.4	1.0	25.4	1.0	12.7	0.5

4.1 Overall Formatting Conventions for Formal Documents

[Formal documents](#) are formatted for publication as books, in which specific document elements begin on either left-hand (even-numbered) or right-hand (odd-numbered) pages (see Section 5). Where necessary, in order to achieve these page assignments, some otherwise blank left-hand pages are page-numbered and marked “This page was intentionally left blank.”

The pages in the [front matter](#) (beginning with the record of revisions/changes [see 5.3]) display a series of lowercase Roman page numbers (ii, iii, iv, etc.) in the [footer](#), at the outside margin. The cover of a formal document is like the hard cover of a book and neither bears a page number nor counts as a numbered page. The signature page counts as Page i but does not bear a page number. The first page of the [body](#) begins a new series of Arabic page numbers (1, 2, 3, etc.) in the footer, at the outside margin, beginning with 1 and continuing through any [appendices](#).

The [headers](#) for the covers and signature pages of [formal documents](#) are shown in Figure 4 and are discussed in 5.1 and 5.2. The headers of all other pages in formal documents display the document number on one line, followed by the Revision level (and Change number, if applicable [see 6.2]) on the next line. Both lines are right-aligned at the outside margin.

Figure 4 shows the layout of the first five pages of a typical [formal document](#) printed double-sided. Arrows indicate how the pages flow like a book, beginning with the right-hand cover.

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[KDP-T-5411](#) (a Microsoft Word template) is available for formatting formal documents according to this guide.

4.2 Overall Formatting Conventions for Engineering Documents

Because of their more limited application and availability, [engineering documents](#) can be formatted more simply, without regard for book-publishing conventions. Some specific document elements begin on new pages, but none are designated as left-hand (even-numbered) or right-hand (odd-numbered) pages.

[Engineering documents](#) show a single series of Arabic page numbers (1, 2, 3, etc.), which are formatted as “Page # of <Total>” and are centered in the footer in 11-point Arial type. All sheets ([front matter](#), [body](#), and [appendices](#)) count toward the total, but page numbers do not appear until the first page after any signature pages (see 5.3).

The [headers](#) for the covers and signature pages of [engineering documents](#) are shown in Figure 5 and are discussed in 5.1 and 5.2. The headers of all other pages in engineering documents display the document number on one line, followed by the Revision level (and Change number, if applicable [see 6.2]) on the next line. Both lines are right-aligned at the right margin.

Figure 5 shows the layout of the first five pages of a typical [engineering document](#) printed double-sided. Arrows indicate how the pages flow in a simple series.

Two Microsoft Word templates are provided for formatting engineering documents according to this guide. [KDP-T-5405](#) is the basic template, and [KDP-T-5413](#) is an advanced template that controls some document data through **Advanced Document Properties**.

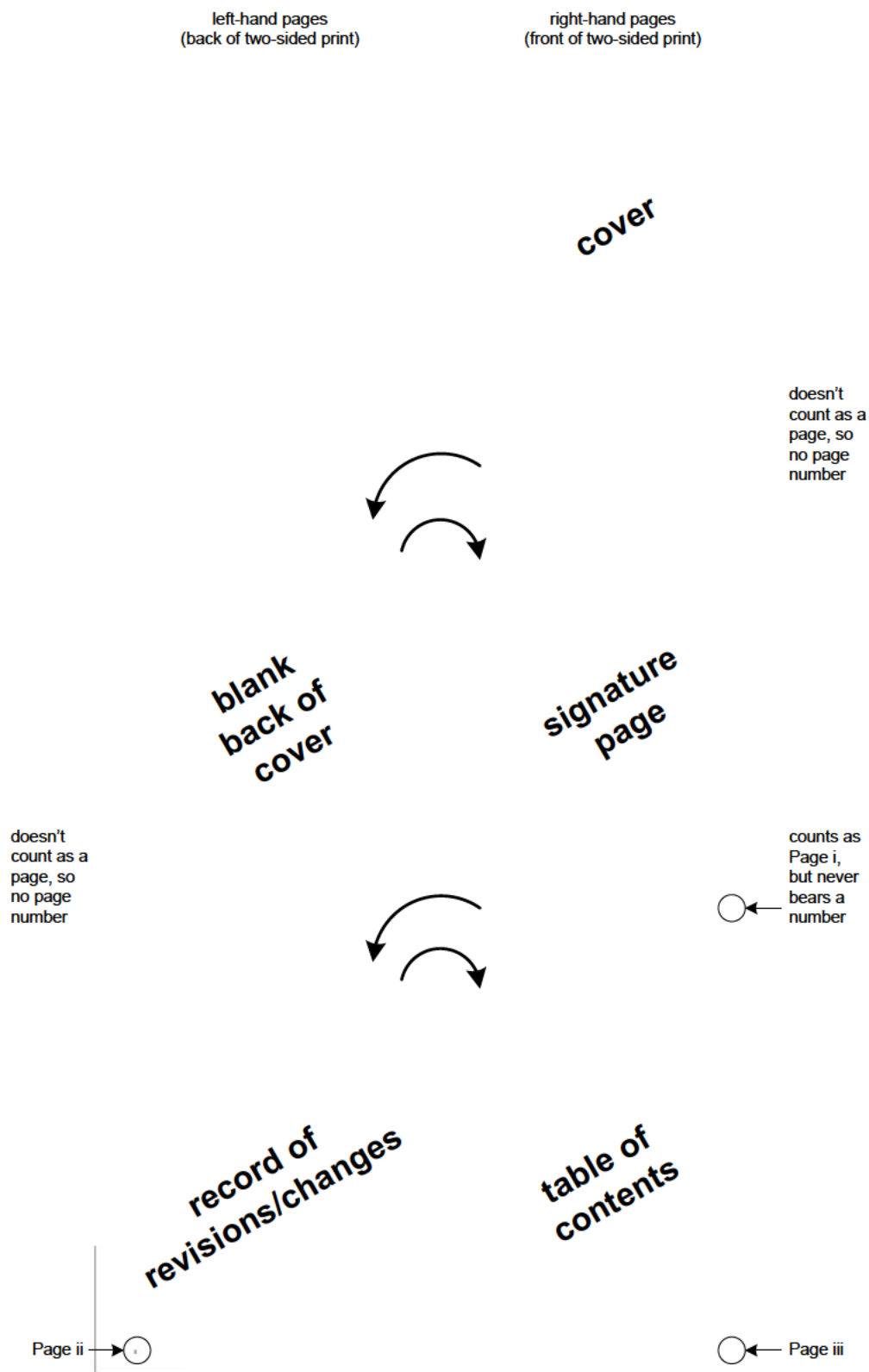


Figure 4. Opening Pages of a Typical Formal Document

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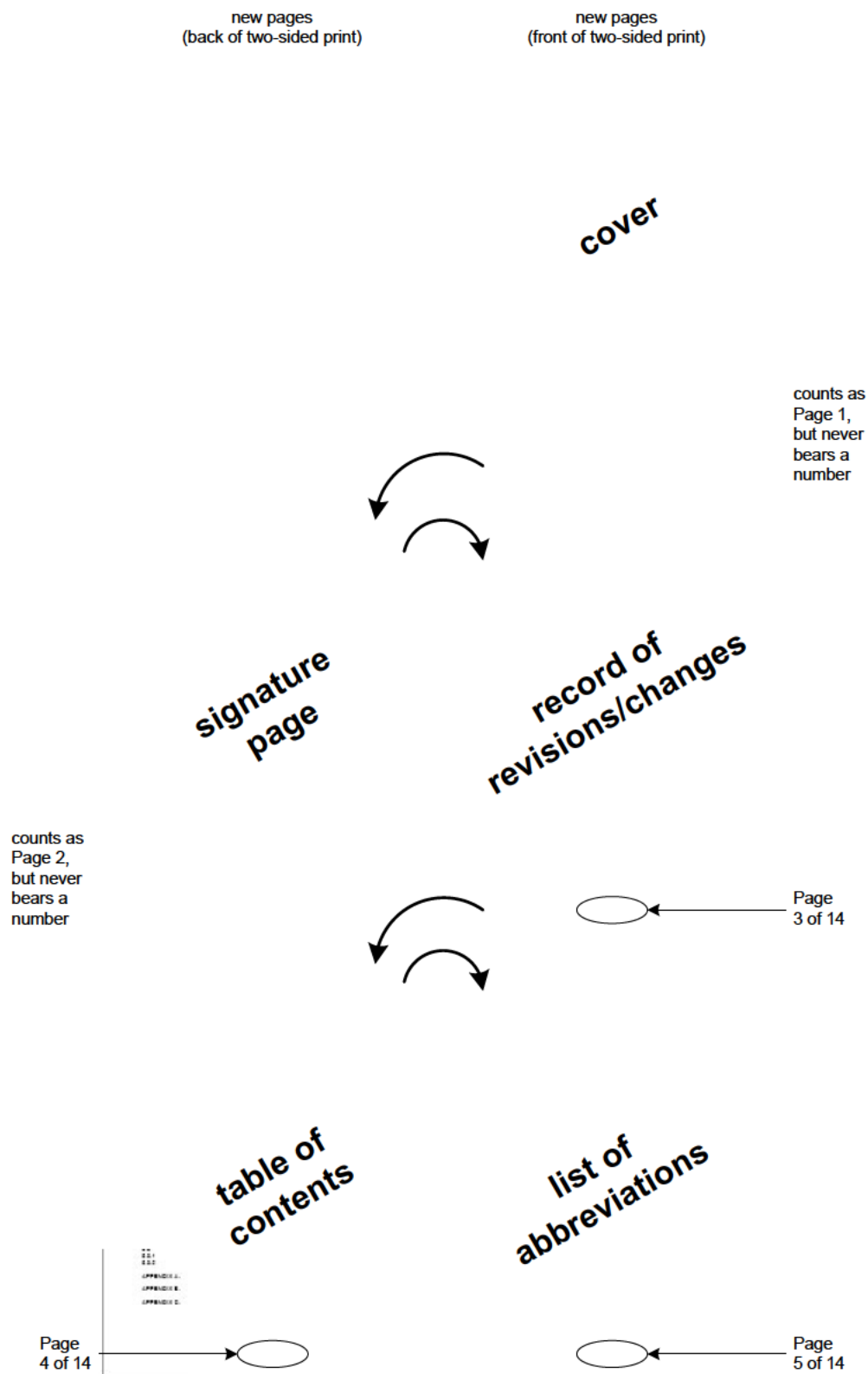


Figure 5. Opening Pages of a Typical Engineering Document

5. FORMATTING SPECIFIC DOCUMENT ELEMENTS

When a document contains any of the elements explained in this section, those elements should be arranged in the order shown in this section.

5.1 Cover

A cover is required for all [formal documents](#) and [engineering documents](#).

Observe the following conventions for components of the covers of formal documents and engineering documents:

a. KSC Form 16-12

- (1) Use KSC Form 16-12 for the covers of all [formal documents](#). Use KSC Form 16-12 for the covers of all [engineering documents](#), unless the project or [release](#) authority has designated a different cover.
- (2) Replicate the features of the [KSC Form 16-12 footer](#) exactly. These features are labels for NASA, KSC, and KSC Form 16-12; the NASA emblem; and a horizontal dividing line. See the cover of this document as an example. Add any required export control markings below the form features, but don't add other text or graphics in this area or delete, move, or alter any of the form features.
- (3) Except as follows, add no other emblems or logos to a KSC Form 16-12 cover:
 - (a) Add the applicable measurement indicator (see Figure 6) to the upper left corner of the cover of a [formal document](#) as directed by the release authority (or designee) or to an [engineering document](#) as directed by the project. Use the [metric indicator](#) when all measurements in the document are metric. Use the [metric/inch-pound indicator](#) when all measurements are first given as metric and then, in [parentheses](#), as English equivalents. Use the [not-measurement-sensitive indicator](#) when measurements are present but do not strictly follow the metric or metric/inch-pound convention.

METRIC	METRIC/INCH-POUND	NOT MEASUREMENT-SENSITIVE
---------------	--------------------------	----------------------------------

Figure 6. Measurement Indicators

- (b) Add the [Change emblem](#) as instructed in 6.2 to [release](#) a [Change](#).
- (4) If the document follows a [released](#) template, place the template file name (such as KDP-T-5405_Basic) in 6-point Arial type in the lower left corner below the [KSC Form 16-12 footer](#).

b. Document Number, Revision Level, and Change Number (if Applicable)

- (1) Set these components in the [header](#) in title case (see 3.12.2) in bold, 14-point Arial type.
- (2) Place the document number on one line, and place the Revision level immediately below it. If the [release](#) is for a Change (see 6.2), place the Change number (for example, “Change 1”) after (but on the same line as) the Revision level, and separate the two with a [comma](#). Align both lines at the right margin, and don’t add space between the lines.

c. Document Title

- (1) Set the document title in all caps and in bold, 18-point Arial type.
- (2) Center the title between the left and right margins, and balance the vertical placement of the document title with the other cover components.
- (3) Avoid introducing [abbreviations](#) in document titles. For document titles that have two parts—one part that identifies the subject system, subsystem, project, or program, and another part that identifies the type of document—put the subject first and the type of document below it, double-spacing between. Don’t put a [comma](#) between such components of the title.

d. Export Control Label and Language**NOTE**

The export control officer (ECO) may require markings in addition to or in place of the export control label and language [paragraph](#). Explicit instructions from the ECO take precedence over any related instructions in this guide.

- (1) Display any required export control label and language below the document title.
- (2) Set the label (for example, “EAR 99 – NO LICENSE REQUIRED”) in bold, 14-point Arial type, and use all caps.
- (3) Center the label between the left and right margins.
- (4) Allow space between the label and the text.
- (5) Set the export control language below the label, in a block [paragraph](#) of 10-point Arial type, aligned at the left margin (with a ragged right-hand margin).
- (6) Don’t place a border around the export control label or language paragraph.
- (7) Balance the vertical placement of the export control label and language paragraph with the other cover components.

e. Release Date

- (1) Display the release date in “Month day, year” format and in title case (see 3.12.2) below the export control text. Don’t add a zero before a single-digit day. Write years as four digits.
- (2) Set the date in bold, 14-point Arial type.
- (3) Center the date between the left and right margins, and balance its placement with the other cover components.

f. Sponsoring Directorate

- (1) Display the name of the sponsoring directorate or office in title case (see 3.12.2) below the date.
- (2) Set the name of the directorate or office in bold, 14-point Arial type.
- (3) Center the name of the directorate or office between the left and right margins, and balance its vertical placement with the other cover components.

Table 5 shows page assignments for the covers of [formal documents](#) and [engineering documents](#). Figure 7 shows an annotated cover suitable for a formal document or an engineering document.

Table 5. Page Assignments for a Cover

Cover of Formal Document	Cover of Engineering Document
• KSC Form 16-12	• KSC Form 16-12 unless designated otherwise by project
• Right-hand page with entirely blank back	• New page
• Does not count as a page and shows no page number	• Counts as Page 1 but shows no page number

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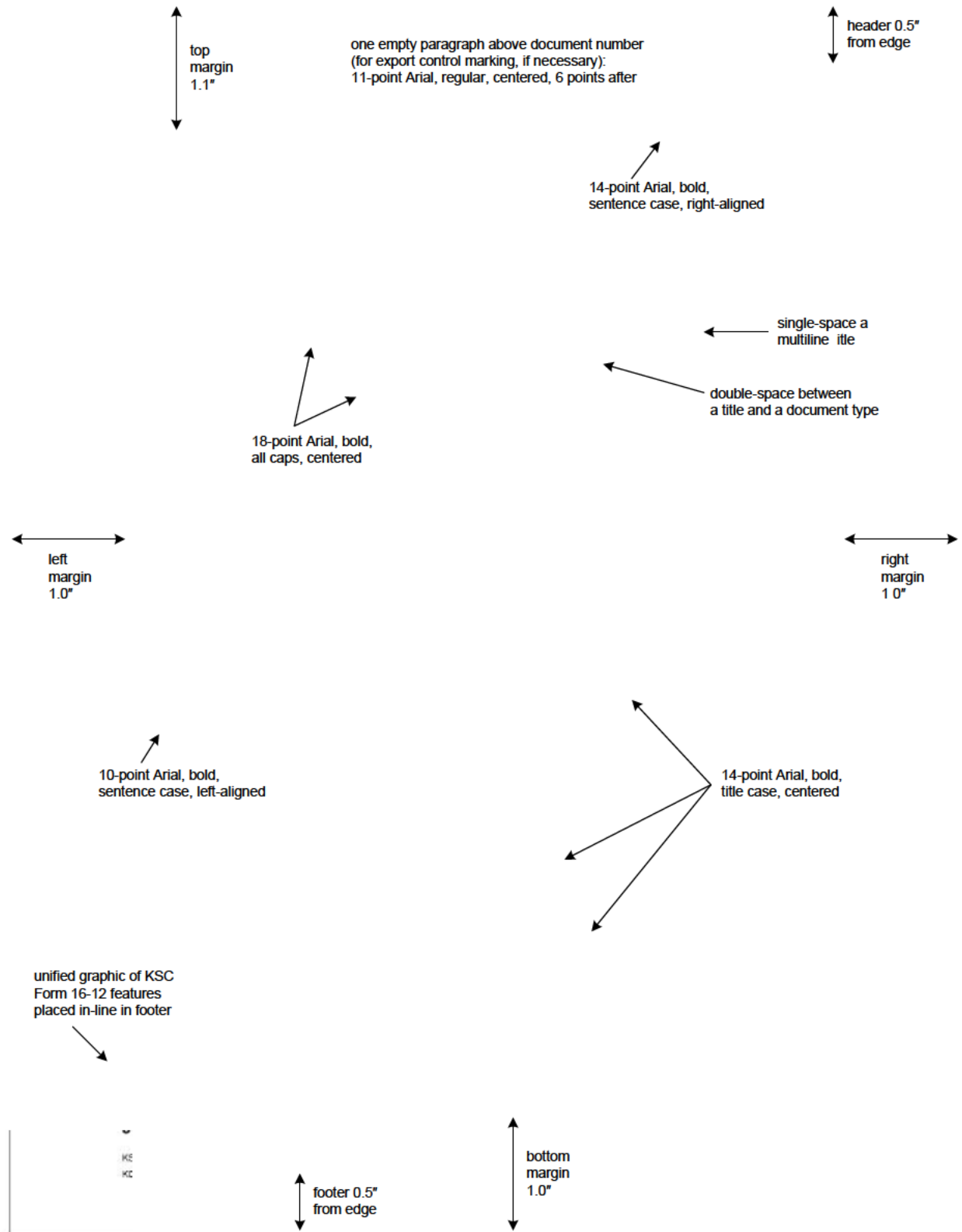


Figure 7. Example of a KSC Form 16-12 Cover

5.2 Signature Page

Evidence of the identity, title, and signature (whether physical or electronic) of the [release](#) authority for each document should be easy to find.

For [formal documents](#), a mandatory signature page provides this evidence. The [release](#) authority for a formal document is usually the director of the sponsoring directorate, though that authority may be delegated. At the direction of the release authority (or designee), other signatories (authors and reviewers) may be shown.

For [engineering documents](#), the document repository may store this evidence. If that is the case, the project or [release](#) authority may choose not to include a signature page in an engineering document. For engineering documents, the release authority and other signatories are determined by the program or project.

Regardless of document type, the number of signatories should be kept to a minimum. Multiple signature pages are to be avoided. If a second signature sheet is unavoidable, it should show the signatures of reviewers only—**not the [release](#) authority.**

Use plain paper—**not KSC Form 16-12.**

Except for the [Cancellation emblem](#) (when necessary—see 6.3), add no emblems or logos to a signature sheet.

Observe the following conventions for components of the signature pages of [formal documents](#) and [engineering documents](#):

- a. **Document Number, Revision Level, and Change Number (if Applicable):** Follow the instructions in 5.1.b.
- b. **Document Title:** Follow the instructions in 5.1.c.
- c. **Signature Blocks**
 - (1) Use the following labels for the roles of signatories:
 - “Prepared by:” for authors,
 - “Concurrence by:” for reviewers, and
 - “Approved by:” for the [release](#) authority.
 - (2) For documents with up to three signatories, center the signature blocks in a single column between the left and right margins. For documents with more signatories, use two columns, and see 5.2.c.(3).
 - (3) When multiple signatories share a role (as authors, reviewers, or [release](#) authorities), arrange the signature blocks for shared roles side by side and then in multiple rows, if necessary. Don’t place signature blocks of different roles side by side. When two signature blocks are side by side, align the signature lines vertically, and label only the top left signature block for the particular role.
 - (4) Allow ample vertical space for written signatures.

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- (5) Set all text in 11-point Arial type, and align all text below the corresponding signature line at the left edge of the block. If space is tight because of multiple signatories, reduce the type to 10 points, especially if it will preclude the need for a second signature page.
- (6) Try to show all names consistently. Initials and last name are sufficient, but honor any expressed preferences for fuller name representations. Academic titles and abbreviations are unnecessary.
- (7) In [formal documents](#) with multiple signatories and in [engineering documents](#), place the signatory's mail code after the name, but on the same line, and separate the name and mail code with a [comma](#). Below the name, show the signatory's functional title first, and then give enough context (program, project, system, office, etc.) for the association with the subject of the document to be clear. For example, write "Lead Design Engineer, CMASS" instead of "Engineer V." Show a managerial title first and then the office. For example, write "Chief, Technical Management Branch" instead of "Branch Chief, Technical Management."
- (8) In a [formal document](#) signed by only the director or other head of a KSC office or directorate, omit the mail code and place the signatory's functional title (for example, "Director") on the same line, immediately after the name and separated by a [comma](#). Place the name of the directorate or office on the following line.

If necessary in order to achieve good spacing, place the functional title and the name of the directorate or office (separated by a comma) below the signatory's name. In that case, don't place a comma after the signatory's name.

- d. **Release Date:** Follow the instructions in 5.1.e.
- e. **Footer:** In bold, 18-point Arial type and all caps, center the following in the [footer](#), between the left and right margins:

JOHN F. KENNEDY SPACE CENTER, NASA

Table 6 shows page assignments for the signature pages of [formal documents](#) and [engineering documents](#). Figure 8 shows an annotated signature page for three signatories, and Figure 9 shows an annotated signature page for more signatories with shared roles.

Table 6. Page Assignments for a Signature Page

Signature Page of Formal Document	Signature Page of Engineering Document
• Right-hand page	• Next page: backs up the cover when document is printed double-sided
• Counts as Page i but shows no page number	• Counts as Page 2 but shows no page number

one empty paragraph above document number
(for export control marking, if necessary):
11-point Arial, regular, centered, 6 points after

top margin
1.1"

header 0.5"
from edge

Document Number
Revision Basic

14-point Arial, bold,
sentence case, right-aligned

SUBSYSTEM OR COMPONENT

DOCUMENT TYPE

18-point Arial, bold,
all caps, centered

left margin
1.0"

right margin
1.0"

Prepared by:

F.M. Lastname, Mail Code
Lead Engineer, CMASS

Concurrence by:

F.M. Lastname, Mail Code
Project Manager, CMASS

Approved by:

F.M. Lastname, Mail Code
Systems Engineer, CMASS

all text in signature blocks:
11-point Arial, regular,
title case, left-aligned

all signature lines:
typed underscores, not drawn lines

14-point Arial, bold,
sentence case, centered

Month d, yyyy

18-point Arial, bold,
all caps, centered

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bottom margin
1.0"

footer 0.5"
from edge

Figure 8. Signature Sheet for Three Signatories

The diagram illustrates the layout of a signature sheet, showing margins, headers, and signature blocks. The layout is defined by the following elements:

- Top Margin:** 1.1" (indicated by a vertical double-headed arrow).
- Header:** 0.5" from edge (indicated by a vertical double-headed arrow).
- Document Number:** 14-point Arial, bold, sentence case, right-aligned.
- Revision:** Basic.
- Subsystem or Component:** 18-point Arial, bold, all caps, centered.
- Document Type:** 18-point Arial, bold, all caps, centered.
- Left Margin:** 1.0" (indicated by a horizontal double-headed arrow).
- Right Margin:** 1.0" (indicated by a horizontal double-headed arrow).
- Signature Blocks:**
 - Prepared by:** F.M. Lastname, Mail Code, Functional Title. All text in signature blocks is 11-point Arial, regular, title case, left-aligned.
 - Concurrence by:** F.M. Lastname, Mail Code, Functional Title.
 - Approved by:** F.M. Lastname, Mail Code, Functional Title.
- Signature Lines:** All signature lines are typed underscores, not drawn lines.
- Date:** 14-point Arial, bold, sentence case, centered, format: Month d, yyyy.
- Bottom Margin:** 1.0" (indicated by a vertical double-headed arrow).
- Footer:** 0.5" from edge (indicated by a vertical double-headed arrow).
- Organization:** 18-point Arial, bold, all caps, centered: JOHN F. KENNEDY SPACE CENTER, NASA.

Figure 9. Signature Sheet for Signatories with Shared Roles

5.3 Record of Revisions/Changes

NOTE

In this section, whenever Revision or Change represents an edition of a document (whether released or being prepared), the term is capitalized to distinguish it from its more common use to represent the concept of the corresponding altered state.

Evidence of the release history for each document should be easy to find. For formal documents, a mandatory record of revisions/changes provides this evidence. For engineering documents, the document repository may store this evidence. If that is the case, the project or release authority may choose not to include a record of revisions/changes in an engineering document.

The record of revisions/changes consists of a table listing the Revision level, Change number, description, and effective date, from left to right.

Observe the general conventions for tables explained in 3.18 and the following conventions for records of revisions/changes of formal documents and engineering documents. Also see Figure 10 and Figure 11.

a. **Overall Formatting**

- (1) Title the page “RECORD OF REVISIONS/CHANGES.” Use bold, 11-point Arial type, and center the title at the top of the page. **Don’t** place this title within the table.
- (2) Set column headings as bold, 11-point Arial type.
- (3) Set data cells as 11-point Times New Roman type.
- (4) **Don’t** allow a row to break across pages, **except** for a Change with a long enumerated list of modifications (see 5.3.d(3) and f(3)).
- (5) When the record extends to additional pages, repeat the column headings, **but not** the page title.
- (6) **Don’t** include the record of revisions/changes in the table of contents.

b. **Release of a Basic Edition**

- (1) Leave the REV LTR and CHG NO. cells blank.
- (2) In the DESCRIPTION cell, type “Basic issue.”
- (3) In the DATE cell, repeat the release date from the cover.

c. **Release of an Initial Revision**

- (1) Place the corresponding uppercase letter in the REV LTR cell, and leave the CHG NO. cell blank.

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- (2) Unless a more specific description is necessary, in the DESCRIPTION cell, type “General revision.”
- (3) Where a more specific description is desired, make an enumerated list with Arabic numbers, beginning with 1. (See the parallel example for Change A-1 in Figure 10.) Express each major content modification as a verb phrase in past tense. Set each phrase in sentence case (see 3.12.1), and end each phrase with a period. Notice that not every instance of a broad change needs to be listed.
- (4) In the DATE cell, repeat the release date from the cover.
- (5) See 6.1 for more information about Revisions.
- (6) If the document being developed requires a record of revisions/changes and the prior edition did not include one, compile one showing Revision levels, Change numbers (if any), effective dates, and minimal descriptions. Show the Basic edition and all Revisions and Changes—**but not drafts**.

d. **Release of an Initial Change**

- (1) Leave the REV LTR cell empty.
- (2) In the CHG NO. cell, enter the combination of the Revision level and the Change number, for example, “Basic-1” or “A-1.”
- (3) In the DESCRIPTION cell, make an enumerated list with Arabic numbers, beginning with 1. (See the example for Change A-1 in Figure 10, and see 6.2 regarding the vertical line in the margin of the row for Change A-1.) Express each major content modification as a verb phrase in past tense. Set each phrase in sentence case (see 3.12.1), and end each phrase with a period.
- (4) In the DATE cell, repeat the release date from the cover.
- (5) See 6.2 for more information about Changes.

REV LTR	CHG NO.	DESCRIPTION	DATE
		Basic issue.	September 30, 2011
A		General revision.	November 18, 2012
	A-1	<ol style="list-style-type: none"> 1. Corrected a misnumbered paragraph in 1.2.g and renumbered subsequent paragraphs in 1.2. 2. Clarified applicability of NASA-STD-5005 in 1.2.i. 3. Corrected references in 1.2.k. 4. Demoted FED-STD-595 and MSFC-STD-486 from applicable document in 2.2 to reference document in Appendix C. 5. Added ASHRAE Handbook—Fundamentals to applicable documents in 2.3. 	June 6, 2013

Figure 10. Record of Revisions/Changes for a Change Following a Revision

e. Release of a Revision Following a Change

- (1) Place the corresponding uppercase letter in the REV LTR cell, and leave the CHG NO. cell empty.
- (2) Unless a more specific description is necessary, in the DESCRIPTION cell, type “General revision.” Then mention the incorporation of the modifications from all the [Changes](#) since the prior [Revision](#). Figure 11 shows the record of revisions/changes for the next Revision after the release of the Change that was illustrated in Figure 10.
- (3) Reduce the enumerated modifications for the prior [Change](#) to a summary, as is shown for Change A-1 in Figure 11.
- (4) In the DATE cell, repeat the [release](#) date from the cover.
- (5) See 6.1 for more information about [Revisions](#) and 6.2 for more information about [Changes](#).

REV LTR	CHG NO.	DESCRIPTION	DATE
		Basic issue.	September 30, 2011
A		General revision.	November 18, 2012
	A-1	Corrected a misnumbered paragraph and various applicable and reference documents.	June 6, 2013
B		General revision. Incorporated Change A-1.	July 8, 2014

Figure 11. Record of Revisions/Changes for a Revision Following a Change**f. Release of Consecutive Changes**

- (1) Leave the REV LTR cell empty.
- (2) In the CHG NO. cell, enter the combination of the [Revision](#) level and the [Change](#) number, for example, “Basic-2” or “A-2.”
- (3) In the DESCRIPTION cell, make an enumerated list with Arabic numbers, beginning with 1. (See the example for Change A-1 in Figure 10, and see 6.2 regarding the vertical line in the margin of the row for Change A-1.) Express each major content modification as a [verb phrase](#) in past [tense](#). Set each phrase in sentence case (see 3.12.1), and end each phrase with a [period](#).
- (4) In the DATE cell, repeat the [release](#) date from the cover.
- (5) Reduce the enumerated modifications for prior [Changes](#) to a summary, as is shown for Change A-1 in Figure 11.
- (6) See 6.2 for more information about [Changes](#).

Table 7 shows page assignments for the records of revision/changes for [formal documents](#) and [engineering documents](#).

Table 7. Page Assignments for a Record of Revisions/Changes

Record of Revisions/Changes in Formal Document	Record of Revisions/Changes in Engineering Document
• Left-hand page: backs up the signature page	• Next page: backs up the signature page when document is printed double-sided
• Page numbering: “ii” at left margin of footer	• Page numbering: “Page # of <Total>” in center of footer

5.4 Foreword, Preface, Acknowledgment, and Executive Summary

Any or all of these optional elements may be included in the [front matter](#) of a [formal document](#) or an [engineering document](#) at the discretion of the project or [release](#) authority. These elements should be placed in the order shown in the title of 5.4. See 5.4.1 through 5.4.3 for specific writing conventions for these elements, but observe the following overall formatting conventions:

- Set the title of each of these elements in bold, 11-point Arial type, and center it between the margins.
- Don’t** include the title in the table of contents.
- Allow a comfortable space (at least 18 points) between the title and the text.
- Set all [paragraphs](#) in 12-point Times New Roman type.
- Use block-style [paragraphs](#), left-aligned with ragged right margins.

Table 8 shows page assignments for these elements of the [front matter](#) in [formal documents](#) and [engineering documents](#).

5.4.1 Foreword and Preface

A foreword (which is written by someone other than the author of the document) and a preface (which is written by the author of the document) serve the same purpose: to provide interesting though nonessential background, such as how a project was conceived or its history. Observe the following conventions for writing forewords or prefaces, and also see Table 8.

- Don’t** include material that is essential for understanding the document as a whole, unless that material is repeated in the [body](#) of the document.
- Don’t** write a foreword or preface as an executive summary (see 5.4.3).
- Identify the author of a foreword by name and title at the end of the foreword text.
- If the document does not include a signature page, identify the author of a preface at the end of the preface text.

- e. **Don't** include tables or complicated lists.
- f. Avoid placing figures in a foreword or preface, but if they are necessary to serve the message, include only simple drawings or photographs—**not** complex diagrams or charts.
- g. Apply the conventions explained in 3.17 to figures in a foreword or preface, with the following exceptions:
 - (1) **Don't** number the figures or include them in the list of figures.
 - (2) Refer to figures in a foreword or preface generally rather than specifically, for example, “as shown in the figures.”

**Table 8. Page Assignments for a
Foreword, Preface, Acknowledgment, and Executive Summary**

Element	Formal Document	Engineering Document
Foreword	<ul style="list-style-type: none"> • Right-hand page • Page numbering: “iii” at right margin in footer (following a one-page record of revisions/changes) 	<ul style="list-style-type: none"> • Next page: backs up the record of revisions/changes when document is printed double-sided • Page numbering: “Page # of <Total>” in center of footer
Preface	<ul style="list-style-type: none"> • Right-hand page if no foreword; otherwise, can follow foreword on same page or can start on next page • Page numbering follows pattern at left or right margin in footer 	<ul style="list-style-type: none"> • Next page but can follow foreword on same page • Page numbering: “Page # of <Total>” in center of footer
Acknowledgment	<ul style="list-style-type: none"> • Right-hand page if no foreword or preface; otherwise, can follow foreword or preface on same page or can start on next page • Page numbering follows pattern at left or right margin in footer 	<ul style="list-style-type: none"> • Next page but can follow foreword or preface on same page • Page numbering: “Page # of <Total>” in center of footer
Executive Summary	<ul style="list-style-type: none"> • Right-hand page • Page numbering follows pattern at left or right margin in footer 	<ul style="list-style-type: none"> • Next page • Page numbering: “Page # of <Total>” in center of footer

5.4.2 Acknowledgment

An acknowledgment may be written by the author of the document or by someone else closely involved with the subject of the document to thank individuals or groups for their contributions. Observe the following conventions for writing acknowledgments, and also see Table 8.

- a. Try to express the gratitude and to describe the contributions specifically and in a personal tone. See 3.7 about the use of personal [pronouns](#).
- b. Be thorough (or even generous) in acknowledging contributions—you won't have a second chance.
- c. Show all names and titles accurately, reflecting individuals' preferences. If you are not sure about how contributors wish to be identified, contact them.

- d. **Don't** include tables, figures, or lists in an acknowledgment.
- e. Identify the author of an acknowledgment by name and title at the end of the acknowledgment text.

5.4.3 Executive Summary

An executive summary does what the term implies: it summarizes a document's content for one or more executives. Its purpose is to help those executives make informed decisions quickly. An executive summary is appropriate for a document that reports findings, such as the results of a test, assessment, analysis, investigation, or trade study. It is not appropriate for a short document or for a long detailed account without conclusions or findings, such as a requirements document. Observe the following conventions for writing and organizing the material in executive summaries, and also see Table 8.

- a. Though an executive summary has no minimum or maximum length, keep it as short as possible to adequately cover the material.
- b. Write at a high level, but include enough detail and discussion to convince your executive readers that your findings are valid. **Don't** refer to material in the [body](#) or in an [appendix](#).
- c. Make your conclusions clear from the start and easy for your executive readers to find.
- d. Include **essential** figures or tables, and apply the conventions explained in 3.17 and 3.18 to figures and tables in an executive summary, with the following exceptions:
 - (1) Label figures and tables as "Executive Figure" and "Executive Table," and number them in a simple sequence (1, 2, etc.).
 - (2) **Don't** include figures or tables from an executive summary in a list of figures or tables.
- e. If titled sections and subsections will make the executive summary easier to understand, try to use **no more than three unnumbered** levels as follows:
 - (1) For the **first level**, set the titles in bold, 11-point Arial type in all caps, aligned at the left margin.
 - (2) For the **second level**, set the titles in bold, 11-point Arial type in title case (see 3.12.2), aligned 0.5 inch from the left margin. Align runover title text with the first line of the heading.
 - (3) For the **third level**, set the titles in bold, italic, 11-point Arial type in title case (see 3.12.2), aligned 1.0 inch from the left margin. Align runover title text with the first line of the heading.
 - (4) **Don't** include sections or subsections of an executive summary in the table of contents.

5.5 Table of Contents

A table of contents is required for all [formal documents](#). It is required for [engineering documents](#) (1) whose [body](#) and any [appendices](#) exceed 15 pages or (2) that include either a list of figures or a list of tables (see 5.6).

Observe the following conventions for tables of contents:

- a. Make a single table of contents for sections and subsections of the body and titles of [appendices](#). Don't place appendix titles in a separate table.
- b. Title the page "CONTENTS"—**not** "TABLE OF CONTENTS." Use bold, 11-point Arial type, and center the title at the top of the page. If the table of contents extends to another page, **don't** repeat the page title.
- c. Allow a comfortable space (at least 18 points) between the title and the text.
- d. **Don't** include column labels for sections, titles, or page numbers.
- e. Set the entries in 11-point Arial type, and apply the same [casing](#) used in the corresponding titles in the [body](#).
- f. Left-align the numbers of sections and subsections and the labels and identifiers of [appendices](#) (for example, "APPENDIX A") at the left margin.
- g. Left-align the titles of sections, subsection, and [appendices](#) 1.25 inches from the left margin.
- h. **Don't** allow long titles to crowd page numbers. Break long titles well short of the width necessary for page numbers, and align any runover title text with the beginning of the title.
- i. Right-align page numbers at the right margin, with leader dots from the ends of the titles.
- j. **Don't** include elements of the [front matter](#) (record of revisions/changes; foreword; preface; acknowledgment; executive summary; table of contents; or lists of figures, tables, or abbreviations) in the table of contents.
- k. Begin entries with the first section in the [body](#).
 - l. Show up to five body levels (for example, "1.2.3.4.5") in the table of contents.
- m. **Don't** show subsections within [appendices](#).
- n. Double-space before entries for sections and [appendices](#), for example, between "1.3" and "2," but **not** between "1.2" and "1.3."
- o. Show numbers and titles as they appear in the [body](#) and [appendices](#). Using the word processing program's automatic features (styles, etc.) will make the table of contents as accurate as it can be.

Table 9 shows page assignments for tables of contents in [formal documents](#) and [engineering documents](#).

Table 9. Page Assignments for a Table of Contents

Table of Contents in Formal Document	Table of Contents in Engineering Document
• Right-hand page	• Next page
• Page numbering follows pattern at right margin in footer	• Page numbering: “Page # of <Total>” in center of footer

5.6 Lists of Figures and Tables

Lists of figures and tables are required for documents that contain more than five figures or tables. Although you show figures and tables in separate lists, observe the following conventions for both lists:

- a. Place the list of figures before the list of tables.
- b. Title the lists “FIGURES” and “TABLES”—**not** “LIST OF FIGURES” and “LIST OF TABLES.” Use bold, 11-point Arial type, and center the title between the margins. If a list extends to another page, **don’t** repeat the list title.
- c. Allow a comfortable space (at least 18 points) between the title and the entries.
- d. **Don’t** include column labels for figure or table numbers, titles, or page numbers.
- e. Set the entries in 11-point Arial type, and apply the same [casing](#) used in the corresponding titles in the [body](#).
- f. Align the labels and numbers of figures and tables at the left margin.
- g. Separate the figure or table number from its title with a [period](#) and a space.
- h. **Don’t** allow long titles to crowd page numbers. Break long titles well short of the width necessary for page numbers, and align any runover title text with the beginning of the title.
- i. Single-space between entries.
- j. Show numbers and titles as they appear in the [body](#) and [appendices](#). Using the word processing program’s automatic features (styles, captions, etc.) will make the lists of figures and tables as accurate as they can be.
- k. **Don’t** show figures or tables from an executive summary (see 5.4.3) in a list of figures or tables.
- l. **Don’t** show the title of a list of figures or a list of tables in the table of contents.

Table 10 shows page assignments for lists of figures and tables in [formal documents](#) and [engineering documents](#).

Table 10. Page Assignments for Lists of Figures and Tables

Lists of Figures and Tables in Formal Document	Lists of Figures and Tables in Engineering Document
<ul style="list-style-type: none"> • List of figures can follow table of contents on same page or can start on next page • List of tables can follow table of contents (or list of figures) on same page or can start on next page 	<ul style="list-style-type: none"> • List of figures can follow table of contents on same page or can start on next page • List of tables can follow table of contents (or list of figures) on same page or can start on next page
<ul style="list-style-type: none"> • Page numbering follows pattern at left or right margin in footer 	<ul style="list-style-type: none"> • Page numbering: “Page # of <Total>” in center of footer

5.7 List of Abbreviations

A list of abbreviations is required for documents that contain 15 or more [abbreviations](#). Observe the following conventions for lists of abbreviations:

- a. Title the list “ABBREVIATIONS, ACRONYMS, AND SYMBOLS.” Use bold, 11-point Arial type, and center the title at the top of the page. If the list extends to another page, **don’t** repeat the list title.
- b. Allow a comfortable space (at least 18 points) between the title and the first entry.
- c. In an [engineering document](#) that contains abbreviations that were not called out in the [body](#) or [appendices](#) (see 3.5.3), place the following statement between the title and the first entry. Use 12-point Times New Roman type, and set the statement as a block-style [paragraph](#), left-aligned with a [ragged right margin](#):

Elements, units of measure, and other terms commonly understood within the subject disciplines are abbreviated in this document without callouts. Those abbreviations and symbols are among the following.
- d. **Don’t** include column labels for the abbreviation or the meaning.
- e. Align the abbreviations at the left margin.
- f. Set the abbreviations and meanings in 12-point Times New Roman type.
- g. Align the meanings 1.5 inches to 2 inches from the left margin, and align any runover text with the beginning of the meaning. Increase the indentation of the entire meaning column if more space is necessary to accommodate a wide abbreviation.
- h. **Don’t** allow a meaning to be broken across pages.
- i. Allow enough space between entries to allow them to be read comfortably. You can adjust the spacing to prevent the final few entries from requiring an additional page.
- j. If the document content is highly scientific or mathematical, consider a separate list for Latin or Greek symbols.
- k. List all abbreviation and meanings (including those for rates) as singular. For example, define *V* as *volt*—**not** *volts*—and *mph* as *mile per hour*—**not** *miles per hour*.
- l. Capitalize only those meanings that are [proper nouns](#).

- m. **Don't** show the title of a list of abbreviations in the table of contents.
- n. **Don't** show the following abbreviations or types of abbreviations in the list of abbreviations: days, months, states, U.S. territories, symbols for mathematical operators, the dollar symbol (\$), the percent symbol (%), or *U.S.* when it stands for *United States*.
- o. Make sure that the list of abbreviations contains only those abbreviations that appear in the document.

Table 11 shows page assignments for lists of abbreviations in [formal documents](#) and [engineering documents](#).

Table 11. Page Assignments for a List of Abbreviations

List of Abbreviations in Formal Document	List of Abbreviations in Engineering Document
• Right-hand page	• Next page
• Page numbering follows pattern at right margin in footer	• Page numbering: "Page # of <Total>" in center of footer

5.8 Sections and Subsections

Observe the following conventions for establishing sections and subsections:

- a. Although word processing programs offer many levels of automatically numbered headings, keep the number of levels to the minimum that will adequately organize the material, but see 5.8.c.
- b. Set all headings (that is, the numbers and titles of sections and subsections) in bold, 11-point Arial type.
- c. Apply outline numbering with Arabic numbers (1., 1.1, 1.1.1, etc.), as is done in this guide. Add a closing decimal point to **only** the first level.
- d. Separate the heading numbers from the titles with a [tab](#). Align any runover title text with the beginning of the title.
- e. With the exception of a requirements document, don't subdivide a section or subsection into **only** one subsequent subsection. That is, don't allow Section 1 without Section 2 or allow 2.1 without 2.2. In a requirements document, in which individual requirements are outline-numbered but not titled, a single numbered requirement may exist within a titled section or subsection.
- f. Except as is explained in 5.8.e, give each outline-numbered section and subsection a title. Set the titles of whole sections (such as Section 3, but not 3.1 or 3.1.1) in all caps, and set the titles of subsections (such as 2.1 or 4.2.15) in title case (see 3.12.2).
- g. Express titles as simple [noun](#) phrases (as appear in the titles of sections and subsections throughout this guide) set in title case (see 3.12.2), without end punctuation. Keep titles brief but descriptive. Except where a pattern of subsections applies to multiple subjects in the document, make each title unique.

- h. Double-space between the title of a section or subsection and the [paragraph](#) that follows it, and keep the section or subsection title and the beginning of its first paragraph on the same page. If a section or subsection title is followed by another subsection title, keep both titles and the beginning of their first paragraph on the same page.
- i. Don't force new sections to the tops of pages simply as a matter of course, but see 5.11.c.

5.9 Section for Introductory Material

The first section of a document introduces the subject and context of the document and customarily discusses purpose and scope. In addition to applying the general guidance of 5.8, observe the following conventions for introductory sections:

- a. Keep all introductory material in a single section (that is, in Section 1).
- b. Arrange any subsections logically, and keep the content concise and on topic.

5.10 Section for Applicable or Reference Documents

The second section of a document is reserved for a listing of documents in the following categories:

- **applicable document:** a document whose authority is expressly invoked by the current document to a specified degree.
- **reference document:** a document whose authority is not expressly invoked by the current document but that provides relevant though nonessential information.

Refer to Section 2 as an example of properly formatted lists of [applicable documents](#) and [reference documents](#). In addition to applying the general guidance of 5.8, observe the following conventions for this section:

- a. If there are both [applicable documents](#) and [reference documents](#), title Section 2 as “Documents,” 2.1 as “Applicable Documents,” and 2.2 as “Reference Documents.” Place the following introductory [paragraph](#) immediately below the title “Applicable Documents,” and then list the documents that apply to each subsection as instructed in 5.10.e.

“The following documents form a part of this document to the extent specified herein.”
- b. If there are only [applicable documents](#), title Section 2 as “Applicable Documents,” place the introductory [paragraph](#) shown in 5.10.a, and then apply the guidance in 5.10.d.
- c. If there are only [reference documents](#) (cited or not), title Section 2 as “Reference Documents” and apply the guidance in 5.10.d and e.

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- d. If either [applicable documents](#) or [reference documents](#) come from both Government and Non-Government sources, establish subsections at the next lower level and title them as “Government Documents” and “Non-Government Documents,” in that order. Then list the documents that apply to each subsection as instructed in 5.10.e.
- e. Arrange and format each list in Section 2 as follows:
 - (1) Set each list of documents in two untitled columns in 12-point Times New Roman type, with the document numbers on the left and the titles on the right.
 - (2) **Don’t italicize** the titles here.
 - (3) If an [applicable document](#) or [reference document](#) has no document number or International Standard Book Number (ISBN), leave the left column blank.
 - (4) If an [applicable document](#) or [reference document](#) has both a document number and an International Standard Book Number (ISBN), show the document number first, and place the ISBN in [parentheses](#) below the document number.
 - (5) Indent the document numbers at least 0.5 inch from the left margin. Indent the titles at least 2.5 inches from the left margin, and if necessary, increase that indentation consistently for all lists in Section 2 to accommodate the length of the longest document number or book number.
 - (6) If you are writing a legally binding document, such as a contract, procurement specification, statement of work, or performance work statement, specify the edition or revision level of each [applicable document](#). **Otherwise, don’t** specify editions or revision levels of applicable documents.
 - (7) Try to show each title as it appears on the document cover, but don’t try to mimic fonts or spacing. Do not abbreviate titles unless multiple titles are long and difficult to comprehend quickly. You may then replace phrases with well-recognized abbreviations, as long as you explain this method in a paragraph that immediately precedes the particular list. Except for ISO standards (which observe sentence case [see 3.12.1] for titles and subtitles) and the Code of Federal Regulations (which observes title case for titles and parts [see 3.12.2] and observes sentence case for sections), apply title case to document titles.
 - (8) Align any runover title text with the beginning of the title.
 - (9) **Don’t** allow a title to be broken across pages.
 - (10) Allow enough vertical space between document entries to allow them to be read comfortably.
 - (11) In new documents, make no further source distinctions (such as for NASA Centers, for U.S. Government agencies, or for scientific or industrial organizations). In Revisions, retain any further source distinctions that remain useful.
 - (12) Sort each list alphanumerically by document number or book number.

5.11 Paragraphs

Observe the following conventions for [paragraphs](#) in the [front matter](#), [body](#), and [appendices](#):

- a. Unless otherwise noted, use 12-point Times New Roman type.
- b. Set the [paragraphs](#) in block style (that is, without initial indentation) aligned at the left margin. Keep a [ragged right margin](#). **Don't** use [justification](#). Single-space all lines within paragraphs, but double-space between paragraphs.
- c. **Don't** allow a single line of a multiline [paragraph](#) to be stranded at the top of a page (a [widow](#)) or at the bottom of a page (an [orphan](#)). Engaging the widow/orphan protection feature of the word processing program will usually keep three-line paragraphs from breaking across pages. In general, try to keep short paragraphs (five lines or less) on a single page.
- d. Keep any [sentence](#) or [clause](#) that uses a [colon](#) to signal the introduction of a list or explanatory text (sentences, clauses, [phrases](#), or words) on the same page with the beginning of the list or explanatory text, whether in the same [paragraph](#) or separate paragraphs. Likewise, when a paragraph ends in a sentence that is completed by items in a vertical list (see Table 2) (and therefore does not take a colon), keep the end of the introductory paragraph and the first item on the same page.
- e. Avoid automatic [hyphenation](#) for two reasons: First, automatic hyphenation can give the impression that some words, especially those containing [prefixes](#) or [suffixes](#), are misspelled. Second, automatic hyphenation will allow the last word of a [paragraph](#) to be broken across lines and allow the last word on a page to be broken across pages. Avoid such breaks, regardless of whether automatic hyphenation is used.
- f. Avoid the use of [quotation marks](#), [italics](#), or underlining to emphasize words in running text, especially when the meaning (often figurative) is clear. If emphasis is essential, apply [bold](#) typeface.
- g. Use [italics](#) where it can highlight a pattern that applies to a section of text. An example is paragraphs that state individual requirements, where each requirement paragraph is followed by an explanatory or guidance paragraph. Setting the requirement paragraphs in [roman](#) type and the explanatory or guidance paragraphs in italic type can help your readers to quickly distinguish the purpose of a paragraph by its appearance. To use the technique most effectively, you should explain the pattern immediately before its first instance.

5.12 Appendices

[Appendices](#) are appropriate for large amounts of data or any amount of supplemental reference information that will not flow smoothly in the [body](#) of the document. Observe the following conventions for appendices:

- a. **Don't** reproduce other documents and attach them as [appendices](#) (see 3.22.2).
- b. Identify each [appendix](#) by a capital letter, starting with A.

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- c. Introduce each [appendix](#) in the [body](#) (or in a prior appendix) by label and identifier, as in, for example, “see Appendix A.”
- d. Arrange the [appendices](#) in the order in which they were introduced.
- e. In a [formal document](#), start each [appendix](#) on a right-hand (odd-numbered) page.
- f. In an [engineering document](#), start each [appendix](#) on a new page.
- g. At the top of the page, left-align the label **APPENDIX** (in all caps) and the identifying letter and follow them with a [period](#), a tab, and the title (also in all caps). **Don’t** use end punctuation.
- h. Set the label, the identifying letter, and the title in bold, 11-point Arial type. Align any runover title text with the beginning of the title.
- i. To divide an [appendix](#) into subsections, apply the following conventions:
 - (1) Outline-number the subsection headings in the following pattern: A.1 to identify the first-level subsection in Appendix A, A.1.1 to identify the second-level subsection in Appendix A, etc.
 - (2) **Don’t** subdivide an [appendix](#) or a subsection of an appendix into **only** one subsequent subsection. For example, don’t allow A.1 without A.2.
 - (3) **Don’t** include subsections of [appendices](#) in the table of contents.
 - (4) Left-align the subsection number and separate it from the title with a [tab](#).
 - (5) Set the title in bold, 11-point Arial type and in title case (see 3.12.2).
 - (6) Express titles as simple [noun phrases](#) (as appear in the titles of appendices in this guide) set in title case (see 3.12.2). Keep titles brief but descriptive. Except where a pattern of subsections applies to multiple subjects in the appendix, make each title unique.

Table 12 shows page assignments for appendices in [formal documents](#) and [engineering documents](#).

Table 12. Page Assignments for an Appendix

Appendix in Formal Document	Appendix in Engineering Document
• Right-hand page	• Next page
• Page numbering follows pattern at right margin in footer	• Page numbering: “Page # of <Total>” in center of footer

5.13 Multivolume Manuals or Documents

Avoid dividing manuals or documents into multiple volumes, but when they are necessary, observe the following and all other conventions in this guide:

- a. Devote each volume to a discrete aspect of the overall subject. Assign volumes logically. **Don’t** simply divide a long document into volumes at arbitrary points.
- b. Give each volume the same document number and overall title, but assign a distinct subtitle and a volume number in Roman numerals (I, II, III, etc.).

- c. Give each volume a cover (5.1), a signature page (5.2), a record of revisions/changes (5.3), a table of contents (5.5), and if warranted, lists of figures and tables (5.6) and a list of abbreviations (5.7).
- d. Place the volume number in the [header](#) of each page, separated from the document number by a comma, as in, for example, “KSC-GP-435, Volume I.”
- e. Reflect updates comprehensively and consistently across affected volumes, but [release Revisions](#) (6.1), [Changes](#) (6.2), or [Cancellations](#) (6.3) for only the affected volumes.

6. REVISIONS, CHANGES, AND CANCELLATIONS

NOTE

In this section, whenever [Revision](#), [Change](#), or [Cancellation](#) represents an edition of a document (whether released or being prepared), the term is capitalized to distinguish it from its more common use to represent the concept of the corresponding altered state.

6.1 Revisions

The following conventions apply to [Revisions](#) of all documents, but see [KDP-KSC-P-1538](#) for how Revisions of KSC Specifications and KSC Standards are processed.

- a. A Revision is issued for the following types of updates:
 - (1) additions, deletions, and updates of a significant portion of the total text,
 - (2) reorganization of material, or
 - (3) any important differences in scope, application, or technical content.
- b. The [Revision](#) includes the content of any [Changes](#) (see 6.2) that were [released](#) since the previous edition ([Basic](#) or Revision), and the record of revisions/changes mentions the inclusion of Changes by number.
- c. [Revisions](#) require at least the same participation, review, and approval that applied to the [Basic](#) edition.
- d. [Revisions](#) are identified by capital letters, beginning with A.
- e. The revised content requires no special formatting.
- f. The reflection of a [Revision](#) in the record of revisions/changes is described in 5.3.

6.2 Changes

The project or release authority determines whether [Changes](#) are [released](#) for associated [engineering documents](#) and how those Changes will be indicated.

The following conventions apply to Changes against all [formal documents](#) (including KSC Specifications and KSC Standards), but see [KDP-KSC-P-1538](#) for how Changes against KSC Specifications and KSC Standards are processed.

- a. A [Change](#) is released when a full review is not warranted for the following types of updates:
 - (1) important editorial corrections (confusing typographical errors, title changes, paragraph renumbering, etc.),
 - (2) removal of obsolete requirements,
 - (3) removal of cancelled [applicable documents](#) with no replacements,
 - (4) substitution of cancelled applicable documents with replacements that were authorized by their cancellation, or
 - (5) addition of requirements or applicable documents that are already authorized or mandated by a NASA directive or by law.
- b. [Changes](#) are identified by appending the words “Change X” to the [Revision](#) level of the current edition, where “X” is the next available Arabic number. For example, the first Change against Revision Basic would be “Revision Basic, Change 1,” and the next Change would be “Revision Basic, Change 2.”
- c. The cover, title page, record of revisions/changes, and those pages whose technical content is affected by the [Change](#) are labeled as Change pages. Pages whose composition is affected only by the addition or deletion of material on prior pages (pages that roll) are also labeled as Change pages.
- d. The [Change emblem](#) appears on the cover of each [Change](#), as shown in Figure 12.
- e. The updated points are described clearly, concisely, and in parallel expression (see 3.11) in the record of revisions/changes (see 5.3).
- f. A vertical bar appears in the outer margin next to lines whose technical content is altered by the [Change](#).
- g. Lines whose composition (that is, the positions of their characters) is altered solely from the addition or deletion of material in prior lines are **not** marked with vertical bars.
- h. Vertical bars do not appear next to modifications to covers, signature pages, [headers](#), [footers](#), tables of contents, or lists of figures or tables.
- i. When multiple [Change](#) editions affect a page (whether from technical modifications marked with vertical bars, from page roll, or from a combination), all vertical bars are retained and the page is identified with the newest Change number.
- j. The participation and review associated with the preparation of a [Basic](#) edition or a [Revision](#) are neither required nor appropriate.

- k. All [Changes](#) are thoroughly reflected in the next [Revision](#). See 6.1.b.
- l. The reflection of a [Change](#) in the record of revisions/changes is described in 5.3.

6.3 Cancellations

- a. The project or [release](#) authority determines the method for indicating the [cancellation of engineering documents](#).
- b. [Formal documents](#) (including KSC Specifications and KSC Standards) are [cancelled](#) by [releasing](#) the signature page (see 5.2) bearing a [Cancellation emblem](#) in the upper left corner as shown in Figure 13. The Revision level is raised, and the document date is changed to the effective date of the cancellation. The cancellation statement identifies the number, [Revision](#) level, and release date of the document being cancelled and the supersession, if any. The cancellation statement appears in 12-point Arial type, centered, and in sentence case. Only the signature of the release authority needs to be shown on a cancellation signature page (see 5.2.c(8)). See [KDP-KSC-P-1538](#) for how Cancellations of KSC Specifications and KSC Standards are processed.

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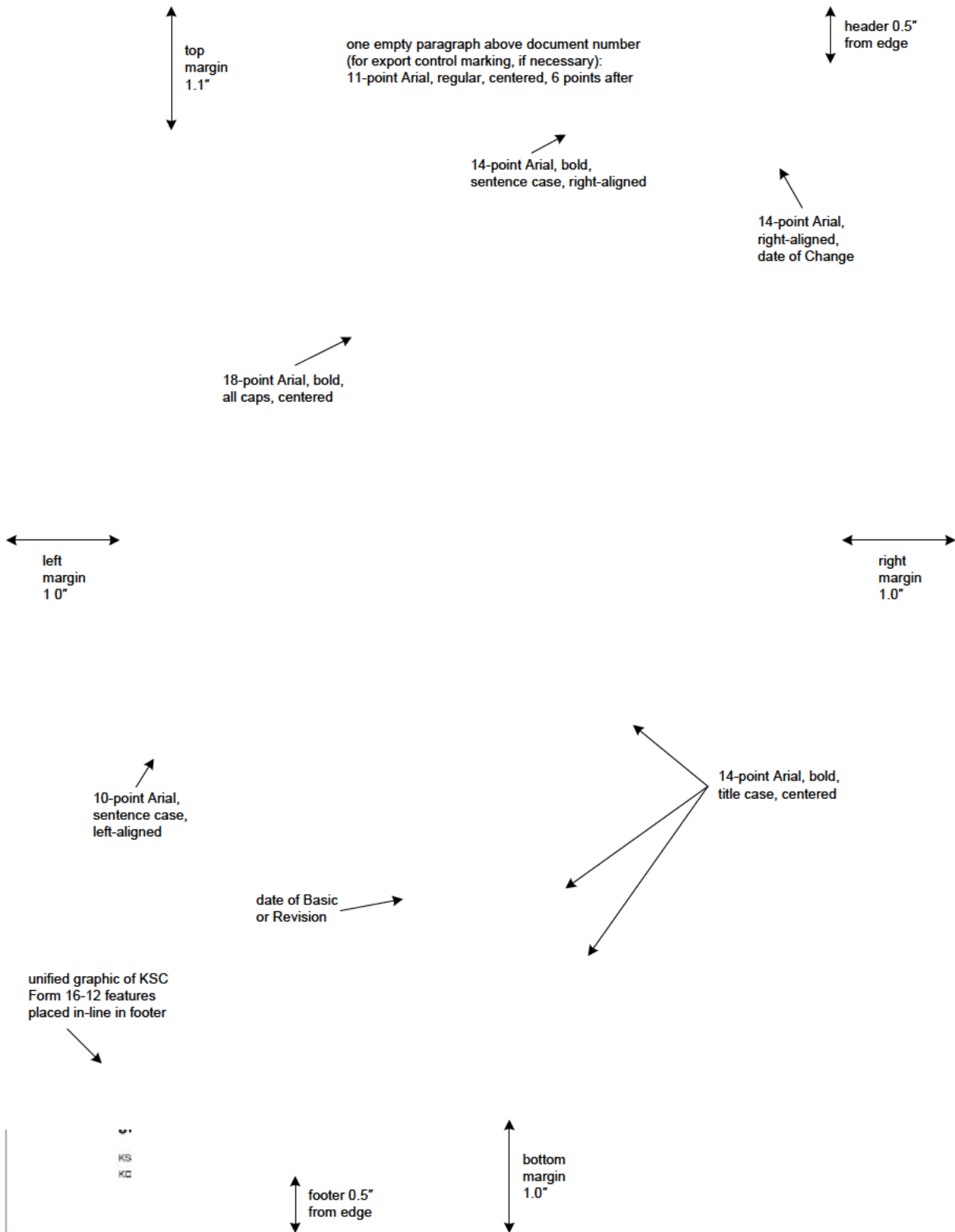


Figure 12. Example of the Cover for a Change Edition

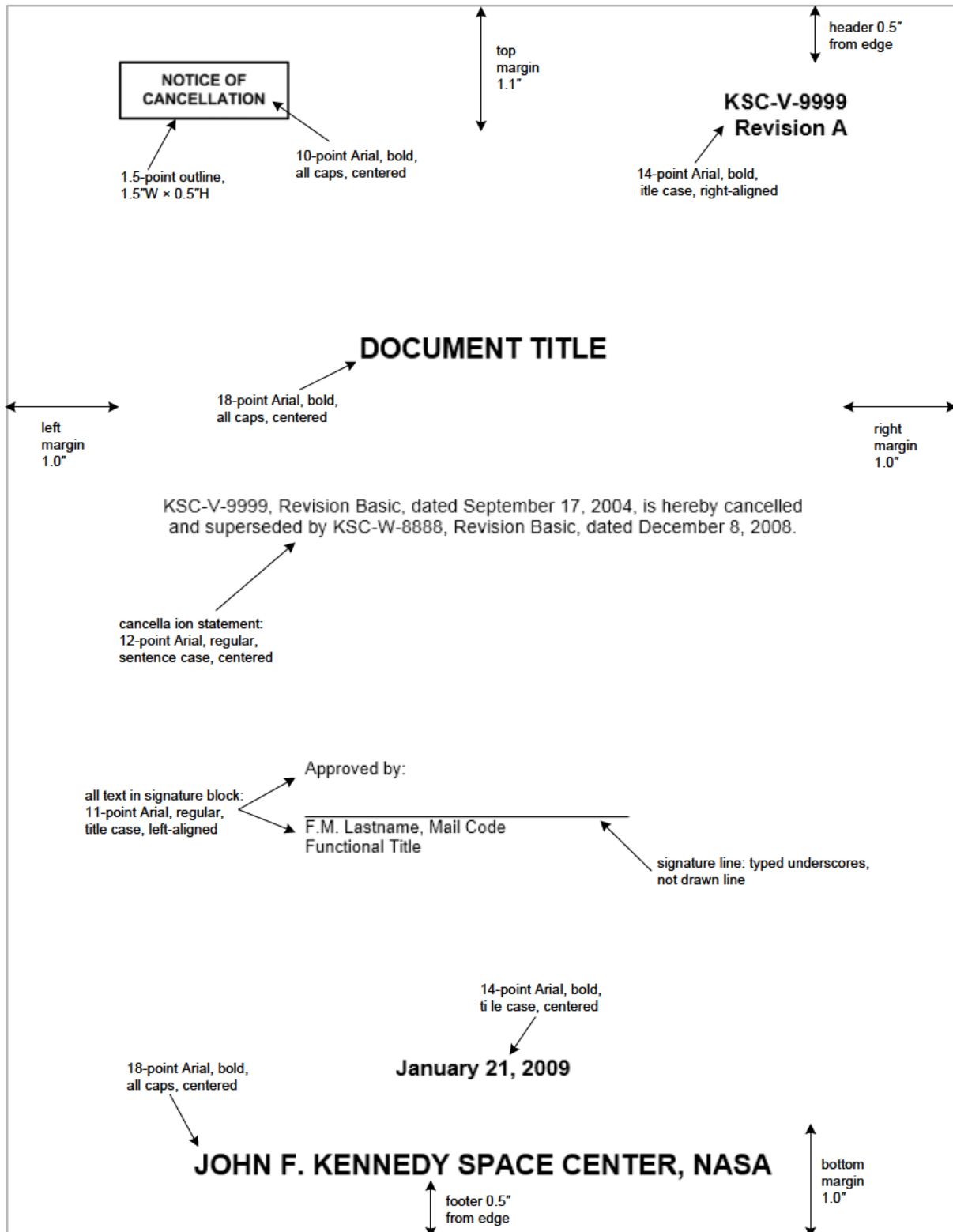


Figure 13. Example of the Cancellation of a Formal Document

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APPENDIX A. USE OF SPECIFIC TERMS

See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
#) (single closing parenthesis)	Avoid the use of a single closing parenthesis following an enumerator , whether it appears in running text or in a list. When enumerators need to be set off, especially in running text, always enclose them fully. Always keep such enumerators on the same line as the first word of the text they introduce.
& (ampersand [<i>and</i>])	The ampersand is used in running text only in an abbreviation. Its only other acceptable use is in a title that is specially formatted for visual effect (such as in a poster). In such a title, omit the comma that would have preceded <i>and</i> in a series of three or more items.
\$ (dollar)	Use the dollar symbol only with a value or to indicate the unit of measure for a table column or a graph axis. The symbol may be used in all documents, without callout or inclusion in lists of abbreviations. Use \$K, \$M, and \$B to indicate thousands, millions, and billions of dollars, respectively. Always repeat the dollar symbol and these abbreviated multiples, when applicable, for all such items in a series and on both sides of a range. Also see 3.16.5.
% (percent)	See percent , percentage , % .
(s) (es) (inflection)	See parenthetical plurals .
2-D, 3-D (adjective, noun)	The hyphenated form is preferred when <i>two-dimensional</i> or <i>three-dimensional</i> (adjective) is abbreviated. For consistency, retain the hyphen when this abbreviation represents the noun (<i>two dimensions</i> or <i>three dimensions</i>), as in “The launch was filmed in 3-D.” Keep the abbreviation from breaking across lines by using a nonbreaking hyphen .
about (adverb)	See approximately .
adapter (noun)	Spell as shown.
advance planning, advanced planning (noun)	See planning .
adviser (noun)	Spell as shown.
and/or (conjunction)	Avoid this combination. In nearly all cases, <i>or</i> conveys the possibility that either or both of the stated options apply. If you cannot trust <i>or</i> to carry your message, write, for example, “use <option 1>, <option 2>, or both.”
appear, display (verb)	Use <i>display</i> only transitively (with a direct object, as in “to display the instructions here” or “click More to display options”). To signify a resulting change in a computer interface, use <i>appear</i> or <i>appears</i> , as in “When you click More , additional options will appear.”
appendix, appendices (noun)	<i>Appendices</i> is the preferred plural.
approximately (adverb)	Use <i>approximately</i> instead of <i>about</i> or <i>around</i> to describe estimations in technical and scientific writing. Don’t use <i>approximately</i> with highly specific values. Don’t use <i>approximately</i> and any form of <i>estimate</i> in the same sentence. Write, for example, “The conduit holds approximately 50 cables” or “We estimate that the conduit can hold 50 cables,” not “The conduit is estimated to hold approximately 53 cables.”

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See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
as (conjunction)	Don't use <i>as</i> to introduce a clause of reason. Instead, use <i>because</i> , <i>since</i> , or <i>for</i> , as in, for example, "We chose this material because (not as) it is the industry standard."
as per (preposition)	See per .
assure, ensure, and insure (verb)	Use <i>assure</i> only to mean "to give confidence to." In active voice , use <i>assure</i> only with an object , as in, for example, "I assure (give confidence to) you that..." In passive voice , the object in the example (<i>you</i>) becomes the subject , as in "You were assured that..." Use <i>ensure</i> only to mean "to guarantee." Also see specific advice about ensure . Use <i>insure</i> only to mean "to protect against financial loss," as through an insurance policy.
axis, axes (noun) <i>x</i> -axis, <i>y</i> -axis, or <i>z</i> -axis (nouns)	When you identify a particular dimension of a coordinate system, italicize the dimension (such as <i>x</i> , <i>y</i> , and <i>z</i>), and connect it to the base word (<i>axis</i> —but not italicized) with a nonbreaking hyphen . When you identify multiple dimensions consecutively, take care to apply the same typesetting and suspend all but the final hyphen (for example, "the <i>x</i> - and <i>y</i> -axes") as explained in 3.9.5.
cancel, cancelled, cancelling (verb) cancellation (noun)	Spell as shown.
communication (noun) communications (noun)	Use <i>communication</i> as a noun or a modifier in the general sense of imparting or exchanging information (for example, "a method of communication" or "a communication plan"). Use <i>communications</i> as a noun or a modifier to indicate either a means of transmitting data (for example, "satellite communications" or "a communications network") or a field of study.
Coordinated Universal Time (noun)	Use this internationally accepted name (capitalized) instead of <i>Greenwich Mean Time</i> or <i>GMT</i> . Abbreviate it as <i>UTC</i> , but only if space is tight. Don't use <i>Universal Time Coordinate</i> or <i>Universal Time Coordinated</i> to align with the abbreviation.
D.C. (noun)	In other than a postal address, retain the periods when abbreviating <i>District of Columbia</i> , and don't insert spaces. Always identify the District of Columbia as "Washington, D.C."
directoriate (noun)	Treat the same way as program .
display (verb)	See appear .
division (noun)	Treat the same way as program .
due to (adjective phrase)	In strict terms, <i>due to</i> means <i>attributable to</i> . Reserve <i>due to</i> for opening an adjective phrase following some form of the verb <i>to be</i> , as in, for example, "the failure is due to a faulty circuit." For opening an adverb phrase, avoid <i>due to</i> in favor of a more precise phrase, such as <i>because of</i> , <i>as a result of</i> , <i>on account of</i> , or <i>as a consequence of</i> . Also, express reasons as specifically as possible. To illustrate, "the launch was delayed because of bad weather" is better stated and more precise than "the launch was delayed due to weather."

See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
e.g. (abbreviation)	This Latin abbreviation means “for example” or “such as.” Always retain the periods . Italicize <i>e.g.</i> only when it represents itself as a word (as it does in this sentence) or when it is part of text that is already italicized. Unless <i>e.g.</i> is representing itself as a word, always follow it with a comma . <i>E.g.</i> and the words or phrases it introduces are best enclosed in parentheses . Because examples are understood not to be exhaustive, never end a list introduced by <i>e.g.</i> with etc. Never begin a sentence with <i>e.g.</i> unless you are using it to represent itself as a word, as was done earlier in this note. Always keep <i>e.g.</i> on the same line as the first word of the text it introduces by placing a nonbreaking space between the comma and the next word. If there is any chance that your readers will mistake <i>e.g.</i> for the meaning of i.e. (<i>that is</i>), use the English words (either <i>for example</i> or <i>such as</i>) instead.
either (adjective)	Be careful of confusing <i>either</i> with <i>both</i> . <i>Either</i> means only one of two stated or clearly implied alternatives. Consider this example: “Keep a 3 ft clearance around either side of the door.” This tells the reader to pick one—and only one—side of the door and to keep a 3 ft clearance around that side. Use <i>either</i> when you mean only one of two alternatives. Use <i>both</i> when you mean both.
e-mail (noun, verb)	Always hyphenate this term, and use a nonbreaking hyphen to prevent the term from breaking across lines.
ensure (verb)	Try to notice words or phrases that exaggerate. A particular exaggerator is <i>ensure</i> , which means “to guarantee.” If you’re not comfortable replacing <i>ensure</i> with <i>guarantee</i> , don’t write <i>ensure</i> . Determine whether the outcome you claim to be ensured can indeed be ensured, and be certain that the agent, whether a person, system, or procedure, can truly ensure the outcome you claim. Adding <i>help</i> to <i>ensure</i> is not a good alternative if it is not truly possible to ensure the outcome you claim. A better approach is to analyze the agent for what it can actually do and to describe the capability directly (for example, using <i>improve</i> , <i>increase</i> , or <i>benefit</i>). This same caution applies to the use of <i>optimize</i> , <i>maximize</i> , <i>minimize</i> , <i>prevent</i> , and other words that denote the achievement of an ultimate or absolute outcome.
et al. (abbreviation)	This Latin abbreviation means “and others.” Always retain the period . Italicize <i>et al.</i> only when it represents itself as a word (as it does in this sentence). Use <i>et al.</i> only in footnotes , endnotes , or bibliographies . Use it to indicate all but the first author of a work by at least three authors, as in, for example, “H.W. Fowler et al.,” or “Garner, B.A., et al.”
etc. (abbreviation)	This Latin abbreviation means “and others” or “and so forth.” Always retain the period . Italicize <i>etc.</i> only when it represents itself as a word (as it does in this sentence) or when it is part of text that is already italicized. Unless <i>etc.</i> appears at the end of a sentence, always follow it with a comma . Don’t use “and etc.” Don’t use <i>etc.</i> in phrases that began with <i>such as</i> , <i>for example</i> , <i>namely</i> , <i>that is</i> , e.g. , or i.e.
flight equipment (noun)	Capitalize only in titles and column heads.
flight hardware (noun)	Capitalize only in titles and column heads.

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See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
gauge, gage (noun, verb)	<i>Gauge</i> is preferred, but <i>gage</i> is an acceptable variant if the spelling is consistent within the document and conforms to the spelling in any governing documents.
gray (adjective, noun)	Spell as shown. Don't use <i>gray</i> or <i>grayed out</i> to describe a computer option that cannot be selected. Use <i>unavailable</i> instead.
ground support equipment (noun)	Capitalize only in titles and column heads.
hard copy (noun) hard-copy (adjective)	A hard copy is a paper print of a software file. Avoid using the term as an adjective (as in, for example, "a hard-copy version") because the noun it modifies is usually superfluous. However, if the term is essential as an adjective, hyphenate it as <i>hard-copy</i> . Also see soft copy .
headquarters (noun)	For clarity, always distinguish between KSC Headquarters and NASA Headquarters. In these uses, capitalize the term, and use a singular verb with it. Without the attachment of a proper noun, set <i>headquarters</i> in lowercase (for example, "the company's headquarters is in Washington, D.C."). <i>Headquarters</i> implies a building, so don't write "KSC (or NASA) Headquarters building."
i.e. (abbreviation)	This Latin abbreviation means "that is." Always retain the periods . Italicize <i>i.e.</i> only when it represents itself as a word (as it does in this sentence) or when it is part of text that is already italicized. Unless <i>i.e.</i> is representing itself as a word, always follow it with a comma . <i>I.e.</i> and the words or phrases it introduces are best enclosed in parentheses . Because the words or phrases are understood to identify their subject definitively and exhaustively, never end a list introduced by <i>i.e.</i> with etc. Never begin a sentence with <i>i.e.</i> unless you are using it to represent itself as a word, which was done earlier in this note. Always keep <i>i.e.</i> on the same line as the first word of the text it introduces by placing a nonbreaking space between the comma and the next word. If there is any chance that your readers will mistake <i>i.e.</i> for the meaning of e.g. (<i>for example</i>), use the English words (<i>that is</i>) instead.
impact (noun, verb)	Avoid <i>impact</i> except for the sense of forceful physical contact. To express an unknown result, use a neutral noun , such as <i>effect</i> , <i>result</i> , <i>change</i> , or <i>consequence</i> . When the result is known, use a more descriptive noun, such as <i>delay</i> , <i>improvement</i> , <i>increase</i> , <i>benefit</i> , <i>decrease</i> , <i>reduction</i> , or <i>damage</i> . For a verb , use <i>affects</i> , <i>results in</i> , or <i>changes</i> when the effect is unknown. When the effect is known, use a more descriptive verb, such as <i>delays</i> , <i>improves</i> , <i>increases</i> , <i>benefits</i> , <i>decreases</i> , <i>reduces</i> , or <i>damages</i> .
incentivize (verb)	<i>Incentivize</i> is an unfortunate vogue word. Don't use it. Instead, identify the incentive that is offered by name. If you don't know the incentive or don't want to identify it, express the thought in terms of giving or offering an incentive, motivating or offering motivation, or inducing or offering an inducement.
include, to (infinitive phrase)	When it is necessary to emphasize that the message of the sentence applies to particular examples, <i>including</i> is preferred over <i>to include</i> . Also see including .

See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
including (preposition)	When the message of the sentence clearly applies to all members of a stated class, don't emphasize particular examples. To do so is redundant, as in, for example, "All ground support equipment designs shall comply with the requirements of KSC-DE-512-SM, including designs of fluid systems." Trust the reader to understand absolutes. When it is necessary to emphasize that the message of the sentence applies to particular examples, introduce the examples with <i>including</i> , and place a comma before <i>including</i> . Also see including but not limited to .
including but not limited to (prepositional phrase)	<i>Including</i> signals one or more examples. By definition, examples are not exhaustive. Don't write <i>including but not limited to</i> . See including .
inert (verb)	Don't use <i>inert</i> as a verb . Instead, write "purge" or "render <something> inert." Use <i>inert</i> as only an adjective .
<i>in situ</i> (adjective, adverb)	Use this Latin phrase, which means "in the natural or original position or place," only in scientific discussions. Always italicize it and show it as two separate words— without a hyphen. As part of text shown in title case (see 3.12.2), capitalize both words.
interface (noun, verb)	Don't substitute "interface with" for "work with," "communicate with," "talk to," "use," or any other more direct and more natural way of describing how people interact with other people, hardware, or computer programs. Reserve <i>interface</i> (as a noun or a verb) for discussions of how items of hardware or software interconnect or work.
Internet (noun)	Capitalize the term.
issue (noun)	Avoid <i>issue</i> as a substitute for <i>problem</i> , <i>concern</i> , <i>factor</i> , etc. Use <i>issue</i> to signify topics that are open to debate.
its (pronoun) it's (contraction)	<i>Its</i> is the possessive form of the pronoun <i>it</i> , as in, for example, "This document is in its fifth revision." The possessive <i>its</i> never takes an apostrophe . <i>It's</i> is a contraction for <i>it is</i> or <i>it has</i> , as in, for example, "It's time this document was revised." The contraction <i>it's</i> always takes an apostrophe.
launch (verb)	In passive voice , make the thing that is launched the subject of the sentence, as in "The rocket was launched from CCAFS today." In active voice , chiefly use this verb transitively (that is, with a direct object, as in, for example, "NASA launches rockets from CCAFS."). Avoid using <i>launch</i> intransitively in active voice (for example, avoid writing "The rocket launched from CCAFS today."). Note: The active, intransitive use of <i>launch</i> is acceptable in the figurative, reflexive sense, as in "We launched (ourselves) into a detailed discussion of GSE design."
launch pad (noun)	Capitalize only to identify a specific launch pad by number, as in "Launch Pad 39A."
lb, lbf, lbm (abbreviations)	Don't use <i>lb</i> alone to represent <i>pound</i> . Always distinguish between values of pound-force (lbf) and pound-mass (lbm). Keep these abbreviations lowercase and singular— never add an <i>s</i> .
life cycle (noun)	Write this common compound noun as two separate words, whether it functions as a stand-alone noun or modifies another noun.
office (noun)	Treat the same way as program .

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See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
one (1)	Don't write numerals in parentheses after numbers written as words. Trust the reader to understand numbers written as words.
oral (adjective)	See verbal .
pad (noun)	Treat the same way as launch pad .
parenthetical plurals (inflection) (s) (es)	Avoid parenthetical plurals—the addition of “(s)” or “(es)” to a singular noun or verb to indicate the possibility of multiple instances or occurrences. Instead, use the plural alone, and trust in the reader's intelligence. If it is essential to emphasize the possibility of singular and multiple instances or occurrences, write “one or more (plural noun),” and use the corresponding plural verb.
per (preposition)	Avoid <i>per</i> except in the sense of rates or apportionment, as in “60 miles per hour” or “one per customer.” Instead, use “according to,” “in accordance with,” “as specified in/by,” “as required by,” or “as directed by.” Don't write “as per” or “as per usual.”
percent, percentage, % (noun, noun, symbol)	Use the symbol only with a value or to indicate the unit of measure in a column head or a graph axis. The symbol may be used in all technical documents, without callout or inclusion in lists of abbreviations. Place the symbol directly against the value. If <i>percent</i> is used, it must be accompanied by a value. In all other expressions, use <i>percentage</i> (for example, “the percentage of equipment use”).
personnel (noun)	If you can call the subjects <i>employees</i> (or <i>workers</i> or a more descriptive but relevant title, such as <i>engineers</i> or <i>technicians</i>), do so. For example, write “employees shall,” not “personnel shall.” Never use <i>personnel</i> with a number. For example, write “three employees,” not “three personnel.” Use <i>personnel</i> as an attributive noun in such phrases as “personnel administration,” where it clearly means “matters related to employment or a workforce,” but again, if you can substitute <i>employee</i> or <i>employees</i> , do so.
planning (noun)	All planning is done in advance. <i>Advance planning</i> and <i>preplanning</i> are redundant. Don't use these phrases. <i>Advanced planning</i> is simply wrong.
plurals in parentheses (inflection)	See parenthetical plurals .
process (noun), in the process of (prepositional phrase)	Don't add <i>process</i> after or <i>in the process of</i> before a term that clearly implies a process on its own. For example, instead of writing “during the fabrication process,” simply write “during fabrication.”
program (noun)	Capitalize <i>Program</i> when it is used with the name of a single NASA program (for example, “the Ground Systems Development and Operations Program”). Use lowercase with the names of multiple NASA programs (for example, “the Gemini and Apollo programs”) or in general references to NASA or other programs (for example, “the U.S. space program”).
project (noun)	Treat the same way as program .

See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
quality (attributive adjective)	Avoid <i>quality</i> as an unmodified attributive adjective . Either modify <i>quality</i> to make it more descriptive or replace it with another more descriptive adjective. For example, instead of writing “The department does quality work,” write “The department does high-quality work,” or “The department does excellent work.” Especially avoid this unmodified use of <i>quality</i> if the term is also being used as an attributive noun , as in, for example, “The quality clauses are in Appendix A.” In this example, the clauses have to do with requirements for quality.
quotations	Replicate written quotations exactly, with proper credit (see 3.22.2.4). Apply standard spelling and punctuation to quotations of spoken remarks, regardless of the speaker’s pronunciation or cadence.
reference (verb)	Avoid <i>reference</i> as a verb . To direct readers to a specific source or location, write <i>see</i> , <i>consult</i> , <i>refer to</i> , or <i>cite</i> . To repeat or to call attention to something that has already been said or written, use a simpler and more descriptive verb, such as <i>said</i> , <i>wrote</i> , <i>mentioned</i> , <i>discussed</i> , or <i>explained</i> .
requester (noun)	Spell as shown.
ship (verb)	Treat the same as launch . Note: The active, intransitive use of <i>ship out</i> is acceptable in the sense of departing (by ship or other means) for an assignment, as in, for example, “The crew ships out tomorrow for training.”
soft copy	Avoid this term in favor of <i>file</i> or <i>electronic document</i> . Also see hard copy .
spoken (adjective)	See verbal .
that/which (relative adjectives)	Both <i>that</i> and <i>which</i> introduce subordinate clauses . These clauses give more information about an earlier word or phrase. If the clause is essential for identifying the specific instance of what the word or phrase represents, the clause is introduced with <i>that</i> , as in, for example, “The report that is being reviewed is only preliminary.” Here, “ that is being reviewed” is essential for identifying the particular report. Because the clause is essential, it is not set off with commas . You read the sentence straight through, without pausing. Using <i>that</i> and omitting the commas shows your readers the importance of the clause and, in this example, guides them to a specific report. If the clause gives only additional, nonessential information about what the word or phrase represents, the clause is introduced with <i>which</i> , as in, for example, “The report, which is being reviewed, is only preliminary.” Here, “which is being reviewed” indicates what’s happening to the report but doesn’t identify it. It can be dropped from the sentence without loss of understanding or focus. Because the clause is nonessential, it is set off with commas . When you read the sentence, you naturally pause before <i>which</i> and after <i>reviewed</i> . Using <i>which</i> and setting the clause off with commas shows your readers that the clause doesn’t give essential information and, in this example, directs them to the important part of the sentence.

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See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
times less than (adjective phrase)	In comparing the lesser attributes of one thing to the greater attributes of another, express the lesser amount as a fraction of the greater amount (for example, “The new model is only half as heavy as [or half the weight of] the old model.”) “Times less than” does not make mathematical sense.
times more than (adjective phrase)	In comparing the greater attributes of one thing to the lesser attributes of another, write, for example, “The new model has twice (or three times) as much power as the old model,” or “The new model has twice (or three times) the power of the old model.” “Times more than” does not make mathematical sense.
transpire (verb)	Some writers and language experts insist that <i>transpire</i> (in its nonscientific sense) can mean only “to be revealed, to come to light, or to become apparent,” and not “to happen, occur, or take place.” Not true. But because you may ruffle a few readers if you use <i>transpire</i> for <i>happen</i> and because <i>happen</i> , <i>occur</i> , and <i>take place</i> are all simpler and more straightforward, reserve <i>transpire</i> for its scientific sense: “to pass off or give passage to (a fluid) through pores or interstices.”
uniform resource locator (URL) (noun)	Call out this abbreviation in nontechnical material. Don’t use <i>universal resource locator</i> .
United States (noun) U.S. (adjective)	Spell out the noun , as in “...throughout the United States.” <i>United States of America</i> may be reduced in unquoted text to <i>United States</i> . Use the abbreviation only as an adjective (for example, “the U.S. space program”) or in a title or table where space is tight. Retain the periods in the abbreviation.
UTC	See Coordinated Universal Time .
utilize (verb) utilization (noun)	In almost all cases, <i>use</i> (verb or noun) is not only sufficient, but preferred.
verbal (adjective)	<i>Verbal</i> means “put into words, whether spoken or written.” For clarity, use <i>written</i> or either <i>oral</i> or <i>spoken</i> .
verbiage (noun)	<i>Verbiage</i> means excessive text that adds little substance to the meaning. It is not a synonym for <i>writing</i> or <i>text</i> . Not only should you avoid writing verbiage, but you should also avoid describing writing as <i>verbiage</i> unless it fits the definition.
Washington, D.C. (noun)	See D.C.
website (noun)	Spell as shown (as a solid word), and use lowercase except in a title.
which (relative adjective)	See that/which .
workers’ compensation (noun)	Capitalize the term only when you refer to the Department of Labor’s Office of Workers’ Compensation Programs. Always use the plural possessive (<i>workers’</i>).
written (adjective)	See verbal .
x-axis	See axis .
x-ray (adjective, noun, verb)	Capitalize the word only at the beginning of a sentence, at the beginning of a list item in which other first words are being capitalized, and in a title in which title case is being used (in this situation, capitalize as <i>X-Ray</i>). Always hyphenate this term, and use a nonbreaking hyphen to prevent the term from breaking across lines.

See keystroke combinations for typing nonbreaking spaces , nonbreaking hyphens , and other characters not found on the standard keyboard.	
Term	Usage Notes
y-axis	See axis .
z-axis	See axis .

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APPENDIX B. GLOSSARY

abbreviation: a character (whether a letter, number, or typographical symbol) or combination of characters that represents a word or phrase. [Initialisms](#), [contractions](#), [acronyms](#), and [symbols](#) are types of abbreviations (see 3.5.1).

acronym: an [abbreviation](#) that can be pronounced as a word (see 3.5.1).

active voice: the grammatical relationship in which (1) the [subject](#) of a [sentence](#) performs the action of the [verb](#) and (2) the receiver of the action (the direct object) is identified. For example, “The lead engineer submitted the report.” Active voice is a better choice of expression than [passive voice](#) when the performer and the receiver of the action are known and are the focus of the sentence.

adjective: a word that indicates any of various attributes of a [noun](#), such as quality, size, age, shape, color, origin, material, or purpose. Also see [comparatives](#) and [superlatives](#).

adverb: a word that indicates any of various attributes of an [adjective](#), a [verb](#), a [prepositional phrase](#), a [clause](#), a [sentence](#), or another [adverb](#), such as degree, manner, place, quality, or time. Also see [comparatives](#) and [superlatives](#).

antecedent: the [noun](#) or noun phrase to which a [pronoun](#) refers. Pronouns must agree with their antecedents in terms of [person](#).

apostrophe (’): the punctuation mark that (1) contracts adjacent words into a single word, (2) indicates missing letters in dialect and other types of nontechnical writing, or (3) makes [abbreviations](#) and words (other than [pronouns](#)) possessive. In the normal formation of contractions (see 3.6), no space appear before or after the apostrophe. Though curly apostrophes (’) are preferred over straight apostrophes (’), consistent application throughout the document is more important than the style of apostrophe. **Don’t** use an apostrophe (curly or straight) for a foot symbol or to indicate minutes of plane angle. Use a prime (’). See [keystroke combinations](#) for how to type a prime.

appendix: a section or chapter of supplemental material, following the [body](#), in the [back matter](#) of a document. (See 5.12.) *Appendices* is the preferred plural.

applicable document: a document, book, or other publication whose authority is expressly invoked to a specified degree by the current document.

appositive: a word or phrase usually set immediately after a word or phrase that it identifies or explains.

article: one of three words that can limit or define a [noun](#) without adding or implying other distinctions. The definite article is *the*, and the indefinite articles are *a* and *an*.

attributive noun: a [noun](#) that acts as an [adjective](#) to [modify](#) the noun it precedes (see 3.8).

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back matter: the pages of a document that follow the [body](#). The following elements are part of the back matter: [appendices](#), [endnotes](#), [bibliography](#), and [index](#).

base word: a word to which a [prefix](#) or [suffix](#) is attached and whose meaning is thereby changed (see 3.9.4 and 3.9.5).

Basic: the first [released](#) edition of a document.

bibliography: a list of documents or other references cited in the current document or used in its preparation.

body: the main text of a document, often divided into sections or chapters, but excluding [front matter](#) and [back matter](#).

bold: the dark, heavy appearance of type in any font, commonly used (1) to emphasize words or phrases, (2) to emphasize elements of the current document (such as its title and date; the titles of sections, subsections, figures, tables, and appendices; and some items in vertical lists), or (3) to identify vectors in mathematical expressions.

bracket ([]): either of the pair of punctuation marks that set off words, [phrases](#), or [clauses](#) within already [parenthesized](#) text. Brackets are always used in pairs: an opening bracket and a closing bracket. No space appears after an opening bracket or before a closing bracket. When the bracketed text is a complete [sentence](#), the end punctuation is inside the closing bracket. When the bracketed text is not a complete sentence, the end punctuation is outside the closing bracket. Also see [parenthesis](#).

Cancellation: the [release](#) of a document's signature page to indicate that the document is no longer in effect. A Cancellation may or may not include supersession (see 6.3).

cardinal number: a number used in simple counting.

case: a change (an [inflection](#)) applied to a [noun](#) or [pronoun](#) to show whether it functions as a [subject](#) ("we wrote the report"), an absolute possessive ("the report is **ours**"), or an [object](#) ("the report was written by **us**").

casings: the application of initial uppercase (capital) or lowercase (small) letters to [nouns](#) based on their type ([proper](#) or [common](#)) and to other [parts of speech](#) based on purpose and context (see 3.12).

caution: a notation before an operational step which if not adhered to or observed, could result in damage to equipment (KNPR 8715.3-1) (see 3.20).

Change: an edition of a [released](#) document to make important corrections or mandated modifications (see 6.2).

citation: a [parenthetical](#) identification of the source of [quoted](#) or [paraphrased](#) material in running text. Most citations identify only the author and year of publication, as long as the document also includes a [bibliography](#). A citation may contain more information if the document does not include a bibliography.

clause: a grammatical unit that contains a [subject](#) and a [predicate](#). Also see [independent clause](#) and [subordinate clause](#).

colon: the punctuation mark that (1) signals an explanation of the word, [phrase](#), [clause](#), or in-line title it follows, (2) joins values in a ratio, or (3) separates hours from minutes in numerical representations of 12-hour time. When a colon signals an explanation, no space appears before the colon and a single space follows the colon. For ratios and time, no space appears before or after the colon.

comma: the punctuation mark that (1) indicates a pause in a [sentence](#), (2) indicates a grammatical separation of words, [phrases](#), or [clauses](#), or (3) groups digits of large numbers. No space appears before a comma. A single space follows a comma that separates a word from another word or from a number. No spaces appear within numbers, whether they contain commas or not.

common noun: a [noun](#) that represents any of a general class of people, places, things, actions, or concepts. A common noun can be [singular](#) or [plural](#) and is capitalized only when it begins a [sentence](#) (see 3.12.1) or appears in a title (see 3.12.2).

comparative: the form of an [adjective](#) or [adverb](#) that shows a higher or lower degree of the quality or manner. Most positive comparatives are formed by the addition of *-er* to shorter [base words](#) or by the addition of *more* before longer base words, as in, for example, *newer*, *quicker*, *more reliable*, and *more efficiently*. Most negative comparatives are formed by the addition of *less* before the base word, as in, for example, *less new*, *less quick*, *less reliable*, and *less efficiently*. But notice that a positive yet reciprocal comparative is sometimes a better choice than a negative comparative. For example, *older* is better than *less new* and *slower* is better than *less quick*.

complex sentence: a [sentence](#) that contains an [independent clause](#) and a [subordinate clause](#).

compound sentence: a [sentence](#) that contains multiple [independent clauses](#).

conjugation: the [inflection](#) of a [verb](#) to indicate [tense](#), [person](#), or [mood](#).

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conjunction: a word that joins [clauses](#), [phrases](#), or words. Examples include *and*, *but*, *yet*, and *nor*. Though the notion is widely disbelieved, there is no respected advice—much less a rule—against starting a [sentence](#) with a conjunction. Consulting almost any published reference on English grammar and usage, regardless of age, will prove this point. Starting a sentence with a conjunction emphasizes the relationship with the thoughts in the prior sentence. *And* signals a continuation or logical progression of the assertion, as does *nor*, when the assertion is negative. *But* and *yet* signal a deeper and sometimes contradictory consideration of the prior assertion. Because initial conjunctions draw your reader’s attention, they can help you emphasize important points when you use them judiciously. Also see 3.10 regarding the role of conjunctions with [items in a series](#).

contraction: an [abbreviation](#) formed by the omission of letters (see 3.5.1); also, a word formed by the combination of two words, with an [apostrophe](#) to indicate the omission of letters (see 3.6).

declarative sentence: a [sentence](#) that makes a statement.

em dash (—): the punctuation mark that indicates a grammatical break in a [sentence](#). The effect is to emphasize the break. The mark is placed between words, without intervening spaces. If the grammatical sentence continues after the break, a second em dash is required. See 3.5.3.b and 3.6 for examples. See [keystroke combinations](#) for how to type an em dash.

en dash (–): the punctuation mark that indicates a range in numerical typesetting of measured values, dates, times, etc. The mark is placed between the values, without intervening spaces. See [keystroke combinations](#) for how to type an en dash.

endnote: an explanatory comment or a source reference placed at the end of a section or document.

engineering document: a KSC document that addresses the engineering, business, or administrative aspects of a specific program or project. Project plans, test plans and procedures, requirements documents, and test and analysis reports are examples of engineering documents. See 4.2.

enumerator: a letter, number, or symbol that, with any accompanying punctuation marks, sets off [items in a series](#) and makes them more distinct. A letter or number enumerator indicates the relative position of the item. A symbol enumerator (that is, a bullet) does not. See 3.11.2.

exclamation point (!): the punctuation mark that signals the end of an exclamatory [sentence](#). No space appears before an exclamation mark that ends a sentence. A consistent number of spaces follow all punctuation marks that end sentences.

footer: an area at the bottom of the pages in a document, where page numbers and sometimes other markings are displayed.

footnote: an explanatory comment or a source reference placed at the bottom of the page on which the subject is mentioned.

formal document: a KSC document with lasting reference value and application, usually across all KSC programs and directorates. KSC Specifications and KSC Standards are examples of formal documents. See 4.1.

front matter: the pages of a document that precede the [body](#). The following elements are part of the front matter: cover, signature page, record of revisions/changes, foreword, preface, acknowledgment, executive summary, table of contents, list of figures, list of tables, and list of abbreviations (and definitions if they continue from the list of abbreviations).

gerund: the [inflected](#) form of a [verb](#), ending in *-ing* and functioning as a [noun](#). A gerund (such as *writing* in “writing well is fun,” or *having* in “the importance of always having good examples”) represents the action or condition conveyed by the verb. Like a noun, a gerund can be a [subject](#) or an [object](#). But, like a verb, a gerund can take an object and be modified by an [adverb](#).

hard return: the result of the keyboard command (pressing **Enter**) that groups text into a [paragraph](#) by placing the next typographical entry point on a new line.

header: an area at the top of the pages in a document, where identifying or other information, such as document number, revision level, date, or distribution restrictions, is repeated.

hyperlink: as a [noun](#), an electronic link in a file for directly reaching another location in the file or elsewhere; as a [verb](#), to create or possess a hyperlink or to reach another location by means of a hyperlink. Hyperlinks are usually formatted with a distinctive color and attribute, such as underlining.

hyphen (-): the punctuation mark that (1) attaches modifying words or numbers (and in particular cases, [prefixes](#) or [suffixes](#) [see 3.9.4 and 3.9.5]) to [base words](#) to produce a combination with a different meaning, (2) joins letters, numbers, or both to form identifiers, or (3) breaks a word that is too long to fit before the end of a line of type. No space appears on either side of the hyphen.

imperative mood: the form of a [verb](#) used to make a command or give an instruction.

imperative sentence: a [sentence](#) that commands or instructs. An imperative sentence begins with a [verb](#), and its understood [subject](#) is *you*, as in, for example, “Follow the advice in this guide.”

independent clause: a grammatical unit that contains a [subject](#) and a [predicate](#) and that expresses a complete thought. An independent clause can be a [complete sentence](#) or part of either a [complex sentence](#) or a [compound sentence](#).

index: an alphabetical list of topics discussed in a document, showing the page or section numbers of instances. An index, when present, is usually placed as the last piece of [back matter](#).

indicative mood: the form of a verb used to make a statement or ask a question.

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infinitive: the basic, [uninflected](#) form or any [verb](#). The [particle](#) *to* joins an infinitive to form an infinitive phrase, such as *to be*. In addition to forming infinitive phrases, this form provides the [imperative mood](#), which we use in commands and instructions ([imperative sentences](#)).

inflection: a change applied to the form of a word in order to show a particular meaning or a relationship to another word or to a phrase. [Verbs](#) are inflected ([conjugated](#)) to indicate [tense](#), [person](#), and [mood](#). [Nouns](#) and [pronouns](#) are inflected to indicate [person](#) and [case](#). [Adjectives](#) and [adverbs](#) are inflected to indicate [comparatives](#) and [superlatives](#) (as in the adjectives *big*, *bigger*, and *biggest*, and the adverbs *reliably*, *more reliably*, and *most reliably*).

initialism: an [abbreviation](#) formed by retaining (and usually capitalizing) only the initial letters of words in a [phrase](#) (see 3.5.1).

integer: zero, any number of 1 or greater that includes no fractional amount, or the negative of that number.

interjection: a grammatically independent word used to exclaim or to express a simple answer or reaction.

interrogative sentence: a question.

italics: the slanted appearance of type in any font, commonly used to distinguish (1) certain words, such titles of books, (2) names of vehicles, (3) some foreign words and [phrases](#), (4) words that represent themselves as words, and (5) certain paragraphs on the basis of purpose or message (see 5.11.g).

item in a series: one of at least two grammatically parallel words, [phrases](#), [clauses](#), or [sentences](#) whose structural consistency reinforces their relationship (see 3.10).

justification: alignment of text such that the text stretches from the left margin to the right margin.

landscape: the orientation of a nonsquare page such that content is arranged for reading or viewing between the margins along the shorter sides. The resulting content area is wider than it is long.

modify: to expand or change the meaning of a word, whether by the addition of [prefix](#) or [suffix](#) or the placement of a [clause](#), a [phrase](#), or another word.

mood: the form of a [verb](#) that indicates how the action or state was conceived. The moods are [indicative](#), [imperative](#), and [subjunctive](#).

nonbreaking hyphen: a specially typed [hyphen](#) that prevents a hyphenated term from breaking across lines. See [keystroke combinations](#) for how to type a nonbreaking hyphen.

nonbreaking space: a specially typed space that prevents a line break from occurring between characters. See [keystroke combinations](#) for how to type a nonbreaking space.

note: text that is specifically formatted to convey context, restrictions, or advice, the adherence to which will reduce misinterpretation, rework, delay, or additional cost (see 3.20).

noun: the name of a person, place, thing, action, or concept. Nouns can be either [common](#) or [proper](#), a distinction that determines their [casing](#) in a [sentence](#) (see 3.12.1).

object: a [noun](#) or noun substitute that (1) receives the action of a [verb](#) (as a direct object) or (2) relates to another word in the sentence via a [preposition](#) (as the object of a preposition) or via an implied preposition (as an indirect object).

ordinal number: a number that indicates position, sequence, or rank. Examples are *first*, *second*, *third*, and *fourth*. All ordinal numbers carry one of the following [suffixes](#): *-st*, *-nd*, *-rd*, or *-th*.

orphan: the first line of a multiline [paragraph](#), stranded at the bottom of a page (see 5.11).

Oxford comma (,): in a [series](#) of at least three items in running text, the [comma](#) placed between the next-to-the-last item and the [conjunction](#) that precedes the final item. This comma is also known as a [serial comma](#). See 3.10.1.

paragraph: in grammatical context, a single sentence or multiple adjacent and related sentences, formatted, whether through alignment, indentation, or vertical spacing, to visually emphasize their relationship and shared focus; in typographical context, all lines (and the contents thereof) between [hard returns](#).

parallel construction: the grammatical expression and visual arrangement of related thoughts (whether [sentences](#), [clauses](#), [phrases](#), or individual words) in a consistent way (see 3.11).

paraphrase: as a [verb](#), to rephrase something said or written by someone else; as a [noun](#), (1) the act of rephrasing something said or written by someone else or (2) spoken or written words that have been rephrased by someone other than the speaker or writer.

parenthesis (): either of the pair of punctuation marks that (1) surround a nonessential word, [phrase](#), or [clause](#) and reduce the emphasis of what they surround, (2) group some mathematical operations, or (3) sometimes indicate [enumeration](#). Parentheses are always used in pairs: an opening parenthesis and a closing parenthesis. No space appears after an opening parenthesis or before a closing parenthesis. The closing parenthesis after an [enumerator](#) is always kept on the same line with the word that follows it. Parentheses set off the entire string of characters. Any part of a parenthetical string that must be set off further is enclosed in [brackets](#) (so parentheses are on the outside [and brackets are on the inside]). However, parentheses around references to enumerators are retained—that is, **not** changed to brackets—even when those references are entirely within parentheses. See the end of 6.3.b as an example. When the parenthesized text is a complete [sentence](#), the end punctuation is inside the closing parenthesis. When the parenthesized text is not a complete sentence, the end punctuation is outside the closing parenthesis. Parentheses reflect the typeface ([roman](#), [italic](#), or [bold](#)) of the overall sentence rather than specifically what they enclose. Therefore, parentheses are most often [roman](#).

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participle: the [inflected](#) form of a [verb](#) that functions as an [adjective](#). For most verbs, the participles end in *-ed*, *-en*, or *-ing*. Like adjectives, participles can [modify nouns](#). But, like verbs, participles can take [objects](#) and be modified by [adverbs](#).

particle: a function word that combines with another [part of speech](#) to fulfill a particular grammatical purpose. For example, the particle *to* joins the infinitive verb *write* to form the infinitive phrase *to write*.

part of speech: any of eight classes of words distinguished by the types of ideas they convey and the purposes they fulfill in a [sentence](#). The parts of speech are [adjectives](#), [adverbs](#), [conjunctions](#), [interjections](#), [nouns](#), [prepositions](#), [pronouns](#), and [verbs](#).

passive voice: the grammatical relationship in which the [subject](#) of a [sentence](#) receives (rather than performs) the action of the [verb](#). Passive sentences are often in past [tense](#). A form of the verb *to be* is added (as an auxiliary) to the main verb, and the performer of the action becomes the [object](#) of a [preposition](#). For example, “The report was submitted by the lead engineer.” Active voice is a better choice of expression when the performer and the receiver of the action are known and are the focus of the sentence.

period (.): the punctuation mark that (1) signals the end of a [declarative sentence](#), (2) reduces some names to initials and some words to [abbreviations](#), or (3) as a decimal point, indicates a portion of an [integer](#). No space appears before a period that ends a sentence. A consistent number of spaces follow all punctuation marks that end sentences. When periods are used after a person’s first and middle initials, that portion of the name is usually written tight, as in, for example, “J.E. Smith.” Try to honor people’s preferences for how their names are punctuated, but also strive for consistency within a document. See 3.16.2.j regarding space before a decimal point.

person: the form of a [verb](#) (its [conjugation](#)) that corresponds to the [inflection](#) of a [noun](#) (for number—[singular](#) or [plural](#)) or a [pronoun](#) (for person and number); also the inflection of a pronoun to show whether

- someone is speaking (first person: *I* for singular and *we* for plural),
- someone is being spoken to (second person: *you* for singular and plural), or
- someone or something is being spoken about (third person: *he*, *she*, or *it* for singular and *they* for plural).

phrase: a grammatical unit that does not include a [subject](#) and [predicate](#).

plural: as an [adjective](#), of or related to multiple instances of the subject being described; as a [noun](#), the [inflected](#) form of a noun or [verb](#) that indicates multiple instances. Also see [singular](#).

portrait: the orientation of a nonsquare page such that content is arranged for reading or viewing between the margins along the longer sides. The resulting content area is longer than it is wide.

predicate: a grammatical unit that expresses what the [subject](#) does or what is asserted about the subject. It consists of the main [verb](#) and all the words, [phrases](#), and [clauses](#) that [modify](#) the main verb.

prefix: a group of letters attached to the beginning of a [base word](#) to change its meaning (see 3.9.4 and 3.9.5).

preposition: a function word that establishes a relationship between its [object](#) (a [noun](#) or noun [phrase](#)) and another word. The preposition and object combine to form a prepositional phrase. Examples of prepositions abound, such as *at*, *in*, *on*, *over*, and *to*. Although the notion is widely disbelieved, there is no respected advice—much less a rule—against ending a sentence with a preposition. Rigid avoidance of ending sentences with prepositions can make your writing unnecessarily stiff and formal and can make some questions sound ridiculous. End sentences with prepositions to avoid stiffness and excessive formality, but **don't mistake** an essential preposition, such as *to* in “This is what we agreed **to**,” for a superfluous preposition, such as *to* in “This is where we went **to**.”

pronoun: a word that substitutes for a [noun](#). Pronouns can act as [subjects](#) or [objects](#) and can act as [adjectives](#) to identify nouns and indicate possession. It is essential for the writing to clearly indicate what a pronoun represents—its [antecedent](#). See 3.7.2.

proper noun: a [noun](#) that represents a specific person, place, thing, or concept as opposed to a general class of such. Proper nouns are always capitalized and tend to be [singular](#).

question mark (?): the punctuation mark that signals the end of an [interrogative sentence](#) (a question). No space appears before a question mark that ends a sentence. A consistent number of spaces follow all punctuation marks that end sentences.

quotation mark (“ ”): either of the pair of punctuation marks that indicate the beginning and end of quoted material; or that indicate the title of a chapter, article, etc., within a larger published work. The conventions for combining quotation marks and other punctuation marks are complex, and they are best left to reliable, published usage guides. But in general, do the following: (1) Place no space after an opening quotation mark or before a closing quotation mark. (2) Place a [comma](#) or [period](#) inside the closing quotation mark, even when the comma or period is not part of the quoted material. (3) Place all other punctuation marks outside the closing quotation mark unless they are part of the quoted material. (4) Although curly quotation marks (“ ”) are preferred over straight quotation marks (" "), use a consistent style of quotation marks throughout the document. (5) **Don't** use quotation marks (curly or straight) for an inch symbol or to indicate seconds of plane angle. Use a double prime ("). See [keystroke combinations](#) for how to type a double prime.

quotation: the character-for-character recitation or reproduction of something said or written by someone else.

ragged right margin: the uneven lengths of lines of text in a left-aligned, [unjustified paragraph](#).

reference document: a document, book, or other publication whose authority is not expressly invoked by the current document but that provides relevant though nonessential information.

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reference: as a [noun](#), an indication of another location or element in the current document; also, the source of [quoted](#) or [paraphrased](#) material. See Appendix A, Page 91, for advice on avoiding [reference](#) as a [verb](#).

release: the issuance of a document for general availability through a recognized KSC documentation management system, such as the KSC Design Data Management System (KDDMS), TechDoc, or the Engineering Documentation Center (EDC).

Revision: a subsequent edition of a [released](#) document to update or reorganize its technical content (see 6.1).

roman: the normal, upright appearance of type, as opposed to [italic type](#), which slants to the right.

semicolon (;): the punctuation mark that indicates a more pronounced grammatical separation of [phrases](#) or [clauses](#) than is produced by a [comma](#). No space appears before a semicolon. A single space follows a semicolon.

sentence: a complete thought with (1) an expressed or implied [subject](#) and (2) a [predicate](#). Sentences can be [declarative](#), [imperative](#), or [interrogative](#).

serial comma (,): in a [series](#) of at least three items in running text, the [comma](#) placed between the next-to-the-last item and the [conjunction](#) that precedes the final item. This comma is also known as an [Oxford comma](#). See 3.10.1.

single quotation mark (‘ ’): either of the pair of punctuation marks that indicate a [quotation](#) within a quotation. The conventions for combining single quotation marks and other punctuation marks are complex, and they are best left to reliable, published usage guides. But in general, do the following: (1) Place no space after a single opening quotation mark or before a single closing quotation mark. (2) Place a [comma](#) or [period](#) inside the single closing quotation mark, even when the comma or period is not part of the quoted material. (3) Place all other punctuation marks outside the single closing quotation mark unless they are part of the quoted material. (4) Place no spaces or other marks of punctuation between a single quotation mark and an immediately adjacent [quotation mark](#). (5) Although curly single quotation marks (‘ ’) are preferred over straight single quotation marks (' '), use a consistent style of single quotation mark throughout the document.

singular: as an [adjective](#), of or related to one instance of the subject being described; as a [noun](#), the [inflected](#) form of a noun or [verb](#) that indicates one instance. Also see [plural](#).

slash (/): the punctuation mark that (1) indicates a choice between or among multiple words or [phrases](#), (2) indicates division (as in fractions) or the mathematical relationship of *per* or *for each*, or (3) separates parts of some [abbreviations](#), such as *c/o* for *care of*, *w/o* for *without*, and *N/A* for *not applicable*. In an unbroken string of full-size type, no space appears on either side of the slash. If a line break is necessary, break after the slash by placing a single space after the mark. Where very small or narrow type makes a slash hard to see (as in a figure callout or a tight table), a single space may be placed on both sides of the slash.

subject: a grammatical unit that performs an action or about which something is asserted. It consists of a [noun](#) (or a [phrase](#) or [clause](#) functioning as a noun) and all the words, phrases, or clauses that [modify](#) that noun.

subjunctive mood: the form of the [verb](#) in expressions of the following:

- conditions contrary to fact (“If I **were** you...” “If this **were** the first instance...”) and
- recommendations, suggestions, proposals, or demands (“The team recommended [or suggested, proposed, or demanded] that he **increase** his efforts.”).

Because of how English verbs are [conjugated](#), subjunctive verbs are more apparent in first-person [singular](#) (when the [subject](#) is *I*) and in third-person singular (when the subject is a singular [noun](#) or [pronoun](#) [*he, she, or it*]).

subordinate clause: a grammatical unit that contains a [subject](#) and a [predicate](#) but that does not express a complete thought. A subordinate clause [modifies](#) a word or [phrase](#) in the [sentence](#). For example, in “I will consult this guide when I have questions,” the subordinate clause “when I have questions” modifies “will consult.”

suffix: a group of letters attached to the end of a [base word](#) to change its meaning (see 3.9.4).

superlative: the form of an [adjective](#) or [adverb](#) that shows the highest or lowest degree of the quality or manner. Most positive superlatives are formed by the addition of *-est* to shorter [base words](#) or by the addition of *most* before longer base words, as in, for example, *newest*, *quickest*, *most reliable*, and *most efficiently*. Most negative superlatives are formed by the addition of *least* before the base word, as in, for example, *least new*, *least quick*, *least reliable*, and *least efficiently*. But notice that a positive yet reciprocal superlative is sometimes a better choice than a negative superlative. For example, *oldest* is better than *least new* and *slowest* is better than *least quick*. Also notice that we often use *the* before positive and negative superlatives, as in, for example, “**the newest** model runs **the least efficiently**.” Trust your ear to tell you when to add *the*.

suspending hyphen: a hyphen that follows a [prefix](#) or [base word](#) to indicate the relationship of the base word or prefix to a base word in either the final [item in a series](#) or the end of a range. The suspending hyphen prevents the repetition of well-understood relationships in quick succession. For example, in “a 10- to 20-page document,” the suspending hyphen after *10* indicates that it means *10-page*. In “the test involved one-, two-, and three-story drops,” the suspending hyphens after *one* and *two* indicate that they mean *one-story* and *two-story*, respectively. See 3.9.4 and 3.9.5.

symbol: an [abbreviation](#) consisting of letters, other typographical characters, or both, usually to represent a numerical quantity, a unit of measure, or a mathematical operation or concept (see 3.5.1).

tab: as a [noun](#), in word processing, (1) the key that moves the insertion point by a specified distance rather than by a certain number of characters or (2) the spacing that results from pressing the **Tab** key once; as a [verb](#), in word processing, to press the **Tab** key.

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tense: the form of a [verb](#) that indicates its relationship to time. The basic tenses are past, present, and future.

verb: a word that expresses an action, an occurrence, or a mode of being.

voice: the form of a [verb](#) that indicates the relationship of the [subject](#) to the action of the sentence. English has two voices: [active](#) and [passive](#).

warning: a notation which if not adhered to or observed could result in loss of life, personal injury, or exposure (KNPR 8715.3-1) (see 3.20).

widow: the last line of a multiline [paragraph](#), stranded at the top of a page (see 5.11).

APPENDIX C. POSTAL ABBREVIATIONS FOR STATES AND U.S. TERRITORIES

Use the following postal abbreviations for states and U.S. territories in full addresses and where space is extremely tight (for example, in a table). Spell out the names of states and U.S. territories in all other instances. Don't include abbreviations for states or U.S. territories in the list of abbreviations.

AL	Alabama	MT	Montana
AK	Alaska	NE	Nebraska
AS	American Samoa	NV	Nevada
AZ	Arizona	NH	New Hampshire
AK	Arkansas	NJ	New Jersey
CA	California	NM	New Mexico
CO	Colorado	NY	New York
CT	Connecticut	NC	North Carolina
DE	Delaware	ND	North Dakota
DC*	District of Columbia*	MP	Northern Mariana Islands
FM	Federated States of Micronesia	OH	Ohio
FL	Florida	OK	Oklahoma
GA	Georgia	OR	Oregon
GU	Guam	PW	Palau
HI	Hawaii	PA	Pennsylvania
ID	Idaho	PR	Puerto Rico
IL	Illinois	RI	Rhode Island
IN	Indiana	SC	South Carolina
IA	Iowa	SD	South Dakota
KS	Kansas	TN	Tennessee
KY	Kentucky	TX	Texas
LA	Louisiana	UT	Utah
ME	Maine	VT	Vermont
MH	Marshall Islands	VI	Virgin Islands
MD	Maryland	VA	Virginia
MA	Massachusetts	WA	Washington
MI	Michigan	WV	West Virginia
MN	Minnesota	WI	Wisconsin
MS	Mississippi	WY	Wyoming
MO	Missouri		

* In other than a full address, retain the periods when you abbreviate *District of Columbia*. In running text, always refer to the District of Columbia as "Washington, D.C."

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