Request to add <p> as allowed inside <named-content>

Requirements document with use cases from Standards Norway (SN)

October 2019,
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Introduction

The ISO/IEC Directives define a requirement as:

3.3.3 requirement
expression in the content of a document conveying objectively verifiable criteria to be fulfilled and from which no deviation is permitted if compliance with the document is to be claimed

Note 1 to entry: Requirements are expressed using the verbal forms specified in Table 3.

<table>
<thead>
<tr>
<th>Verbal form</th>
<th>Equivalent phrases or expressions for use in certain cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>shall</td>
<td>is to</td>
</tr>
<tr>
<td></td>
<td>is required to</td>
</tr>
<tr>
<td></td>
<td>it is required that</td>
</tr>
<tr>
<td></td>
<td>has to</td>
</tr>
<tr>
<td></td>
<td>only ... is permitted</td>
</tr>
<tr>
<td></td>
<td>it is necessary</td>
</tr>
<tr>
<td></td>
<td>needs to</td>
</tr>
<tr>
<td>shall not</td>
<td>is not allowed [permitted] [acceptable] [permissible]</td>
</tr>
<tr>
<td></td>
<td>is required to be not</td>
</tr>
<tr>
<td></td>
<td>is required that ... be not</td>
</tr>
<tr>
<td></td>
<td>is not to be</td>
</tr>
<tr>
<td></td>
<td>need not</td>
</tr>
<tr>
<td></td>
<td>do not</td>
</tr>
</tbody>
</table>

**Table 3 — Requirement**

**EXAMPLE 1**
Connectors shall conform to the electrical characteristics specified by IEC 60603-7-1.

**Imperative mood:**
The imperative mood is frequently used in English to express requirements in procedures or test methods.

**EXAMPLE 2**
Switch on the recorder.

**EXAMPLE 3**
Do not activate the mechanism before...

Do not use “must” as an alternative for “shall”. (This will avoid any confusion between the requirements of a document and external constraints – see 7.6).

Do not use “may not” instead of “shall not” to express a prohibition.

The Directives make a distinction between requirements (shall, shall not), recommendations (should, should not), permissions (may, need not), possibilities (can, cannot) and external constraints (must). The use cases identified by SN do not make this distinction, as user of the standards will consider all these as requirements, but depending on the keyword they will be able to identify what to do with a particular statement.

For the remainder of this document, “Requirement” shall therefore mean any statement in the standard text which uses one of the keywords (shall, should, may, can, must) and is identified as a requirement, recommendation, permission, possibility or external constraint by the Authors.

Requirements are important in Standards a lot of guidance is given in the ISO/IEC Directives on this topic. However, neither ISO STS or NISO STS provide a specific element to markup requirements in standards.
The objective of this document is to explain the use of \texttt{<named-content>\texttt{\text{\textend{enumerate}}}} to markup requirements and the need to allow \texttt{<p>} inside \texttt{<named-content>\texttt{\text{\textend{enumerate}}}.

Data elements connected to requirements

SN has identified the following data elements pertaining to requirements:

<table>
<thead>
<tr>
<th>Data element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent ID</td>
<td>(Globally) Unique identifier</td>
</tr>
<tr>
<td>Value/Content</td>
<td>The actual requirement text</td>
</tr>
<tr>
<td>Type</td>
<td>Shall, should, may, can, must (or, according to directives: requirement, recommendation, permission, possibility, external constraint)</td>
</tr>
<tr>
<td>Note</td>
<td>Optional Note to the requirement</td>
</tr>
<tr>
<td>Explanatory/Background information</td>
<td>Optional additional information that gives more context to the requirement</td>
</tr>
<tr>
<td>Implementation Guideline</td>
<td>Optional information about how a requirement should be implemented</td>
</tr>
<tr>
<td>Example</td>
<td>Optional example illustrating the requirement further</td>
</tr>
<tr>
<td>Motive</td>
<td>&quot;raison-d'être&quot; for the requirement: why do we even need it? Example: in the Oil and Gas Industry, a Motive for a requirement could be either Capability, Health, Safety, Environment</td>
</tr>
</tbody>
</table>

These data elements are mainly based on requirements from customers in the Oil and Gas industry and by more general looking at standards with requirements. However, if these data elements were available for markup in NISO STS, SN believes it should cover most of their use cases even in other industries.

\texttt{<named-content>} fits the need very well; it's definition as "Word or phrase whose content/subject matter has distinct semantics or content-related significance that is not defined in this Tag Set." seems to fit the purpose also.

Marking up requirements using \texttt{<named-content>\texttt{\text{\textend{enumerate}}}

For the current pilot project for digitalization of NORSOK standards, requirements are marked up using \texttt{<named-content>}:

- Requirements are marked up using the element \texttt{<named-content>} and have a unique ID. They are easily identifiable through the attribute \texttt{@vocab set to "requirement".}
- The requirement type (shall | should | may | must | can) is set using the \texttt{@vocab-term attribute.}
- The motive (Capability | Health/Work environment | Safety/Integrity | Environment) is set using the \texttt{@content-type attribute.}

\textbf{Example:}

\begin{verbatim}
<named-content id="id-20f93044-8607-430f-acbb-e0735e88e9f6" content-type="capability" vocab="requirement" vocab-term="shall">
A pointing device and a keyboard including a QWERTY layout shall be used as input device.
</named-content>
\end{verbatim}

For Implementation guidelines and Explanatory/Background information, \texttt{<non-normative-note>} with \texttt{@content-type set to "Guide" or "Explanatory" is used.}
Examples are marked up with `<non-normative-example>`.

**Requirements can be nested**

Requirements can contain a number of different elements, such as bullet lists, equations, tables, figures etc. They can also contain other requirements to represent a parent-child relationship.

**Requirements can span over multiple paragraphs**

A requirement can contain just about any content that an author can think about to explain his concept. The same concept can be expressed over multiple paragraphs if required to make reading more comprehensive. `<named-content>` does not allow `<p>` inside it and hence authors cannot represent their content in the way they need.
Real-world examples from NORSOK standards
Examples from NORSOK M-001, Materials Selection, Edition 5, 2014

Example 1:

4.1 Philosophy
The material selection process shall reflect the overall philosophy regarding design lifetime, cost profile (CAPEX/OPEX), inspection and maintenance philosophy, safety and environmental profile, failure risk evaluations and other specific project requirements.

End user requirements to philosophy may be defined in standards and/or design basis.

The keyword “shall” identifies the first paragraph of the section as a requirement. The keyword “may” identifies the second paragraph of the section as a requirement.

The motive for requirements in this standard is mostly “Capability”.

XML markup:

Example 2:

If sand production and/or particles from well cleaning and squeeze operations are expected, an erosion evaluation shall be carried out. The evaluation should be based on DNV-RP-O501 or a model agreed with end user.

For pipelines an inhibited corrosion rate, CR_{in}, in the order of 0.1 to 0.2 mm/year shall be used. The inhibited corrosion rate shall, however, be documented by corrosion tests at the actual conditions, by relevant field or other test data. If corrosion inhibitors are used for (topside) process systems, ref. subclause 5.1, an increased value for the inhibited corrosion rate of 0.5 mm/year shall be used for design purposes.

The inhibitor availability to be used in a design calculation depends on the planned corrosion management programme, including corrosion monitoring and corrosion inhibition. Unless defined otherwise, an inhibitor availability of 0.90 (90 %) shall be used. Maximum inhibitor availability shall not

This example shows that requirements are not necessarily written such that one requirement fills a whole paragraph. We can also have multiple requirements in a single paragraph. The different colors identify the different requirements.

In this example, the first sentence of the third paragraph is actually Background information associated to the requirement in the previous paragraph. As <named-content> does not allow <p>, the content above cannot be accurately represented and will hence be missing a paragraph break between the two sentences.
Example 3:

The corrosion allowance for risers shall be calculated as follows:

- CA for carbon steel and SM13Cr in the splash zone coated with 12 mm (nominal) vulcanised chloroprene rubber shall be minimum 2 mm.
- At elevated temperature the CA for carbon steel shall be increased by 1 mm per 10 °C increase in operating temperature above 25 °C;
- No CA is required for risers made of solid type 22Cr duplex and type 25Cr duplex SS with 12 mm (nominal) vulcanised chloroprene rubber.

NORSOK M-501 System 2A shall not be used for splash zone protection of risers, but may be used for structural steel with minimum 3 mm CA.

In this example, the main requirement contains a list of sub-requirements. The last paragraph after the list is still considered part of the parent requirement, but since <p> is not allowed inside <named-content>, it is not possible to accurately represent the structure and the paragraph distinction is lost.

XML markup: