

The **NORSOK** journey

From paper to digital standard
development

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From paper to digital standard development



**CLIMATE &
ENVIRONMENT**

➤ ➤ ➤ ➤ ➤ ➤ ➤ ➤
**THE RATE OF CHANGE
HAS ACCELERATED**
➤ ➤ ➤ ➤ ➤ ➤ ➤ ➤

**DIGITALIZATION AND
AUTOMATION**

SHIFTS IN THE INDUSTRY

**GENERATION NEXT
MILLENNIALS**

**JOBS ARE
EVOLVING**



NORSOK standards

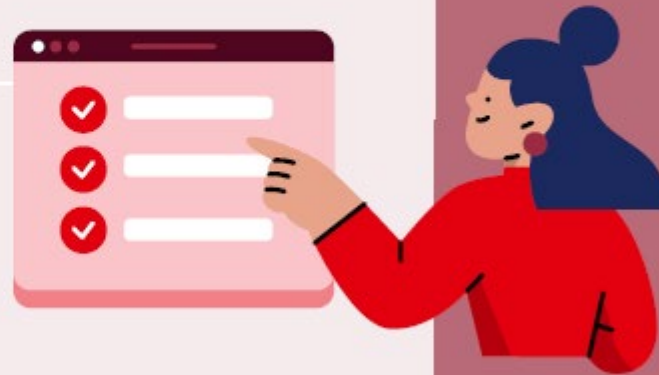
- NORSOK standards are industry standards for the oil and gas industry similar to API standards
- They are developed and maintained by the Norwegian oil and gas industry and used worldwide
- NORSOK standards were developed where ISO, IEC and CEN/CENELEC did not provide adequate provisions for our climate, safety and project needs
 - There are 70 unique NORSOK documents
 - Ten ISO and IEC documents are based on former NORSOK standards
- NORSOK standards were not developed where other industry standards, e.g. API and DNV, provided acceptable guidance and level of provisions
- Several NORSOK standards are referred to by regulating bodies

ISO/IEC SMART

- 2025-01-01 – OSD for all ISO projects
- Smartification – post processing

IEC/ISO SMART project

**Unleashing the digital
power of international
standards**



Vision: More people using more standards

[iso.org/smart](https://www.iso.org/smart)



<https://www.iso.org/smart>

CEN/CENELEC SMART

- CEN/CENELEC is building a layer on top of OSD
 - Marking up content
- Pilots may be granted access from November 2024
 - CEN Smart documents will not be published before 2025-Q4
- Standards Digital is developing the overlay
- Several countries has started to develop SMART content for their national documents
 - <https://experts.cen.eu/key-initiatives/smart-standards/>



Levels of digitalisation

Typicals of content classifications, features of the levels

Level 0

Paper

- ✓ No machine interaction possible

Level 1

Open digital format

- Read and search on screen
- ✓ Very little machine interaction possible

Level 2

Machine readable document

- Structured content of standard documents.
- Content can be processed by software.
- Machine capabilities
- ✓ No understanding of search results or parsed content.

Level 3

Machine readable content

- Semantic enrichment of content for selective access.
- Receive content of multiple standards for a given purpose.
- ✓ Ontology lacking to place elements in context.

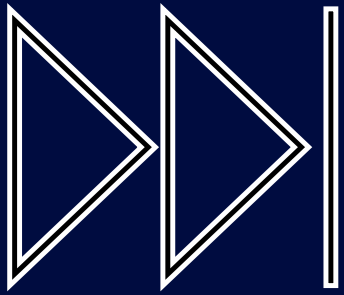
Level 4

Machine interpretable content

- Information modelling expressing content and relations btw elements.
- Self-learning analysis and validation cycles to improve content handling and access.
- Interruption-free data flow
- Automatic question answering or predictive content supply.
- ✓ Machine capabilities
- relation of addressable elements
- find and use elements in a given context



SMART content



Better standard development

The business goals:

- developing documents in XML editor without using MS Word!
- structure and digitalize the content providing
 - ✓ better / more consistent content
 - ✓ better publication process
 - ✓ better products
 - ✓ better use



What are the advantages with XML

Editing in the XML editor

Experts focus on content and structure, not the lay-out

Improved collaboration

The editing process is faster

The experts define the content for all end users

ISO Dir 2 editing rules included in the editor


 **Better content**

Publishing directly from XML

Styling is fixed and automated

There is a single source for all formats (PDF, ePub, Online)

Not possible to serve special wishes from project teams

 **Better publishing**

Production of advanced products

Sophisticated products can be generated e.g.:

- redline versions
- online reading with commenting
- flexible access to the content

 **Better products**

Import of XML content

End-users import raw XML without risking introducing errors

Software providers can use the XML- content in their products

Changes can be identified automatically

 **Better use**



The NORSOK pilot project - how

- Provisions were marked-up in Authoring
 - no modifications allowed
 - reflect the published document 1:1
- Verification of markup by committee experts



HOW - mark up provisions

- NORSOK M-501:2012 was shared with IOGP
 - All provisions were tagged
 - Provisions are easily identified
 - *Provisions are statements with “shall, should and may”*
 - *Can be used in design tools in companies*

REQUIREMENTS

7.3 Final surface condition.

REQUIREMENT

The surface areas to be coated shall be prepared until meeting the required steel preparation grade, and be clean, dry, free from oil and grease..

SHALL - CAPABILITY

REQUIREMENT

The specified roughness and cleanliness shall be maintained until the first coat is applied..

SHALL - CAPABILITY

REQUIREMENT

Dust, blast abrasives etc. shall be removed from the surface after blast cleaning such that both the particle quantity and the particle size do not exceed rating 2 of [NS-EN-ISO-8502-3](#).

SHALL - CAPABILITY

REQUIREMENT

The surfaces shall be free from any foreign matter such as weld flux, residue, slivers, oil, grease, salt etc. prior to blast cleaning..

SHALL - CAPABILITY

REQUIREMENT

All surfaces should be washed with clean fresh water prior to blast cleaning..

SHOULD - CAPABILITY

Why – verification and traceability

- XML provisions gets a GUID
- Data models need
 - singular
 - measurable, and
 - verifiable provisions
- Transformed, digitalised and referred provisions
 - increased efficiency, quality and safety in project execution and operation of plants
- Traceability between revisions





Challenges & main issues

- Content
 - written to be read by a human
 - from top to bottom
- Provisions are not singular neither measurable or verifiable
 - often related as parent- child
- Quality checks

What is next, ontologies?

- ISO/TC 184/SC 4 provides several standards to model large scale industrial data
 - Industrial data ontologies (IDO)
- Testing if end users can benefit from systematic content descriptions
 - NORSOK M-501 *Surface preparation and protective coating* and
 - NORSOK M-004 *Piping and equipment insulation*





Photo: Adobe Stock

Sharing digital content and IPR

Operators (and others) want to extract requirements from standards in their purchasing processes and internal management systems

All standardization bodies need to find a license model that permits content to be used legally in company systems that do not violate intellectual property rights (IPR) of the document issuing bodies



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