



ECSS

Drafting rules and template for ECSS Handbooks

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The following is the text to be introduced in the "Foreword" and "Disclaimer" sections of each ECSS handbook:

Foreword

This Handbook is one document of the series of ECSS Documents intended to be used as supporting material for ECSS Standards in space projects and applications. ECSS is a cooperative effort of the European Space Agency, national space agencies and European industry associations for the purpose of developing and maintaining common standards.

The material in this Handbook is defined in terms of description and recommendation how to organize and perform the work of <Introduce here the name of the ECSS Standard(s) or Clauses of the standard(s) which this handbook is related to>

This handbook has been prepared by the ECSS Executive Secretariat Working Group, reviewed by the ECSS Executive Secretariat and approved by the ECSS Technical Authority.

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Published by: ESA Requirements and Standards Division
ESTEC, P.O. Box 299,
2200 AG Noordwijk
The Netherlands

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Change log

EXPECTED CONTENT

It is expected that the Change log includes a table with the changes between the previous published version of the document and the present one, identifying the page and numbered item, and the change.

In the case of a complete re-edition of a document, a summary of the changes, both in the structure of the document and in the contents, is expected.

DRAFTING RULES REQUIREMENTS

- a. The change log shall provide traceability between the previous version of the published document and the present one.
- b. In the case of a first version, the change log shall state "First issue".
- c. The Change log shall not contain requirements.

EXAMPLE

As an example, the Change log of the present document is provided below.

| | |
|------------------------------|-------------|
| ECSS-D-00-02A 1 June 2012 | First issue |
|------------------------------|-------------|

Table of contents

EXPECTED CONTENTS

The table of contents is included for a quick reference to the contents of the document. It includes the sections in the order that they appear in the document, and then a list of Figures and a list of Tables.

DRAFTING RULES REQUIREMENTS

- a. The table of content shall include first all the sections in the order in which they appear in the document, and then a list of Figures and a list of Tables.
- b. The table of contents shall be automatically generated.
- c. The Table of Contents shall not contain requirements

EXAMPLE

As an example, the table of contents of the present document is provided below.

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Introduction

EXPECTED CONTENTS

Introduction is an optional element, and therefore this section can be deleted if not used.

The following are examples of subjects that can be included in the Introduction:

- Specific description on the technical content
- Reasons prompting the preparation or the update of the standard
- History of the standard
- Relation with other ECSS standards

DRAFTING RULES REQUIREMENTS

- a. The Introduction of a handbook shall not contain requirements

EXAMPLE

As an example, the Introduction of the present document is as follows:

Introduction

The present document complements ECSS-D-00, Annex A “Drafting rules for ECSS Documents”.

1 Scope

The present drafting rules sets the actual layout and specifies the requirements for drafting ECSS handbooks.

It is applicable to all ECSS handbooks and their drafts, from WG drafts to publication.

It is not applicable to other ECSS documents (e.g. standards and technical memoranda)

EXPECTED CONTENTS

The purpose of the Scope section is to describe, in a few lines, the document as a whole. The Scope section does not intend to recreate an expanded version of the TOC, chapter by chapter.

Since ECSS handbooks describe acceptable means of compliance to ECSS requirements, the purpose of the Scope is also to identify the standard, group of standards, or particular requirements in a standard, which the handbook responds to.

Any other descriptive material can be included in the introduction, e.g. history of the handbook, rationale behind its preparation or relationships with other documents.

DRAFTING RULES REQUIREMENTS

- a. The Scope section of a handbook shall identify the following, and only the following:
 1. The subject of the standard and aspects covered by it.
 2. The standard, group of standards, or particular requirements to which the handbook refers, by introducing the sentence:
“This handbook describes acceptable means of compliance for <Standard name(s) / Clause number(s) / Requirement identifier(s)>
- b. The Scope section of a handbook shall not contain requirements

EXAMPLE

The present document is not a handbook, as handbooks do not contain requirements, and this document specify requirement (on how to draft handbooks). Therefore, the scope of the present document is not a good example for the scope of a handbook. The following is an example of the scope of a handbook:

1

Scope (adapted from ECSS-E-HB-10-12A)

This handbook is a part of the System Engineering branch and covers the methods for the calculation of radiation received and its effects, and a policy for design margins. Both natural and man-made sources of radiation (e.g. radioisotope thermoelectric generators, or

RTGs) are considered in the handbook.

This handbook can be used for the evaluation of radiation effects on all space systems.

This handbook can be used for all product types which exist or operate in space, as well as to crews of on manned space missions.

This handbook describes acceptable means of compliance for the requirements of ECSS-E-ST-10-12C "Methods for the calculation of radiation received and its effects and a policy for the design margin".

2 References

EXPECTED CONTENTS

The purpose of the “References” section is to list the documents referred to in the text of the handbook. Availability of the documents referred to is, which are therefore necessary to apply the standard in drafting.

NOTE In ECSS standards, Clause 2 is reserved for normative references, and the section “Bibliography” for informative references. Since handbooks are not normative documents, they cannot contain normative references. Therefore, this section 2 is dedicated to “References”, and section “Bibliography” is not necessary.

DRAFTING RULES REQUIREMENTS

- a. The “References” clause list all the documents called in the text of the handbook, and only those documents.
- b. Reference to non-ECSS documents shall be dated, or the number of the version included.
- c. References to ECSS documents shall be undated.
- d. A document listed in “References” clause shall be published and publicly available.

NOTE Publicly available does not necessarily mean available for free.

- e. The Working Group shall inform the ECSS Executive Secretariat where the referenced documents (with the exception of ECSS, ISO or EN) can be obtained.
- f. The “References” clause shall not contain requirements.

EXAMPLE

As an example, the “References” clause of this template is as follows:

2 References

| | |
|-----------------|----------------------------------|
| ECSS-S-ST-00-01 | ECSS system - Glossary of terms |
| ECSS-E-ST-10-02 | Space engineering - Verification |

3**Terms, definitions and abbreviated terms****3.1 Terms from other documents****EXPECTED CONTENTS**

The purpose of the “Terms from other documents” clause is to list the terms defined in other documents which are applicable to the handbook being drafted.

There is always at least one document whose terms are applicable to the standard being drafted: ECSS-S-ST-00-01 “ECSS system - Glossary of terms”.

DRAFTING RULES REQUIREMENTS

- a. The “Terms from other documents” clause shall include:
 1. In the case that terms from ECSS-S-ST-00-01 are generally applicable, the sentence: “For the purpose of this document, the terms and definitions from ECSS-S-ST-00-01 apply”.
 2. In the case that some particular terms of ECSS-S-ST-00-01 are specifically applicable:
 - (a) The sentence “For the purpose of this document, the terms and definitions from ECSS-S-ST-00-01 apply, in particular for the following terms:”, and
 - (b) The list of the applicable terms (without including the definition itself).
- b. If terms from documents other than ECSS-S-ST-00-01 are also applicable, they shall be introduced with the sentence “For the purpose of this document, the following terms and definitions from <<Reference of the Document>> apply:”, followed by the list of applicable terms (without including the definition itself).
- c. The layout of the “Terms from other documents” clause shall be as in the example herein.
- d. The “Terms from other documents” clause shall not contain requirements.

EXAMPLE

As an example, the “Terms from other documents” clause of this template is as follows:

3.1 Terms from other documents

For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 apply, in particular for the following terms:

handbook
permission
recommendation
requirement

standard
supplier

3.2 Terms specific to the present document

EXPECTED CONTENTS

The purpose of the “Terms specific to the present document” clause is to present the terms specific to the document in drafting together with their definitions.

In ECSS documents, a definition is not an explanation or a clarification. It is equivalent to the term it defines and it can replace the term in any sentence of the document without changing the meaning of the sentence (see Figure 3-1).

A first implication of this way of drafting definitions is that a definition is a single sentence. Any additional piece of information (e.g. examples and clarifications) can be added as a NOTE and stay separate from the definition itself.

A second implication is that both the term and the definition are written using lowercase letters (no capital letter), ending without full stop.

DRAFTING RULES REQUIREMENTS

- a. A term shall not be defined in the handbook unless it meets all the following three conditions:
1. It is used in the handbook.
 2. As used in the handbook, its definition differs from common definitions (as given in the Oxford English Dictionary), and
 3. As used in the handbook, the term is not defined in any ECSS document.

NOTE Clause 3.1 “Terms from other documents” is provided to this end.

- b. The definition of each term shall be drafted in such a way that if the term is used in a sentence, it can be substituted by its definition without changing the meaning of the sentence.

NOTE See Figure 3-1 and the corresponding explanation in “expected contents” above for a detailed discussion and implications of this requirement.

- c. If the singular of a term exist, the defined term and the definition shall be in singular.
- d. Definitions shall be listed in alphabetic order.
- e. When the same term is used with two different meanings, the context shall be indicated before the definition, between “<>”.

NOTE For example:
3.2.23 objective
<management> goal to be accomplished
<optics> set of lenses that work as a single lens

- f. When a definition includes words which meaning is not the common one (therefore either listed in clause 3.1 or defined in clause 3.2), these words shall appear in bold.

NOTE For example:
3.2.1 handbook in drafting

handbook to which the present rules are made applicable

The word **standard** appears in bold because it is listed in clause 3.1.

- g. When synonymous terms are defined, one of them shall include the definition and a NOTE mentioning the existence of a synonymous term, and the other term shall refer to the previous one.

NOTE 1 For example:

3.2.12 termination point

see "**triple point**" (3.1.24)

.....

3.2.24 triple point

location, in a bonding application, where the local stress is multi-directional due to a geometric discontinuity

NOTE 2 The term "termination point" is synonymous with the word "triple point".

- h. If a term is different to the definition in ECSS-S-ST-00-01 "ECSS System – Glossary of terms" then this shall be clearly stated in a NOTE accompanying the definition.

- i. Abbreviation of the term may be included after the term, between brackets.

NOTE 1 For example:

3.2.6 time synchronization cycle (TSC)

time interval delimited by two Time Synchronization Messages

NOTE 2 The inclusion of the abbreviation in the definition does not preclude it to be listed in "Abbreviated terms" (see 3.3).

- j. The layout of the "Terms specific to the present document" clause shall be as in the example herein.

- k. The "Terms specific to the present document" clause shall not contain requirements.

EXAMPLE

As an example, the "Terms and definitions defined in this standard" clause of this template is as follows:

3.2 Terms specific to the present document

3.2.1 acceptable means of compliance

means to comply with a requirement or set of requirements which, if used, the supplier can claim full compliance with the requirement or set of requirements

3.2.2 expected response

<document requirement definition (DRD)>

deliverable document which content is specified in a **DRD**

3.2.4 handbook in drafting

handbook to which the present rules are made applicable

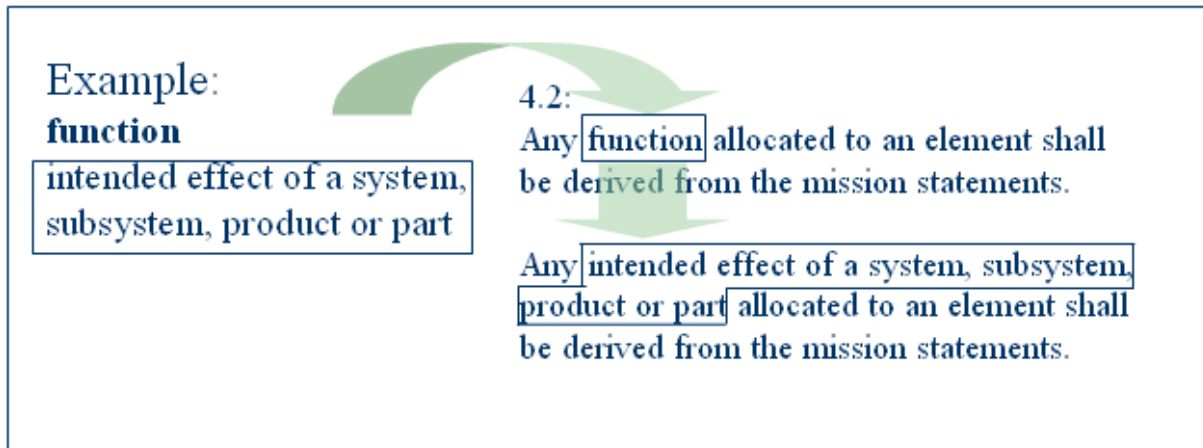


Figure 3-1: How to draft a definition

3.3 Abbreviated terms

EXPECTED CONTENTS

The purpose of the “Abbreviated terms” clause is to list the abbreviation used in the document, and their expanded meaning.

REQUIREMENTS

- a. If an abbreviated term is used in the document, and the expanded term is not included every time that the abbreviated term is used, the term shall be listed in this clause 3.3.
- b. An abbreviation shall not be included unless if it is used in the document.
- c. The same abbreviated term or symbol shall not be used within a document for two different concepts.
- d. The abbreviated term shall appear in bold, and the expanded meaning shall be written using lowercase letters (unless they are proper names), and in regular.

NOTE 1 It is sometimes argued that the use of uppercase letters in the expanded meaning highlights the correspondence with the abbreviation (e.g. XML is “eXtensible Mark-up Language”). Although valid for other documents (e.g. teaching books), the argument fails for standards or handbooks, where the intention is to offer an abbreviated alternative to a long denomination, and not to demonstrate the suitability of the selected abbreviation.

NOTE 2 The abbreviation does not need to be an extraction of letters from the term. For example: ISO is “Organization Internationale pour la Normalization”.

- e. The layout of the “Abbreviated terms” clause shall be as in the example herein.
- f. The “Abbreviated terms” clause shall not include requirements.

EXAMPLE

As an example, the “Abbreviated terms” section of this template is as follows:

3.3 Abbreviated terms

The following abbreviations are defined and used within this handbook:

Abbreviation Meaning

| | |
|-------------|--|
| DRD | document requirements definition |
| ECSS | European Cooperation for Space Standardization |
| IS | international system of units |
| TA | ECSS technical authority |
| TBD | to be determined |
| WG | working group |

4

Principles for drafting a handbook

4.1 Content of ECSS handbooks

ECSS handbooks are non-normative documents, and therefore they only contain descriptive text. That means that they do not contain requirements (and therefore permissions, i.e. alleviations or waivers to requirements).

Although handbooks cannot introduce requirements in themselves, they can describe that a particular requirement exists and it is specified in a given standard. For this purpose, they can quote literally the requirement and the source standard.

ECSS handbooks can include background information, orientation, advice or recommendations related to one specific ECSS discipline or to a specific technique, technology, process or activity, used to fulfil that set of requirements. ECSS handbooks provide acceptable means of compliance for an ECSS requirement or set of requirements.

ECSS handbooks cover two types of documents: guidelines and good practices, and collection of data.

4.2 Language in ECSS handbooks

4.2.1 Use of verbs

4.2.1.1 Verbal temps

The preferred verbal temp in handbooks (as in any other technical document) is the present tense.

The past can be used when needed to describe a past condition necessary for the existence of the present situation. For example, “

The use of the future is completely deprecated. The reasons are that:

- a. It is not necessary. The future is much used in technical literature to express cause-effect relationship, for example “If the switch is turned on, the current will attack the lamp”. However, since this kind of statements are non-temporal, the present tense can be successfully used instead, for example: “If the switch is turned on, the current attacks the lamp”
- b. The use of “will” introduces a high level of ambiguity since it can express not only a future action, but also a present obligation (which is not permitted in ECSS handbooks) or intention.

4.2.1.2 Verbal forms

Since ECSS handbooks cannot contain requirements, any verbal form expressing obligation is inappropriate (see 5.1.2a).

Recommendations are permitted in ECSS handbooks, and therefore the verbal form “should” (“should not”) is permitted. Also any other verbal form expressing recommendation or preferred option are permitted.

Permissions, as defined in ECSS (alleviation or waivers to existing requirements), make no sense in ECSS handbooks because they cannot contain requirements. However, the verbal form used for permissions (“may”) is understood in ECSS handbooks with its common meaning, and it is therefore permitted.

The preferred verb to express possibilities/capabilities in ECSS handbooks, is “can”, but other verbal forms (e.g. “it is possible”) can also be used as far as they are in present tense. Therefore, the following forms are deprecated:

- a. “Could” in favour of “can”. The reason is that both (“can” and “could”) express possibilities, but “can” is factual (it express that the possibility exists), and “could” introduces a subjective level of probability. Since technical document are not be concerned with subjective assessments, the use of “can” is considered more appropriate.
- b. “Would” in favour of “can”. The reason is that “would” expresses an hypothetical situation, and therefore is not factual.

4.2.1.3 Summary

The discussion on the verbal temps and forms to be used and to be avoided in ECSS handbooks is summarized in Table 4-1 and Table 4-2.

Table 4-1: Verbal forms and temps permitted in ECSS handbooks

| Verbal form and temp | Comments |
|---|--|
| Present tense of any verb (except those in Table 4-2) | It is the preferred verbal temp to be used |
| Past | Only when needed to describe a past condition necessary to arrive to the present situation |
| “can”, “could” and “would” | “Can” is the preferred verb to express possibilities or capabilities, however “could” and “would” can also be used. |
| “should” | It is the preferred verb to express recommendation |
| Equivalent to “should” | For example “it is recommended”, “it is preferred” |
| “may” | With its common meaning, expressing possibility. However, the use of “can” is preferred. Note that, as explained in Table 4-2, some uses of “may” can express obligation, and are not therefore permitted, e.g. “may not” (with the meaning of a prohibition) and “may only”. |
| “will” | The use of “will” is only permitted to express future facts. As explained in Table 4-2, the use of “will” if forbidden to express requirements or intentions. |

Table 4-2: Forbidden verbal forms and temps in ECSS handbooks

| Verbal form and temp | Comments |
|-----------------------|---|
| "will" | The use of "will" is forbidden to express requirements or intentions. As explained in Table 4-1 the use of "will" is permitted to express future facts |
| "shall" | The verb "shall" is prevented in handbooks because it is used to express requirements, as requirements are forbidden in handbooks |
| Equivalent to "shall" | For example, "must", "has/have to", "is/are to be", "may not" (with the meaning of a prohibition), "may only", "is/are mandatory", "is/are required", "is/are obliged", "is/are forbidden", "is/are prohibited", "under no circumstance..." |
| "may" | The use of "may" is forbidden to express obligations, e.g. "may not" (with the meaning of a prohibition) and "may only". However, as explained in Table 4-1, the use of "may" is permitted to express possibility. |

4.2.2 Use of expressions introducing ambiguity

Ambiguity is a characteristic to be avoided in any technical document. However, unlike for requirements (which in accordance with ECSS rules cannot introduced any ambiguity, see ECSS-D-00-01 "Drafting rules for ECSS standards", clause 5.2.3), a certain level of ambiguity is permitted in descriptive and guidance text. The reason is that expressions with some level of ambiguity can still provide guidance material. For example "The objective is to reduce the weight as much as possible".

4.3 Structure of ECSS handbooks

The structure for an ECSS handbook is presented in Figure 4-1. As explained before, all sections are descriptive (i.e. non-normative).

NOTE 1 As specified in 5.2.1a, sections "Introduction" and "Annexes" are not mandatory, but they can be used if necessary.

NOTE 2 As explained in section 2, the "Bibliography" section is not used at all in ECSS handbooks.

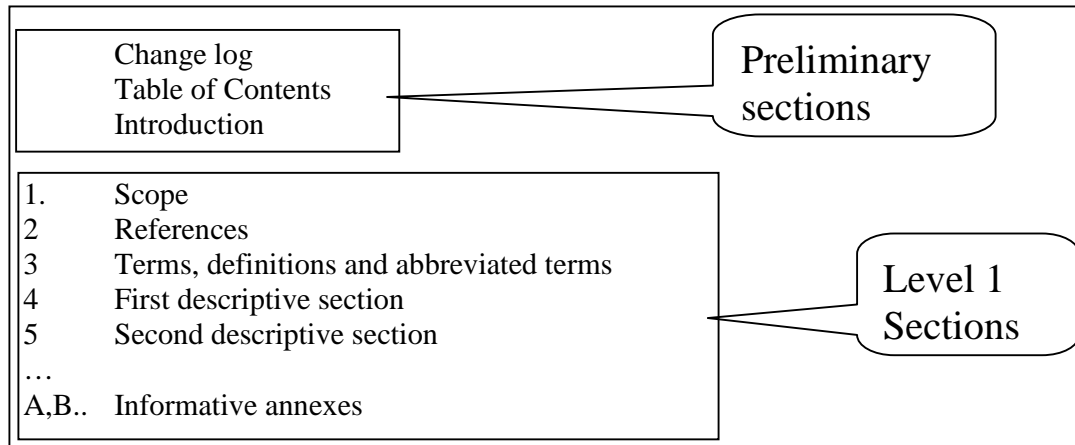


Figure 4-1: General structure of an ECSS handbook

5

Requirements for drafting handbooks

5.1 Type of the information in an ECSS handbook

5.1.1 Descriptive and guidance material

- a. An ECSS handbook shall only contain descriptive and guidance material.
- b. In a handbook, to describe possibilities/capabilities, the verbal form “can” should be used.
- c. To draft the descriptive and guidance material of the handbook, the present tense should be used.

5.1.2 Avoidance of requirements

- a. A handbook shall not introduce (implicit or explicit) requirements.

NOTE 1 That includes any statement expressing obligation, such as “shall”, “must”, “has/have to”, “is/are to be”, “is/are mandatory”, “is/are forbidden” (see Table 4-2).

NOTE 2 However, a handbook can describe/inform that a particular requirement is actually specified in a given standard.

NOTE 3 ECSS standards are appropriate documents for normative material.

5.1.3 Recommendations

- a. A handbook may contain recommendations.

NOTE 1 Recommendations are considered part of the guidance material of a handbook.

NOTE 2 In ECSS standards, the only appropriate verbal form for recommendations is “should” (“should not”). However, in handbooks this rule is more relaxed. Therefore, verbal forms as “is/are recommended” and “is/are preferred” can also be used (see Table 4-1).

5.2 Structure of an ECSS handbook

5.2.1 General structure and layout

- a. From the elements of Figure 4-1, an ECSS handbook shall include at least the following ones:
 1. Preliminary sections: at least “Change log”, and “Table of contents”.
 2. Level 1 sections: at least “Scope”, “References”, “Terms, definitions and abbreviated terms”, and one or several “Descriptive sections”.

5.2.2 Structure of numbered sections

5.2.2.1 Level of numbered sections

- a. Level of numbered sections higher than 5 shall not be used.

NOTE Descriptive text can be structured in up to five levels of sections (from Level 1 to Level 5). Not all levels need to be used. Therefore, any section up to Level 4 (lower than Level 5) can (but need not) be subdivided in lower level sections. Level 5 sections cannot be further subdivided.

5.2.2.2 Hanging and superfluous sections

- a. Hanging sections shall not be used.

NOTE A “Hanging section” is text that cannot be referred to as it does not have an own clause number. The following is an example of IMPROPER text. The text between the section number 4.3.5 and section 4.3.5.1 cannot be referenced to because, when referring to “section 4.3.5” the whole section including all subsections is referred to.:

4.3.5 Example of hanging section

This text is a hanging section, because it cannot be referred to (4.3.5 is the whole text, including 4.3.5.1 and 4.3.5.2).

4.3.5.1. Continuation of the example

This is not a hanging section, because it can be referred to as “section 4.3.5.1”.

4.3.5.2. Finalization of the example

This is not a hanging section, because it can be referred to as “section 4.3.5.2”.

- b. Any section shall not be further subdivided in a single lower level section.

NOTE The following is also an example of IMPROPER text because the level 4 section 4.3.5.1 is superfluous and can be omitted.

4.3.5 Example of superfluous section

4.3.5.1 Continuation of the example

This is a wrong subdivision, because numbering it as 4.3.5.1 is not necessary. This text can be referred to as “4.3.5”.

4.3.6 Other paragraph

This is not a hanging section, because it can be unambiguously referred to as “clause 4.3.6”.

5.2.2.3 Titles

- a. The title of the handbook shall contain one of the following words:
 - 1. “handbook”, in case the document contains a collection of data or accepted practices.
 - 2. “guidelines”, in case the document contains acceptable means of compliance with existing requirements.
- b. Level 1 sections shall have a title.
 - NOTE Sections of a level lower than 1 (i.e. Levels 2 to 5) need not have a title.
- c. Titles of sections shall be used consistently among “sibling” clauses.
 - NOTE For example, if section 5.6.8.1 is untitled, sections 5.6.8.2, 5.6.8.3, ..., 5.6.8.x are also untitled. However, sections 5.6.7.1, 5.6.7.2, ..., 5.6.7.x can be all together titled or untitled.
- d. If a section is titled, all its upper level sections shall be titled (i.e. if a section is untitled, all its lower level sections shall be untitled).

5.2.3 Annexes to a handbooks

5.2.3.1 Types of annexes

- a. Annexes to an ECSS handbook shall be only informative.

5.2.3.2 Designation

- a. Annexes shall be designated using capital letters of the Latin alphabet, beginning with A, after the word “Annex”.
- b. The informative character of the annex shall appear in parenthesis.
- c. The name of the annex shall follow the layout of this template.
- d. The numbering of sections, tables, figures and equations within the annex shall be preceded by the letters assigned to the annex.
- e. The numbering shall start afresh with each annex.

5.3 Organization of the (informative) text

5.3.1 Organization of (informative) text in numbered lists

- a. When numbered lists are used to organize the informative text, no more than three levels in the list shall be used.
- b. The levels in the list shall be numbered using:
 - 1. minor letters at the first level, followed by a dot.
 - 2. Arabic numbers at the second level, followed by a dot.
 - 3. minor letters between brackets at the third level.

- NOTE For example, an appropriately numbered list is:
- a. List item a
 - b. List item b
 1. Element 1 of list item b
 2. Element 2 of list item b
 - (a) Subelement (a) of element b.2
 - (b) Subelement (b) of element b.2
 3. Element 3 of list item b
 - c. List item c.

5.3.2 Notes

5.3.2.1 Notes to the text

- a. In a handbook, the use of notes to the text should be avoided.

NOTE The reason is that NOTES are intended to introduce explanatory text to a particular requirement or set of requirements. Since a handbook cannot contain requirements, NOTES are not necessary. In general, in a handbook the text in a NOTE can be drafted as normal text. Note that also in standards, NOTES to the explanatory text are deprecated (only NOTES to requirements are considered appropriate).

5.3.2.2 Footnotes

- a. Footnotes should be avoided.

NOTE Footnotes create problems when transferring requirements into a requirements database.

5.4 Elements of a handbook

5.4.1 Format

- a. Draft handbooks shall be provided in electronic MS Word® format.
- b. The drafting of the handbook shall use the “Electronic template for ECSS handbooks”, with the styles used as defined therein.

NOTE The “Electronic template for ECSS handbooks” can be downloaded from the ECSS Websites as follows:

- Browse to www.ecss.nl, and once logged in, click on “FOR STANDARD DEVELOPERS”
- Click on “ECSS drafting templates for ECSS Standards and Handbooks”

5.4.2 References from the (informative) text

5.4.2.1 External references

- a. When the (informative/guidance) text of a handbook makes an (informative) reference to other document, it shall:
 1. refer to the particular numbered paragraphs that are made applicable
 2. include the version or date of the referred document.

NOTE As specified in Clause 2 of the present drafting rules, the referred document is listed in Clause 2 "References".

5.4.2.2 Internal references

- a. References within the document shall be made to numbered items (individual sections, annexes, figures, tables or formulas), identified by their numbers.

NOTE This requirement prevents general and vague references such as "as specified in the present handbook", "as shown in the figures", "as specified below", or "as described in the following sections".

- b. Maximum level of nesting of internal references should be 2.
- c. References within the handbook shall be implemented by using hyperlinks.

5.4.3 Numbers and units

5.4.3.1 Numbers

- a. For numbers, the decimal sign shall be a decimal comma.
- b. If a value less than -1 and +1 is written in decimal form, the decimal sign shall be preceded by a leading zero.

5.4.3.2 Units

- a. ECSS standards shall use the units, multiples and submultiples of the International System of Units (SI-units).

NOTE This prevents, for example, the use of bar and mbar for the pressure, since in the SI-unit of pressure is Pa.

- b. When stating values, the units in which values are expressed shall be indicated as follows:
 1. For degrees, minute and second (plane angles), immediately the numerical value without a blank space.
 2. For any other unit, after the numerical value, preceded by a blank space.

5.4.3.3 Tolerances

- a. Tolerances shall be specified in an unambiguous way.

NOTE See the following examples:
Example 1: 80 mm × 25 mm × 50 mm
[NOT: 80 × 25 × 50 mm]

Example 2: $80 \mu\text{F} \pm 2 \mu\text{F}$, or $(80 \text{ F} \pm 2) \mu\text{F}$
[NOT: $80 \pm 2 \mu\text{F}$]

Example 3: 80_{-1}^{+2} mm
[NOT $80 \text{ mm} \begin{smallmatrix} +2 \\ -1 \end{smallmatrix}$]

Example 4: $80 \text{ mm} \begin{smallmatrix} +20 \\ -10 \end{smallmatrix} \mu\text{m}$

Example 5: 5 kHz to 7 kHz, or (5 to 7) kHz
[NOT: 5 to 7 kHz, or 5-7 kHz].

- b. Tolerances stated in percent shall be expressed in a mathematical correct form.

NOTE See the following examples:

Example 1: For a range, use "from 25 % to 27 %"
[NOT: "from 25 to 27 %"]

Example 2: For a central value, use "(25 ± 2) %"
[NOT "25 ± 2 %"]

5.4.4 Tables and figures

5.4.4.1 Use of tables and figures

- a. Tables and figures shall not contain requirements.

5.4.4.2 Caption of tables and figures

- a. Tables and figures shall have a caption.
- b. The caption of tables and figures shall include an identifier, followed by a blank space, and a title (with the layout of the captions of Table 4-1 and Figure 4-1 respectively).
- c. Except for annexes, the identifier of tables and figures shall be formed by the word "Table" or "Figure" respectively, followed by a dash ("-"), the number of the Level 1 section, and a correlative number from 1 on, started afresh with each Level 1 section.
- d. For annexes, the identifier of tables and figures shall be formed by the word "Table" or "Figure" respectively, followed by the letter of the annex that they belong to, followed by dash ("-"), and a correlative number from 1 on, started afresh with each annex.
- e. The caption shall be positioned as follows:
1. In tables, before the table.
 2. In figures, after the figure.
- f. The identifier shall be automatically generated through the use of the specific paragraph style as intended in the ECSS template.

5.4.4.3 Reference to tables and figures from the text

- a. All tables and figures shall be explicitly cross-referred to from the body text.

NOTE This implies that if a table or figure is not referred to from the text, it is unnecessary for the understanding of the document, and therefore it can be deleted.

- b. When the text refers to a table, figure or equation, it shall refer to it by their identifier.

NOTE For the identifier of figures and tables, see 5.4.4.2c and 5.4.4.2d.

- c. The explicit cross-reference specified in 5.4.4.3b shall be implemented by using hyperlinks.

5.4.4.4 Notes to tables and figures

- a. Notes to tables and figures shall be located within the frame of the table or figure, at the end of the relevant table or immediately above the title of the relevant figure.
- b. Notes to tables and figures shall be of one of the following two types:
 1. Notes to the totality of the table or figure.
 2. Notes to particular elements of the table or figure.
- c. Notes to the totality of the table or figure shall be numbered with the word NOTE followed by a sequential Arabic number, from 1 on, afresh in each table or figure.
- d. Notes to particular elements shall be identified by a superscript minor letter from "a" on (afresh in each table or figure) in both, just after the calling element in the table or figure, and before the referred note at the end of the table or figure.
- e. Notes to tables and figures shall not contain requirements.

5.4.4.5 Formatting a table

- a. The first word in the heading of each column shall begin with a capital letter, and the rest shall not be capitalized.
- b. The units used in the columns of a table shall be indicated as follows:
 1. In the case that the units of all the columns are the same, with a statement placed above right-hand corner of the table.

NOTE For example:

| Dimensions in mm | |
|------------------|-----------------|
| Outside diameter | Inside diameter |
| | |

2. In any other case, at the bottom of each column heading.

NOTE For example:

| Type Linear density kg/m | Inside diameter mm |
|-----------------------------|-----------------------|
| | |

5.4.4.6 Presentation of figures

5.4.4.6.1 Units

- a. The units in which values in the figure are expressed shall be indicated.

NOTE Figures in a handbook are used to illustrate the descriptive/guidance material provided by the handbook. For this reason, both a technical drawing and a photography can be used as figures.

5.4.4.6.2 Formatting

- a. The orientation on vertical dimension lines shall be such that they can be read from the right-hand side of the pages
- b. Inscriptions on drawings shall be such that, in printing size on A4 format, the height of the lower case characters should be not less than 1,4 mm (except in the case of indices and exponents).

5.4.4.7 Continuation of tables and figures

- a. When a table of figure is continued through several pages, the caption shall be repeated over running pages together with the indication "(PART x/N)" in the next line.
- b. For tables, the column headings shall be repeated over running pages.
- c. For tables reaching the foot of a page to be continued on the following page, the frame shall be left open at the bottom (i.e. without lower horizontal line).

5.4.5 Equations

5.4.5.1 Presentation of equations

- a. Equations shall be expressed in mathematically correct form, the variables being represented by letter symbols the meanings of which are explained in connection with the equations, unless they are listed in section 3.
- b. The layout presented in Figure 5-1 shall be used for equations.

| | |
|---|-------|
| $A = \sum_{n=1}^t A(x^n - \frac{x}{n})$ | [5-1] |
| <p>where</p> <p style="margin-left: 20px;">A is the ...</p> <p style="margin-left: 20px;">n is ...</p> <p style="margin-left: 20px;">x is ...</p> | |

Figure 5-1: Layout of an equation

5.4.5.2 Caption of equations

- a. Equations called from the text shall have a caption.

NOTE Equations which are not called from the text do not need to have a caption.
- b. The caption of equations shall include the number of the Level "N" section where they appear, followed by a dash ("-"), and a correlative number, started afresh with each Level "N" section.

NOTE For example, let's assume that the first equation to be numbered appears in section 5.3.8. If the author decided to use "N=1" then the first equation is numbered [5-1]. If he decides to use "N=2" then the first equation is numbered [5.3-1]. If he decided to use "N=3" the number is [5.3.8-1]. .

- c. The Level “N” specified in 5.4.5.2b should be the Level 1.

NOTE However, in long handbooks it can be practical and advisable to group the equations in lower level sections.

- d. The caption shall be positioned to the right of the equation, with the following layout:
e. The caption of the equation shall be automatically generated.

5.4.5.3 Reference to equations from the text

- a. When an equation is referred from the text, it shall be referred by its caption.

NOTE Unlike tables and figures, not all equations need to be referred from the text.

- b. The cross-reference specified in 5.4.5.3a shall be implemented by using hyperlinks.