

Writing a Formal IT Specification for Publication by ISO

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Rex is an independent consultant who has worked in the IT industry since 1976. Since 1984, he's been involved in producing and reviewing formal specifications for C, C#, CLI (a subset of Microsoft's .NET™ framework), C++/CLI, Hack, Java™, JavaScript™, Office Open XML (the file format used by Microsoft's Office™ suite as well as by other products), PHP, Powershell™, and XPS (XML Paper Specification). This work was done via ANSI, ISO, Ecma International, open-source forums, and commercial organizations.

This document was produced using the Simple Word template (see <https://www.iso.org/iso-templates.html>) provided by the ISO Central Secretariat. The layout of an ISO specification is governed by ISO/IEC Directives, Part 2: "*Principles and rules for the structure and drafting of ISO and IEC documents*," (see <https://www.iso.org/sites/directives/current/part2/index.xhtml>) hereinafter referred to as *The Directives*.

ISO also has an in-house *Style Guide*, which contains many requirements over and above The Directives. See <https://www.iso.org/ISO-house-style.html>.

This document is formatted according to the advice provided by its content and most of it is intended to comply with ISO's requirements.

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Preparing a Specification for ISO Standardization

1 Introduction

The *International Organization for Standardization* ([ISO](#)) and *International Electrotechnical Commission* ([IEC](#)) are well-known *Standards Development Organizations* (SDOs). Each has its own structure for committees to produce an ISO or IEC standard, respectively. Given the overlap of their work in relation to IT standards, in 1987, ISO and IEC agreed to create *Joint Technical Committee 1* ([ISO/IEC JTC 1](#)), whose subcommittees produce IT-related ISO/IEC standards [and *Technical Reports* (TRs)].

While most of these standards are produced by committees within ISO, IEC, or JTC 1, specifications from the outside world can be brought “inside” via the *Publicly Available Specification* (PAS) process either directly to ISO or to JTC 1. (A parallel process, *Fast Track*, allows National-Body members [countries, that is] of these SDOs and a few other accredited organizations [such as [Ecma International](#)], to submit specifications for consideration.)

Regardless of how a specification gets developed, once it is submitted to ISO or JTC 1, it becomes a *Draft International Standard* (DIS), and it is processed by the *ISO Central Secretariat* (ISO CS). This specification is circulated for a 5-month DIS Ballot, which often results in comments being attached to votes. For a standard to get published, the vote shall pass, and the comments shall be resolved satisfactorily at a *Ballot Resolution Meeting* (BRM).

Historically, specifications were prepared using a wide variety of tools, such as FrameMaker, PageMaker, TeX with LaTeX macro package, troff, various versions of MS Word, and a variety of XML vocabularies. So long as the submitter could produce a PDF rendering, ISO CS accepted that. **However, that is no longer the case. Unless a submitter has an exemption, submissions shall now be in MS Word, preferably using an ISO CS-provided template.**

[The XML file format used by MS Word is specified by the ISO/IEC standard IS 29500, Part 1 (Strict) and Part 4 (Transitional), originally produced by Ecma International and Fast Tracked to JTC 1, where these Parts are now maintained by ISO/IEC JTC 1/SC 34. As such, in theory, any IS 29500-compliant word-processing system could be used instead. **However, a submitter should first check with ISO CS before committing to using such a system (Google Docs, for example), to make sure that doing so will be acceptable.** A copy of IS 29500 can be obtained from: <https://standards.iso.org/ittf/PubliclyAvailableStandards/index.html>.]

An ISO, IEC, or ISO/IEC standard is required to have a layout format as specified by The Directives. While PAS (and Fast Track) submitters have some latitude with their first edition, they are required to comply with these directives for subsequent revisions. Interestingly, despite the user community having had many years of exposure to non-paginated renderings of documents via HTML and the World Wide Web, the current model used by ISO CS remains the printed page!

The purpose of this document is to provide practical information about how to comply with the format requirements, in general, and with MS-Word-specific things, in particular. It is intended to augment what is contained in The Directives and the Style Guide. However, those and/or the ISO CS Simple Word template may change at any time, any comments pertaining to them might not apply to newer versions.

2 ISO document processing

ISO CS uses a series of tools to process a Word submission (herein called *the submitted spec*), which involves conversion to XML, some unknown (at least by this author) processing, and finally, the generation from the XML of a PDF for publication. They also produce a new Word document (herein called *the ISO spec*). Along the way, ISO editors may well make formatting changes to the submitted spec.

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Attention: When the submitter finally gets an ISO spec draft to proof, they will need to perform a diff on their submitted spec against the ISO spec to make sure that no errors in content and format were introduced by ISO CS. (After all, the ISO editors are unlikely to be subject matter experts in the subject of the specification!)

The resolution of comments from the DIS ballot may well require further edits to the ISO spec, and even one or more further DIS ballots!

Ultimately, the ISO spec is published in PDF form.

For several years now, this workflow has proved to be a bone of contention, at least among project editors in various JTC 1 subcommittees, and various efforts have been made to try and get improvements in the process, especially to accommodate large (as in thousands of pages) and complex specifications. This debate is on-going.

Attention: The ISO CS editor assigned to your project is unlikely to have ever been on a committee that actually produced a specification. As such, they haven't experienced the process from the "other side!" When this author, as the project editor of a 4-Part ISO spec totally 6,500 pages, attended a meeting of ISO project editors, when he asked what the average length of an ISO standard was, he was told, "around 50 pages." As you can imagine, managing a much larger and complex specification can require a greater understanding of the real-world issues resulting from that size and complexity.

3 The base format used by a submitter going forward

What comes out of the ISO CS process, the ISO spec, is a Word document. While ISO CS probably intends that a submitter then use that document as the base for the next edition, that is for the submitter to determine. There are good reasons why editors chose one particular document-management tool over another. For example, the [markdown](#) (md) format under [GitHub](#) has become a popular platform for collaborative editing and specification maintenance for both open-source and commercial projects.

If a submitter wishes to continue using a non-Word platform, they will have to determine all the changes made by ISO CS to the submitted spec in the generation of the ISO spec, and to apply them to their own base. And, of course, they'll have to convert from their format to Word again for the next round of balloting and publication.

The first ISO spec received by this author contained a footer on *every* page that said, "Edited DIS – MUST BE USED FOR FINAL DRAFT." From ISO's point of view, having made numerous edits and added Word comments, ISO editors want to be able to see that their instructions and requests have been followed. However, from the submitter's point of view, if they intend to maintain their specification in something *other* than the ISO Word template, they don't want to make the changes twice: once in the ISO spec and again in their base spec. Also, any substantive/systematic edits might better be handled by tools in the base spec rather than in Word, with the base spec resubmitted.

In any event, some of the issues reported in §6 indicate that the ISO process actually introduced errors as well as removing useful style information.

Attention: The Word-formatted ISO spec a submitter finally gets from ISO CS might *not* be suitable for use as the base for the next edition!

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4 Some basic terminology

Here are some important ISO terms used in the context of a standard's format:

clause — the equivalent of a chapter.

subclause — the equivalent of a section or subsection. A subclause may contain nested subclauses; they are all called subclauses regardless of their level.

annex — the equivalent of an appendix. An annex may contain (nested) subclauses.

content, normative— see Clause 7, Conformance.

content, non-normative/informative — see Clause 7, Conformance.

5 Making a Word version of a specification

There are a number of ways to do this:

1. If starting a specification from scratch, begin with the Word template provided by ISO CS, and use the styles it contains as text is added.
2. Take an existing specification in Word format, but that does *not* use the ISO CS template, and submit that.
3. Take an existing specification in any format other than Word and copy/paste that into an empty document that uses the Word template provided by ISO CS, and apply the styles it contains.
4. Take an existing specification in any format and programmatically generate a Word document from it that either has all the attributes of the ISO CS template, or that is then manually edited afterwards to exhibit those. [One way to do this is via the freely available tool [pandoc](#).]

Item 2 is worth further comment. “Do you mean I really don’t have to use the ISO CS template?” Late in 2019, this author submitted a DIS to ISO CS that was a Word document with numerous custom styles but was not based on, nor derived in any way from, the ISO CS template. ISO CS managed to produce an ISO spec from that without complaint, and the ballot started using a PDF rendering. The resulting ISO spec looked *as if* the template had been used.

1. Going in, clause headings were set in 24-point Cambria with blue color, but came out as 13-point Cambria, automatic, which meant “black.”
2. Going in, all paragraphs had a ragged-right margin, but came out right-justified.
3. Going in, each clause started on a new page, but coming out each clause continued right after the previous one ended, on the same page if space permitted.
4. Going in, top-level items in a numbered list were indented from the left margin, but came out flush with that margin.

Attention: While some flexibility appears to be allowed, you won’t know for certain until you try something and then get back from ISO a proof of a draft specification *after* it has been submitted!

6 Potential shortcomings of the ISO spec

After a comparison of the ISO spec against the submitted spec, here are some findings made by this author:

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1. The ISO spec does not preserve soft returns (which are typically used to inhibit bad page breaks). See 8.1.7 for more details.
2. The “Terms and definitions” clause requires that entries be numbered. For large collections of entries, during specification maintenance, it makes sense for these numbers to not be hard-coded, so entries can be inserted, removed, and moved. And Word provides a way to do this via some fields. And while the text generated by these fields is retained in the ISO spec, the fields themselves are not! See 8.4 for more details.
3. Handling of styles
 - a. This author uses a style called “Term”, which for his specs is italic or bold/italic, using the default font. As only critical/big-picture terms are defined in “Terms and definitions,” he defines all other terms at their first use, at which time, they are set using this style, which is a common typesetting practice in the US/English world. (This is especially useful for specs of thousands of pages, in which there is no point in adding hundreds of terms to “Terms and definitions.” The ISO spec did *not* retain this style information; although, it did retain the italic. However, the ISO editor made a comment on each such occurrence saying, “Please write this term in upright type.” Unless such styles can be preserved, this is a hardship on submitters. See 8.4 for another useful application of a term style. Regarding this practice, the ISO editor noted later, “Please consider removing this item and write all terms in upright type. The usual ISO practice is to only italicize terms in cross-references within Clause 3.” Note how this is written as a request, not as a requirement.
 - b. In one of this author’s submissions, a number of styles (which all included non-default fonts) were defined to distinguish various kinds of XML core items, such as elements, attributes, attribute values, and types. While all these styles *were* retained in the ISO spec, the effects of three of them were *not*; for those three, all text styled as such came out using the default style. This was a non-trivial problem.
4. Right-justification of paragraphs can lead to some visually displeasing results, especially when URIs are involved. For example, from one “Terms and definitions” clause:

Unicode,	<i>The</i>	<i>Unicode</i>	<i>Standard,</i>	The	Unicode	Consortium,
http://www.unicode.org/standard/standard.html						
<i>XML Schema Part 1: Structures,</i>	W3C	Recommendation,	28 October	2004.		
https://www.w3.org/TR/xmlschema-1/						
<i>XML Schema Part 2: Datatypes,</i>	W3C	Recommendation,	28 October	2004.		
https://www.w3.org/TR/xmlschema-2/						

5. As discussed in §8.4, the first use of a term in a “Terms and definitions” entry shall be followed by a cross-reference link to where that term is described in detail. As this author did not have such links, the ISO editor added them, but as hard-coded numbers, so they were not hyperlinks!
6. All cross-reference links were turned into hard-coded numbers with no hyperlink. This is quite unacceptable (this author’s large specs contained many hundreds if not thousands of such links), and **renders the ISO spec as completely unsuitable as a base document for the next edition.**
7. The ISO editor changed *every* pair of spaces following a sentence-ending period to a single space.
8. Non-breaking spaces are preserved; good!

7 Conformance

The reason for having a standard is to clearly say what is and what isn't allowed or required. To that end, The Directives contain Clause 7, "Verbal forms for expressions of provisions," which shows which positive and negative terms are to be used to indicate requirements ("shall" and "shall not") recommendations ("should" and "should not"), and permissions ("may" and "need not"), among other things.

Content containing a requirement is regarded as being *normative*, while all other content is *informative* (that is, non-normative). By definition, notes, examples, and footnotes (among other things) are informative. In various specifications, this author previous used markers—such as "This clause is informative" and "Start/end of informative text"—to indicate the start and end of blocks of informative content in subclauses. However, he was informed by ISO editors that any text that does *not* contain requirements using the mechanisms defined in The Directives, is implicitly informative, and need *not* be so marked. However, this does *not* apply to an annex, which *shall* be identified as being normative or informative in its title. (This begs the question, "Can one have an annex containing both normative and informative content? Presumably not.")

For some specifications, it can be useful to have a Conformance clause. For example, some of the content might be conditionally normative. That is, if one implements an optional feature, one shall implement it as described, or not at all. Also, in specifications for things like programming language compilers, there will be separate notions of conforming implementations and conforming programs that are input to an implementation.

Attention: For a large specification, it might be useful to have an informative annex that contains a summary of all the conformance rules, in ascending clause/subclause order, with links to the corresponding clause/subclauses. However, to extract this information programmatically, one would need a rather smart tool to find the appropriate occurrences of "shall," "may," etc.

8 Editorial issues and layout

This clause deals with issues pertaining to The Directives.

[Note that the presence of the paragraph above is *disallowed* by The Directives, because it is a *hanging paragraph*. A clause or subclause that contains subordinate subclauses—as does this clause—shall not contain content *prior* to the first subordinate subclause. That is, that paragraph would have to be put into a new, first subclause. The rationale for this is that if one has a cross reference link to Clause 8, does that refer to the whole clause or just to the content prior to the first subclause.]

[To address this, this author often names the first nested subclause "General." However, it is possible that one might finish up with the following subclause numbering structure: 8 XX, 8.1 General, 8.2 YY, 8.2.1 General, ... That is, with multiple subclauses, at different header levels, all called "General." While this separation can easily be handled in Word, it gives rise to duplicate header labels when working with other tools.]

Attention: Hanging paragraphs are not permitted!

8.1 General issues

8.1.1 Clause number format

The number of a clause shall not be followed by a period (which does not appear to be the default with Word). For example, the current clause, Clause 8, is numbered "8," without a trailing period.

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8.1.2 Clause, subclause, and annex headings

It is common in US/English writing to use [title case](#) for chapter and section headings. However, this is *not* permitted in an ISO specification, although it is not obvious just where in the ISO Directives, Part 2, that is stated. (That said, those directives themselves are written *without* title case, and an ISO editor told this author that is the required way.)

So, what one might have written as “6.2 Mapping ZIP Item Names to Logical Item Names” shall be written instead as “6.2 Mapping ZIP item names to logical item names.” All except the first word shall start with a lowercase letter, except for proper nouns, acronyms, product names, and such that contain uppercase letters as part of their correct spelling (as with “ZIP” above).

8.1.3 Code blocks and code fragments

All blocks of programming language code, scripts, and such shall be set in the font Courier New; for example:

```
i = ++i + 1;
a[i++] = i;
```

Likewise, for such content inside narrative; for example:

The three types `char`, `signed char`, and `unsigned char` are collectively called the character types. The implementation shall define `char` to have the same range, representation, and behavior as either `signed char` or `unsigned char`.

Ordinarily, in Word, this author uses the constant-width font Consolas. However, characters in Courier New are wider than those in Consolas. So, when that got changed to Courier New, numerous lines in code examples overflowed the right margin and wrapped to the next line requiring manual editing of numerous examples!

8.1.4 Fonts and text highlighting

According to one ISO editor, “Our house style is Cambria, and code is in Courier New; any other fonts used in the document will be normalized [by the ISO tool(s)] to these two.”

Question to ISO: What other options do we have to highlight text elements besides roman, bold, and italic? For example, can we use underlining, shading, **color**, or borders (and combinations of such things) to distinguish textual elements?

ISO Editor 1 response: Underline, bold, italics are possible (only to be used in certain cases per the Directives). No colours, shading, or borders.

ISO Editor 2 response: Please avoid using italics, bold and underline to give emphasis to words or paragraphs in the text. This will be clarified in the “ISO House Style” which will be made available online shortly.

Question to ISO: It can also be useful to be able to distinguish between *italic text (without serifs)* and *slanted text (with serifs)*, but the former requires a typeface other than Cambria. Is there a way we can achieve this?

ISO Editor 1 response: No.

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8.1.5 Links to external specification files

It is useful for some things (such as XML schemas and program source files) to be provided in electronic form only. These resources shall be provided to ISO for posting to its own site with the corresponding link(s) embedded in the specification.

8.1.6 Justification of text

In general, text is to be justified right.

See Clause 5 for a comment regarding not doing this.

Question for ISO: Are we permitted to disable right-justification for those (few) cases? And if so, will the ISO toolchain respect that and not change back to justification right?

ISO Editor Response Yes, you can disable right-justification for these cases.

Question for ISO: Just to be clear, are you saying that manual disabling of justification by us in these cases will be preserved by your tools?

ISO Editor Response: We can disable justification in such cases, but we should bring such instances to the attention of ISO editors when we submit the final copy. ISO editors view the PDF rendering to see how we intend things to look.

8.1.7 Use of soft returns to inhibit bad page breaks

Consider the following example from a “Terms and definitions” clause in a published specification:

3.1.3
behavior
external appearance or action

Clearly, it would be bad form to allow a page break between the first and second lines, and between the second and third lines. To enforce that in Word, one terminates the first and second lines with a soft return (using Shift-Enter) rather than a hard return (Enter). Doing so results in the following when the Show/Hide Paragraphs Settings button (¶) is selected:

3.1.3↵
behavior↵
external·appearance·or·action¶

Attention: The ISO spec does not preserve soft returns, which means any efforts to avoid bad page breaks in the submitted spec are *ignored*. [This is a reason to not use the ISO spec as the base for the next edition.]

8.1.8 Cross-references

Regarding the format of a cross-reference, the ISO style guide does *not* say explicitly, but it contains the following distinct examples:

- ... (see Clause 15).
- ... – see Clause 10.

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- ... (see Annex C).
- See Clause 30.
- See 10.4 and 10.5.
- ... (see 3.1.1 and 10.6).
- See the examples in 11.4.
- See the definition given in 3.3.3.
- ... (see Figure 3).
- ... (see C.6.3.3).
- ... Table 3, ... Table A.1
- Subclause 16.5 contains ...

So, from these we deduce that the word “Clause” or “Annex” *shall* precede a reference to a whole clause or annex, respectively, but these words are *never* used with subclauses. Also, if a sentence begins with a subclause number, that number shall be preceded by “Subclause”, as shown above in the final bullet.

Note that a number of standards currently published by ISO omit “see” from all parenthesized references, while some others use the well-known [section symbol §](#) instead for both clauses as well as subclauses, in which, case, they don’t use the “Clause” prefix. This author was recently asked to *remove all occurrences* of § in this context, even though is common notation in US/English publishing.

Consider the following text:

... denoted by the [Package Name](#) field.

where “Package Name” is a hyperlink, which when selected leads to subclause 3.3.1. (This is common in specifications written using markdown.)

While the Directives make *no* mention of this approach, *all* cross-reference instances in the Directives contain an explicit numbered link *separate* from the term to which the hyperlink pertains. As such, we deduce that the text above shall be written instead, as follows:

... denoted by the Package Name (see [3.3.1](#)) field.

with the clause/subclause number (rather than the text “Package Name”) being the hyperlink.

A similar situation exists with a hyperlink to an external document. For example:

Consider the following text:

This document uses the prefix `rdf:` to refer to the [RDF/XML](#) namespace:

where “RDF/XML” is a hyperlink, which when selected leads to the (otherwise hidden) URI

<https://www.w3.org/TR/2014/REC-rdf-syntax-grammar-20140225/>.

So, the text above shall be written instead, as follows:

This document uses the prefix `rdf:` to refer to the RDF/XML namespace (see <https://www.w3.org/TR/2014/REC-rdf-syntax-grammar-20140225/>):

with the explicit URI being the hyperlink.

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Bottom line, each hyperlink shall show in printable form the destination of the link (presumably so people using a hard copy of the spec know where to look).

Entries in the Bibliography begin with an entry number of the form “[*n*].” As such, a reference to such an entry shall be written as “see Reference [*n*].”

8.1.9 Self-references

When referring to the specification from within itself, do *not* use “this standard,” “this specification,” or “this Technical Report;” instead, use “this document.”

8.1.10 Formatting numbers

The Directives require numbers to be written in a non-English format **even when a spec is written in English!** When this author had the text, “shall not exceed 65,535 bytes”, the ISO editor wrote, “Please note that in ISO documents, the decimal sign is a comma. Each group of three digits shall be separated by a small space from the preceding digits. Please write the number as “65 535” if applicable.” This is especially problematic in specs for (the vast majority of) programming languages in which the decimal sign is the period! So that would mean that the code example uses a period but the narrative a comma; really! One would reasonably expect that an English-language spec should be written and read using an English-language [locale](#), but NO!

8.2 Front matter

8.2.1 Foreword

This shall only contain generic and fixed text as specified in the Simple template. Any other information shall be moved elsewhere (e.g., to the Introduction).

If the specification is a revision of an ISO and/or IEC standard, then a list of changes in this edition from the previous ISO and/or IEC edition is allowed. Changes between earlier editions shall not appear here but may go in an informative annex. [If the specification is a PAS submission that replaces an earlier edition, but one that was *not* published by ISO and/or IEC, such differences also belong in an informative annex, as there was no previous ISO edition.

8.2.2 Table of contents

The ISO Directives appear to have no guidance nor constraints on this element of a specification. Although the Simple template provides styles for six heading levels, by default, the template only displays the top three in the Table of contents.

To change this (typically to allow more than three), select the whole table of contents starting with “Foreword” and ending with “Bibliography,” right clicking the selected text, and choosing “Toggle Field Codes.” This results in the display of the *Word field* that underlies the whole table. (This and all other Word fields are documented in IS 29500:1 2016, 17.16, “Fields and Hyperlinks.”) After doing this, you will see something like the following:

```
{·TOC·\o·"1-3"·\h·\z·\t·"Heading·1;1;ANNEX;1;Biblio·Title;1;Foreword·Title;1;Intro·Title;1"·}
```

You can customise the Table of contents format via the switches on the TOC field. For example, the \o switch selects the range of heading styles to be included, in this case, 1–3. For example, by changing the 3 to a 4, the fourth level will also be included. Mark the toggled field line, right-click, select “Toggle Field Codes,” and the Table of contents should be displayed according to the heading-level change.

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Knowing how the TOC field works allows one to have Tables of contents in places *other* than at the beginning of the specification. For example, this author maintained a 4,000+-page specification (yes, it's one *very* big Word file). Its main Table of contents is limited to two heading levels, 1 and 2, and is 4½ pages long. (If all heading levels were included, the ToC would exceed 100 pages, which is longer than many standards!) As it is very useful for readers to quickly locate headings of levels higher than two, clauses containing subclauses with such headings each have their own "mini" Table of Contents with \o switches having the desired ranges. That said, this author has yet to submit this to ISO under the new process, so it is not known how it will come out in the ISO spec. That is, is this approach acceptable?

Word has numerous predefined Table of Contents styles, and editors can design their own. However, this author has no knowledge of whether ISO's tools will preserve such things, convert them, or disallow them.

8.3 Normative references vs. Bibliography

Imagine someone building a product or service that conforms to a specification. In theory, they should be able to do a clean-room implementation relying only on what the specification requires, ignoring any and all informative content. Any required information that is *not* part of the specification (including any electronic annexes) needs to have an entry in the "Normative references" clause, so the implementer can locate a copy. It is not enough to just list a document in the Normative references clause! All entries in this clause shall be mentioned at least once in the specification in a normative way.

Normative references to external dependencies that are not published as recognized standards (the ZIP file format is one such example) require that the owner of that source provide a *Referencing Explanatory Report* (RER) for that external resource.

Resources that are not essential, but which might be useful, may be put in the (informative) Bibliography, but again, each one shall have at least one reference to it in the specification.

The Directives limit what kind of text can go in a normative reference or bibliography entry. If additional information is needed for specific entries, it should be put in a footnote.

Question for ISO: We would appreciate further explanation of your requirement with respect to Clause 2, "Normative references": "only references cited normatively in the text shall be listed." This is not stated clearly in Directives Part 2, Clause 10, "Referencing."

Consider a hypothetical example in which it is a requirement that a document contain a date having one of the formats of IS 8601. Which of the following is correct?

- a) A document shall contain a date in one of the formats specified by ISO 8601.
- b) A document shall contain a date, which shall be in one of the formats specified by ISO 8601.

In other words, does there have to be a normative requirement to implement the referenced specification as well as a normative requirement to include (or not) the result in the document (b)? Or is it sufficient that the statement overall is normative (a).

ISO Editor Response: The presence of "shall" makes the text normative in both cases, so the mention of 8601 is considered normative. Either approach is acceptable to ISO. As to which to choose is a matter of what makes sense for the intended audience. Regarding option a), changing "shall" to "should/may" makes it non-normative, so 8601 would *not* be normatively referenced.

What if the requirement were to be negated? Which of the following two examples is correct?

- c) A document shall not contain a date in any of the formats specified by ISO 8601.

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d) A document shall not contain a date, which shall be in one of the formats specified by ISO 8601.

As we see it, (d) doesn't make sense, so (c) must be correct. All the above seem to us to reference ISO 8601 normatively.

ISO Editor Response: Again, the presence of “shall” makes the text normative in both cases, so the mention of 8601 is considered normative.

Assuming that (a) and (c) are both correct ((b) may also be correct, but we think it is clumsy), we therefore conclude that “only references cited normatively in the text shall be listed” actually means “only references cited in text that is normative shall be listed.”

ISO Editor Response: The editor suggested a better interpretation of “only references cited normatively in the text shall be listed” is “only references cited **as requirements** in the text shall be listed”

8.4 Terms and definitions

See 8.1.7 for information about inhibiting bad page breaks in a Terms-and-definitions entry.

According to one ISO editor in correspondence with this author, ‘Only terms that are used shall be listed, exactly as they appear in the text. Please check throughout the document to make sure that the terms listed are all used. For example, “package, abstract” is defined as a term but the text uses “abstract package” instead. The term entry shall match its usage.’

It is required that terms be numbered, **but that those numbers not appear in the ToC**. While a short list might be numbered manually, a large list really should be maintained correctly when terms are added or inserted without the numbers being hard-coded.

Consider the following sample of terms within separate lists:

3.1 Basics

3.1.1

byte
sequence of 8 bits treated as a unit

...

3.2 Abstract package model

3.2.1

part
stream with a name, a MIME media type and associated common properties

...

Here’s the underlying use of fields in Word this author uses to get auto-numbering of term entries:

```
{ SEQ TermsAndDefsLevel1 \r \h }{ SEQ TermsAndDefsLevel1 \r \h }{ SEQ TermsAndDefsLevel2 \r \h }  
{ STYLEREF "Heading 1" \n \* MERGEFORMAT }.{ SEQ TermsAndDefsLevel1 \n } Basics
```

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```
{ STYLEREF "Heading 1" \n \* MERGEFORMAT }.{ SEQ TermsAndDefsLevel1 \c }.{ SEQ TermsAndDefsLevel2 \n }
```

byte
sequence of 8 bits treated as a unit

...

```
{ SEQ TermsAndDefsLevel2 \r \h }} STYLEREF "Heading 1" \n \* MERGEFORMAT }.{ SEQ TermsAndDefsLevel1 \n } Abstract package model
```

```
{ STYLEREF "Heading 1" \n \* MERGEFORMAT }.{ SEQ TermsAndDefsLevel1 \c }.{ SEQ TermsAndDefsLevel2 \n }
```

part
stream with a name, a MIME media type and associated common properties

...

If the text of an entry references terms that are defined in other entries, such references shall be in italic. For example, here's an excerpt from The Directives:

3.1.1

document

ISO or IEC standardization draft ...

3.1.2

standard

document (3.1.1), established by ...

3.2.3

mandatory element

element that has to be present in a *document* (3.1.1)

And as shown in the final two entries above, all such terms shall be followed by a cross-reference to the corresponding entry. [In the 2018 HTML version of the Directives, this is also a hyperlink, but I can't find a Word version to see how that was done. (The 2016 Word version did *not* make it a hyperlink.) I note this because T&d entries are *not* headers (or at least they are not allowed to appear in the Table-of-Contents), and if they are not headers, how does one make a hyperlink to them? I can see how this could be done by bookmarking the target entries and using the bookmark names in links, but would those bookmarks and links be preserved in the ISO spec?]

Question for ISO: In large and complex specifications, we limit the entries in "Terms and definitions" to only those needed to understand the "big picture." This means that many terms are not defined there, but instead are introduced in subclauses as needed. And as is commonly the case in US/English publishing, the first use of such terms contains a definition and the term is set in italic (using a style this author uses called "Term"). However, ISO CS reports that this is not permitted, which means that, unfortunately, the reader sees no visual distinction. For long-term maintenance purposes we wish to maintain this style, but what typeface can we make it, so it is distinguishable from ordinary text? Or must we make it Roman?

ISO Editor 1 response: Per ISO editorial rules, terms that are important for the understanding and use of the document shall be defined in the "Terms and definitions" clause. Using styles that are not defined in the Directives would make your spec inconsistent with other ISO documents. Terms that are explained in the subclauses other than Clause 3 are regarded as part of the text and shall use consistent upright type.

Clearly, for large specifications, defining all up front can result in a large T&d clause.

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8.5 Notes

This author maintains a specification containing many hundreds, if not thousands, of notes, none of which is numbered. Some are embedded in the middle of a paragraph, occupy part of a line, occupy multiple, indeed many, lines. Their format is: [*Note*: ... text of note ... *end note*] None of them is referenced from within the specification.

According to one ISO editor in correspondence regarding this, 'Please update all the NOTES per [The Directives]. They shall be numbered within each subclause and shall not be put in square brackets. Please understand that even though there's no need to reference NOTES within this document, it is possible that other documents would like to refer to a specific NOTE in this document. **Numbering them is necessary.**'

From the Directives, we learn the following:

- A note has the form "NOTE [n] <body of note>", where [n] is a decimal number starting at 1 for each new clause/subclause, provided there is more than one note in that subdivision; **otherwise, the number shall be omitted.** Even if a spec does not itself contain references to the numbers of its own notes, numbers are still required, so other specs *can* reference them. [This begs the question, "How does one reference an unnumbered (single) note? Presumably using something like "see the Note in 3.2.4", rather than "see Note 3 in 4.2" for a numbered note.]
- Although it is not stated as a requirement, all examples of notes in the Directives show the NOTE to be indented.
- A note shall not contain the following: requirements (shall) or any information considered indispensable for the use of the document, recommendations (should) or permissions (may), which is *more* than just prohibiting normative text. [This *does* allow "must," "must not," "might," and "might not."]

According to the Directives, "Notes are used for giving additional information intended to assist the understanding or use of the text of the document. The document shall be usable without the notes."

Consider the following: "<normative text>. (Note that the implication of this is ...) "<normative text>". Does the very presence of the word "note" **require** this be formatted as a NOTE (which means breaking this paragraph into three paragraphs)? What if the parenthetical remark were written as, "(This means that ...)" or "(This implies that ...)", or "(Therefore, ...)" instead?" Just when must a note/aside become a NOTE? Surely not every informative bit of text has to be written as a NOTE!

Question for ISO: Just because a sentence contains the text "Note, ..." does that require that sentence to be set as an ISO-format NOTE?

ISO Editor 1 response: This is not a requirement; but it is good practice to put additional information intended to assist the understanding or use of the text into NOTES consistently.

Question for ISO: In the following text, how can the reader tell if the second paragraph is part of the note?

NOTE 2 Path segments are not explicitly represented as folders in the abstract package model, and no directory of folders exists in the abstract package model.

A package implementer is

ISO Editor 1 response: Text within a NOTE would be 1-point size smaller (Cambria 10) than normal body text (Cambria 11).

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Question for ISO: If the second paragraph is not part of the note, how can one write a note containing multiple paragraphs, possibly including figures/tables?

ISO Editor 1 response: Please just make sure the font size for all the paragraphs within the NOTE is set to 10. For Figures/Tables, they cannot be "included" within a NOTE; but they can be referenced. For example, within the text of a NOTE, citations like "see Table/Figure X" can be added (each Table/Figure shall be clearly cited in the text anyhow). It is ultimately the cross-references that create the linkage, not the positioning of the content.

8.6 Examples

This author maintains a specification containing many hundreds, if not thousands, of examples, none of which is numbered. Some are text embedded in the middle of a paragraph, occupy part of a line, occupy multiple, indeed many, lines, and/or contain program code. Their format is: [*Example*: ... text of example ... *end example*] None of them is referenced from within the specification.

According to one ISO editor in correspondence regarding this, 'Please update all the EXAMPLEs per [The Directives]. They shall be numbered within each subclause and shall not be put in square brackets. Please understand that even though there's no need to reference EXAMPLEs within this document, it is possible that other documents would like to refer to a specific EXAMPLE in this document. Numbering them is necessary.'

From the Directives, we learn the following:

- An example has the form "EXAMPLE [n] <body of example>", where [n] is a decimal number starting at 1 for each new clause/subclause, provided there are more than one example in that subdivision; otherwise, the number need not be provided. Even if a spec does not itself contain references to the numbers of its own examples, numbers are still required, so other specs *can* reference them. [This begs the question, "How does one reference an unnumbered (single) example? Presumably using something like "see the Example in 3.2.4", rather than "see Example 3 in 4.2" for a numbered example.]
- Examples do not need to have a title, but they can, if necessary, be grouped into a clause or subclause titled "Example" or "Examples."
- Examples can have the text "EXAMPLE [n]" followed by some horizontal spacing and on the same line with example text, or having the text "EXAMPLE [n]" be on a line by itself with the example text starting on the next line. Either approach is permitted.
- Examples shall not contain requirements (use of "shall") or any information considered indispensable for the use of the document, for example instructions (imperative mood), recommendations (use of "should") or permission (use of "may"). Examples should be written as a statement of fact.

According to the Directives, "Examples illustrate concepts presented in the document. The document shall be usable without the examples."

Consider the following: "<normative text>. (For example, this means that ...) <normative text>". Does the very presence of the word "example" **require** this be formatted as an EXAMPLE (which means breaking this paragraph into three paragraphs)? What if the parenthetical remark were written as, "(This means that ...)" or "(This implies that ...)", or "(Therefore, ...) instead?"

Question for ISO: Just because a sentence contains the text "for example," does that require that sentence to be set as an ISO-format EXAMPLE?

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ISO Editor response: This is not a requirement; but it is good practice to put examples illustrating certain concepts into EXAMPLEs consistently.

Question for ISO: In the following text, how can the reader tell if the second paragraph is part of the example or not?

EXAMPLE 2 If an abstract package contains a part named "/a", the name of another part in that abstract package must not be "/a" or "/A".

For each part name N and string S, let the result of concatenating N, the forward slash, and S be denoted by N[S]. A part name N1 is said to be *derivable* from another part name N2 if, for some string S, N1 is equivalent to N2[S].

ISO Editor response: Text within an EXAMPLE would be 1-point size smaller (Cambria 10) than normal body text (Cambria 11).

Question for ISO: If the second paragraph is not part of the example, how can one write an example containing multiple paragraphs, possibly including figures/tables?

ISO Editor response: Please just make sure the font size for all the paragraphs within the EXAMPLE is set to 10. For Figures/Tables, they cannot be "included" within an EXAMPLE; but they can be referenced. For example, within the text of an EXAMPLE, citations like "see Table/Figure X" can be added (each Table/Figure shall be clearly cited in the text anyhow). It is ultimately the cross-references that create the linkage, not the positioning of the content.

Question for ISO: The following is intended to be one large example: a code block followed by text followed by another code block. How can this be made clear?

EXAMPLE 7 Consider a Relationships part

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<rlsps:Relationships
...
</rlsps:Relationships>
```

Given Id="rId6" and Type="http://../relationships/image", Step 2 constructs

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Relationships ...
</Relationships>
```

ISO Editor response: Please just make sure the font size of text in-between code blocks is set to 10.

Further question for ISO: Just be clear, if an example contains one or more paragraphs of text, they must be set in 10-point Cambria. However, if the example also contains one or more code blocks, do they have to be set in 10-point Courier New, rather than 11-point? If not, it seems odd to have two different point sizes in an example.

ISO Editor Response: While the text before/after a code block in an example must be set in 10-point, the code block itself *must* be set in 11-point.

Further question for ISO: I note that all EXAMPLEs in the Directives, Part 2, are inside ruled boxes. Is this required? Allowed? If it is not allowed, then why use it? Could it be because without it, it can be difficult to see the extent of the EXAMPLE? Yes, you have already said that these Directives are not required to comply to their content, which I think is a major mistake, and quite misleading.

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ISO Editor Response: The Directives Part 2 is *not* a standard, so it need *not* comply with its own rules. The ruled boxes used are *not* to be used in standards.

8.7 Lists

According to one ISO editor in correspondence regarding this topic, ‘please use “a), b), c)...” for top-level numbering and “1), 2), 3)...” for second-level numbering per [The Directives].’ This is not the default behavior in Word.

Question for ISO: What format should be used for number levels beyond two? Directives Part 2 doesn’t say.

ISO Editor 1 response: For a numbered list use: a), b), c) for the first level; 1), 2), 3) for the second level; i), ii), iii) for the third level; and return to a), b), c) for the fourth level. This will be clarified in the "ISO House Style" which will be made available online shortly.

8.8 Tables

From the Directives, we learn the following:

- Tables shall be designated “Table” and numbered with Arabic numerals, beginning with 1.
- A single table shall be designated “Table 1”; that is, a number is always required even if there is only one.
- It is recommended to provide a concise table title. (This is unclear; must a title be provided, or if one is, it can be concise?) The title comes after an em-dash separator.
- Although the Directives don’t say this, by example they show that the “Table” designation, number and title must be on the line *preceding* the table (not following it, as required for Figures).
- Table numbering shall be independent of the numbering of the clauses. For example, the Directives show Tables 1 and 2 in Clause 6, Tables 3–7 in Clause 7, then Table 8 in Clause 16. [This means that table numbers do not get reset to 1 at the start of each clause/subclause. However, in each annex, the table numbering *restarts*, and the number is preceded by the annex letter (e.g., Table A.1). For example, the Directives show Table A.1 in Annex A, and Table B.1 in Annex B. (Interestingly, Annex D has two large tables, *neither* of which has a “Table” designation *nor* table number!) So, table numbering in clauses is different to that in annexes: all clauses share the same set of table numbers while each annex gets its own set.
- Tables within tables are *not* permitted! Subdivision of a table into subsidiary sections with new column headings is not permitted. [**For some specs, this restriction can be a real hardship.**]
- There are also rules for Notes and footnotes in tables.
- Each table shall be explicitly referred to within the text, using, for example, the following forms for references to tables: “Table 3 lists...”; “See Table B.1”. [**This seems very strange especially when a table immediately follows introductory text to which it applies, as it often does.**]

This author maintains a specification containing many hundreds of occurrences of text organized using a Word table style; however, they are not tables, per se. Rather, they are un-numbered lists. Requiring that each of those so-called tables have a title that would add no value and would never be referenced would be a very big task. Equally, requiring all of them to be reformatted as un-numbered lists would be quite unproductive. And readers have been seeing these in their current format for more than 10 years.

Almost none of the lists organized as tables are, or needs to be, referenced in this specification. Each list simply follows on from the text that it augments. Requiring an explicit reference saying something like,

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“The following list <List-number> augments/reinforces/supports the text above.” seems completely superfluous.

Consider the following, taken from an existing ISO/IEC standard maintained by this author:

The following additional attributes can be specified for a document of a transitional conformance class:

Attributes	Description
left (Start Indentation)	Semantically equivalent to the start attribute. The possible values for this attribute are defined by the ST_SignedTwipsMeasure simple type (Part 1, §17.18.81).
leftChars (Start Indentation in Character Units)	Semantically equivalent to the startChars attribute. The possible values for this attribute are defined by the ST_DecimalNumber simple type (Part 1, §17.18.10).
right (End Indentation)	Semantically equivalent to the end attribute. The possible values for this attribute are defined by the ST_SignedTwipsMeasure simple type (Part 1, §17.18.81).
rightChars (End Indentation in Character Units)	Semantically equivalent to the endChars attribute. The possible values for this attribute are defined by the ST_DecimalNumber simple type (Part 1, §17.18.10).

When this information is organized using a Word table, the Directives seem to require that it shall have a table number and title (which is referred to somewhere). But what if it is organized as a bullet list, as follows?

The following additional attributes can be specified for a document of a transitional conformance class:

- left (Start Indentation) – Semantically equivalent to the start attribute. The possible values for this attribute are defined by the ST_SignedTwipsMeasure simple type (Part 1, §17.18.81).
- leftChars (Start Indentation in Character Units)– Semantically equivalent to the startChars attribute. The possible values for this attribute are defined by the ST_DecimalNumber simple type (Part 1, §17.18.10).
- right (End Indentation) – Semantically equivalent to the end attribute. The possible values for this attribute are defined by the ST_SignedTwipsMeasure simple type (Part 1, §17.18.81).
- rightChars (End Indentation in Character Units) – Semantically equivalent to the endChars attribute. The possible values for this attribute are defined by the ST_DecimalNumber simple type (Part 1, §17.18.10).

Now it doesn't need a number or title, but it is probably harder to read!

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Just which uses of a Word table style constitutes having a table?

Question for ISO: Table (and Figure) numbering requirements

ISO requires figures and tables in clauses to be numbered separately, with numbers going from 1–n across all clauses, as in Figure 1, Figure 2, Table 1, Figure 3, Table 2, ..., Figure M, Table N.

ISO requires figures and tables in Annexes to be numbered separately, with numbers going from 1–n for **each** annex, as in Annex A has Figure A.1, Figure A.2, Table A.1, ..., and Annex B has Figure B.1, Figure B.2, Table B.1,

I contend that this **cannot** be done using the automated caption numbering machinery provided using Word's "References|Insert Caption" option. One can either have numbers 1–n across the whole document, or numbers like 1.1, 1.2, ... 2.1, 2.2, 2.3, ... for captions in clause 1, 2, and 3, But one ***cannot*** have annex captions automatically numbered A.1, A.2, ... because the "Insert Caption|Caption Numbering|Include chapter number|Chapter starts with style" option ***only*** allows chapters having styles "Heading 1" through "Heading 9". And annexes ***cannot*** have such styles (which are used for clauses) because, by definition, an annex has a different format than a clause, so shall have a different style. (Indeed, ISO's simple Word template uses annex styles ANNEX, a2, a3, a4, a5, and a6, none of which can ever show up in Word's drop-down box for caption styles.)

ISO editors, if you believe your required numbering approach can be automated using Word without the use of fields (see below), please explain how.

Rex's interpretation of ISO Editor's verbal response: After some discussion, it seemed to Rex that no-one at ISO had looked at the sample he'd sent based on ISO's simple template, that showed his workaround for numbered figures and tables in annexes. As such, we never got a mutual understanding of the situation. During that time, Rex was referred to the following link which ISO staff thought might help resolve the issue.

<https://shaunakelly.com/word/numbering/numberingappendixes.html>

Rex looked at this series of articles (which were written quite some years ago and refer to Word 2010 and earlier). The author states "You have to use the built-in Heading styles in order to be able to use their "magic" properties. ... Therefore, we use Heading 1 to Heading 5 for headings in the main body of the document. And we use Heading 6 to Heading 9 in the Appendixes."

This is an interesting idea and, at a glance, allows the annex caption numbers to be reset with each new Header 6. [Note that ISO's simple template does *not* use this approach.] However, after some investigation, this author was *not* able to get this approach to meet ISO's requirements.

8.9 Figures

According to one ISO editor in correspondence regarding this topic, 'Figures in the document shall be numbered, given concise titles and referenced in the text. Please check throughout the document and number, title and reference the Figures. The numbering shall be independent of the numbering of the clauses. In annexes, the figure numbering restarts, and the number is preceded by the annex letter (e.g., Figure A.1).' **After much experimentation, this author has not been able to get Word to maintain figure numbering differently for clauses and annexes.**

This author maintains a specification having many, and sometimes very long, tables whose rows describe artwork for borders (among other things). Each such row contains a small image showing what the described artwork is intended to look like. Are each of those figures? If so, can figures be drawn *inside* a table cell? This has yet to be resolved.

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8.10 Annexes

An annex marked as normative, shall be referenced from at least one normative place in the specification. It cannot just be referenced from one or more informative places (such as a footnote or other informative annex).

9 Details of Word Feature Removal

It seems that the ISO tools remove things, ignore things, and consolidate white space.

Question for ISO: What things are removed or ignored? Without a detailed list, we won't know what to avoid or redefine. (And in a very large/complex specification, we wouldn't be able to visually proof the result after processing.)

ISO Editor Response: **Our process removes [Word] fields and ignores custom styles present in the document. Anything not in Courier New or Cambria will be adjusted to one of those two fonts. Whitespace is kept as presented in code only; in the rest of the document, whitespace characters are normalized to house style. For code, 1 tab character space is equal to three single character spaces.**

[As best as this author can tell, using a custom style is not prohibited provided it uses an approved font.]

Question for ISO: To avoid bad page breaks, such as between the introductory paragraph and the first entry in a numbered or unnumbered list, we mark the intro paragraph using Word's paragraph/keep-with-next. Are such markers removed by the ISO tools?

ISO Editor Response Yes. We normalize text and paragraph marks during treatment. We do take care to handle layout to ease readability, and will [presumably manually] add or remove page breaks where needed.