

Updated and latest news from international standardization

Runar Østebø, Advisor (Equinor) and ISO/TC67/WG4 Convenor

*5th ISO Seminar on International Standardization in
the Reliability Technology and Cost Area*

Hosted by TotalEnergies, Paris, France - 1 December 2022



Content

- Background and introduction
 - Standards communication – Recent seminar and conferences involving ISO/TC67/WG4
 - Standards in the energy industries framework – global business focus
- ISO/TC67 framework and [ISO/TC67/WG4 standards portfolio](#)
- Executive overview of standards and status
- Concluding remarks

Last 4th ISO seminar in Houston, 4 May 2018



Presentations from the ISO Seminar on International Standardization in the Reliability Technology and Cost Area

ISO and with Statoil as a host organized the successful seminar entitled "International Standardization in the Reliability Technology and Cost Area" on Friday 4 May 2018. This was the 4th ISO seminar on this topic and was held at the Statoil offices in Houston.



Welcome address by Helge Hove Haldorsen, Vice President, Investor Relations, Statoil

Presentations from these recent ISO seminars can be found below:

- [4th ISO seminar – 4 May 2018, Houston, USA \(hosted by Statoil\)](#)

See you at OTC 2023
at the Standardization Implementation Panel
Thank You!

3

The photo of ISO seminar from 4 May 2018 was shown at the closing of OTC panel session 4 May 2022, and was "precursor" for the OTC standardization session series 4 years afterwards 😊.

OTC 2022 – Panel

"How Unified International Standards Enable Efficiency in the Energy Transition"



OTC 2022 – Technical session
"Standardization Throughout the Project Life Cycle"



ONS 2022 – Technical session with panel
"Standardization accelerates value creation in the Oil and Gas Sector - Energy transition"



[LINK to ONS Aug 2022 session at ISO/TC67 committee website \(and presentations\)](#)

[6 min video with ONS 2022 interviews](#)

[LINK to OTC May 2022 sessions at ISO/TC67 committee website \(and papers\)](#)

Standards needed to achieve net Zero (*)



Standards needed to achieve net zero, said UNSG at COP26

IEC, ISO and ITU ready to share standards and knowledge with proposed Expert Group.

3 minutes to read

[COP26 reference](#)

[IWA 42 published at COP27](#)

(*Net Zero Guidelines)

COP27 (11 Nov 2022):

«**Energy efficiency**» depends on «**Operational efficiency**» which depends on «**Cost-efficiency**».



Example of SDG for ISO/TC67



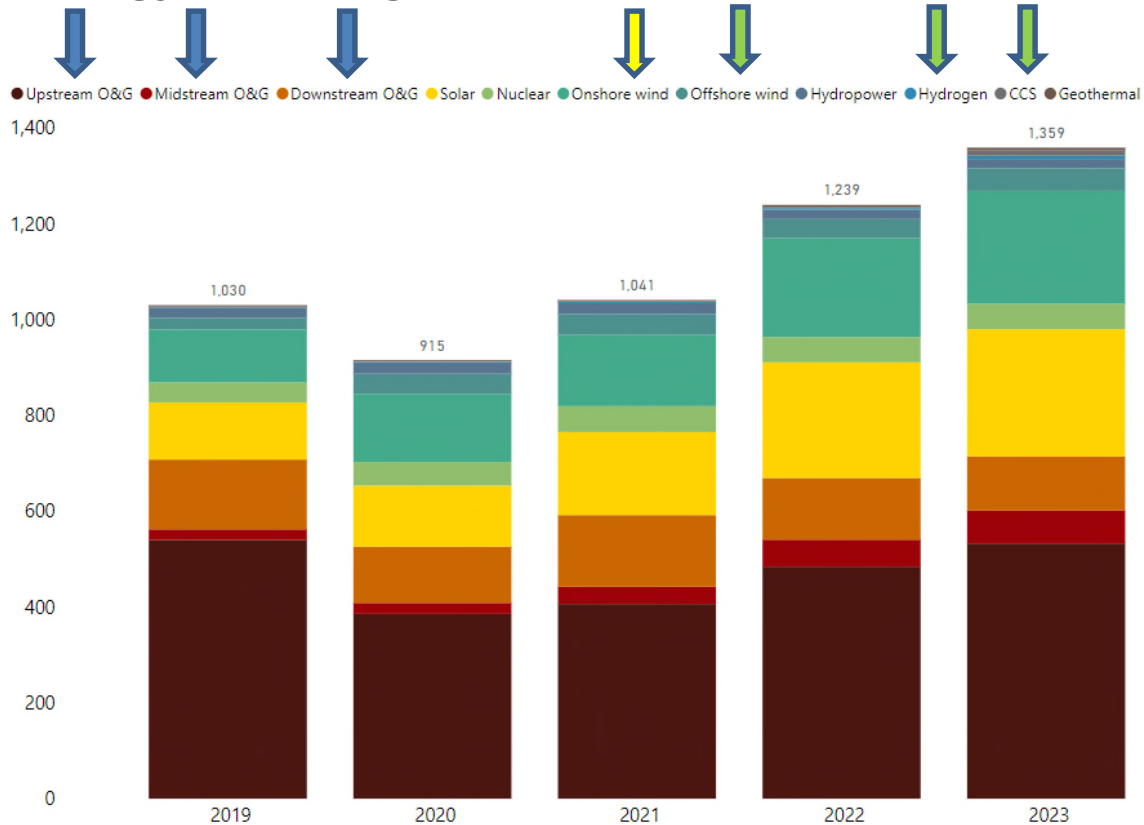
← Sustainable Development Goals

Goal 9: Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

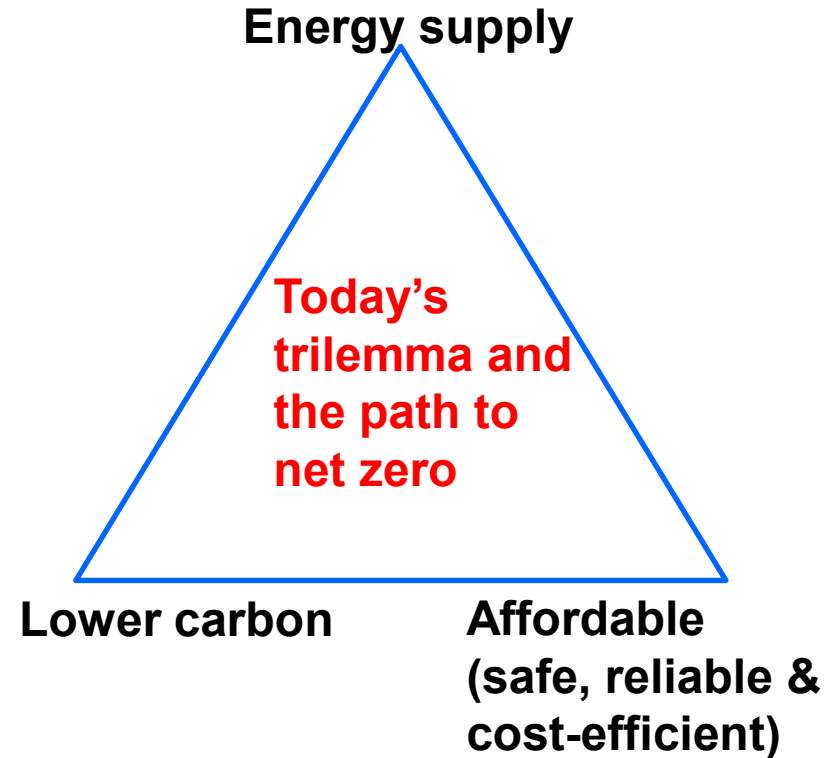
Energy supply trilemma - Global energy industries

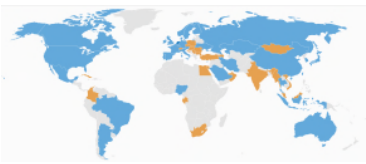
Energy spending - \$ billion (nominal)



Source: Rystad, Energy Spending Analysis Dashboard – 10 Nov 2022

Scoping in ISO/TC67





Scope of ISO/TC 67

- *Standardization in the field of the oil and gas industry, including petrochemical and lower carbon energy activities*

ISO/TC67 Vision



[See ISO/TC67 Standards Committee website](#) (35 countries)



ISO courses: [Register interest for ISO/TC67/WG4 standard courses at this link](#)

Working Group 4 “Reliability engineering and technology” *ISO/TC67/WG responsible for reliability and cost related ISO/TC 67 standardization activities in the field of the oil and gas industry, including petrochemical and lower carbon energy.*

ISO/TC67/WG4 standardization member countries



- 51 experts from 13 countries (per Nov 2022)



Previously also («partly»):

- *Belgia*
- *China*
- *Denmark*
- *Nigeria*
- *(Ukraine)*

ISO Standards for use in the oil & gas industry



ISO/TC67/WG4 standards

ISO 3250 Calculation and reporting production efficiency in the operating phase

ISO 3421 Offshore drilling conductor (New)

ISO 5124 LNG railcar applications (New)

ISO 6385-1 Submersible linear motors (New)

ISO 10418 Process safety systems

ISO 10419 Replaced by API Spec 6AV2

ISO 10423 Wellhead & christmas tree equipment (Rev)*

ISO 12489 Reliability modelling/safety systems

ISO 13354 Shallow gas diverter equipment

ISO 13533 Drill-through equipment (BOPs)

ISO 13534 Hoisting equipment – care/maintenance

ISO 13535 Hoisting equipment – specification

ISO 13626 Drilling and well-servicing structures

ISO 13702 Control and mitigation of fires and explosions

ISO 13703 Offshore piping systems (Rev)

ISO 14224 Reliability and maintenance data

ISO 14692-1 GRP piping vocabulary, symbols, applications and materials

ISO 14692-2 GRP piping qualification and manufacture

ISO 14692-3 GRP piping system design

ISO 14692-4 GRP piping fabrication, installation and operation

ISO 14693 Drilling equipment

ISO 15138 Heating, ventilation and air-conditioning

ISO 15156 Cracking resistant materials for use in H2S environments

ISO 15544 Emergency response

ISO 15663 Life cycle costing (Rev)

ISO 16901 Risk assessment in the design of onshore LNG installations (Rev)

ISO 16903 Characteristics of LNG influencing design and material selection

ISO 16904 LNG Marine Transfer Arms

ISO 17177 Unconventional LNG transfer systems

ISO 17292 Metal ball valves

ISO 17776 Major Accident hazard management during design

ISO 17778 Duplex stainless steel materials testing

ISO 17782 Qualification of manufacturers of special materials

ISO 17945 Materials resistant to sulfide stress cracking

ISO 17969 Guidelines on competency for personnel

ISO 18683 Systems and installations for supply of LNG as fuel to ships (Rev)

ISO 19008 Standard Cost Coding System

ISO 19277 Qualification testing for coating under insulation

ISO 20521 Powered elevators

ISO 20815 Production assurance and reliability management

ISO 21457 Materials selection

ISO 23936-1 Thermoplastics (Rev)

ISO 23936-2 Elastomers

ISO 27469 Method of test for offshore fire dampers

ISO 29001 Sector-specific quality management systems

ISO 13624 Marine drilling riser systems, Parts 1-2

ISO 13625 Marine drilling riser couplings

ISO 19901-7 Stationkeeping systems

ISO 13628-1 Subsea production systems

ISO 13628-2 Subsea flexible pipe systems

ISO 13628-3 Subsea THL pumpdown systems

ISO 13628-4 Subsea wellhead and tree equipment

ISO 13628-5 Subsea control umbilicals

ISO 13628-6 Subsea production controls

ISO 13628-7 Completion/workover riser system

ISO 13628-8 HOT and interfaces

ISO 13628-9 HOT intervention systems

ISO 13628-10 Bonded flexible pipe

ISO 13628-11 Flexible pipe systems for subsea and marine applications

ISO 13628-15 Subsea structures and manifolds

ISO 10400 Calculations for OCTG performance properties

ISO 10405 Care/Use of casing/tubing

ISO 10407-1 Drill stem design

ISO 10407-2 Inspection and classification of drill stem elements

ISO 10414-1 Field testing of water-based fluids

ISO 10414-2 Field testing of oil based drilling fluids

ISO 10416 Drilling fluids – lab testing

ISO 10417 Subsurface safety valve systems

ISO 10422 Replaced by API Spec 5A

ISO 10424-1 Rotary drill stem elements

ISO 10424-2 Threading and gauging of connections

ISO 10426-1 Well cementing

ISO 10426-2 Testing of well cements (Rev)

ISO 10426-3 Testing of deepwater well cement

ISO 10426-4 Atmospheric foamed cement slurries

ISO 10426-5 Shrinkage and expansion of well cement

ISO 10426-6 Static strength of cement formulations

ISO 10427-1 Blow piping casing centralizers

ISO 10427-2 Centralizer placement and stop-collar testing

ISO 10427-3 Performance testing of cement float equipment

ISO 10492 Subsurface safety valves

ISO 10493 Replaced by API Spec 5AV1

ISO 11960 Casing and tubing for wells

ISO 11961 Drill pipe

ISO 11963 Qualification of casing connections for thermal wells (Rev)*

ISO 13085 Tubing aluminium alloy pipes

ISO 13500 Drilling fluids

ISO 13501 Drilling fluids – processing systems evaluation

ISO 13503-1 Measurement of viscous properties of completion fluids

ISO 13503-2 Measurement of properties of proppants

ISO 13503-3 Testing of heavy brines (Rev)*

ISO 13503-4 Measurement of stimulation & gravel-pack fluid leak-off

ISO 13503-5 Measurement of long term conductivity of proppants

ISO 13503-6 Measuring leak-off of completion fluids under dynamic conditions

ISO 13678 Thread compounds

ISO 13679 Casing and tubing connections testing

ISO 13680 CRA seamless tubes for casing & tubing

ISO 14810 Packers and bridge plugs

ISO 14998 Accessory completion equipment

ISO 15136 Progressing cavity pump systems, Parts 1-2

ISO 15463 Field inspection of new casing, tubing and plain end drill pipe

ISO 15464 Gauging and inspection of threads

ISO 15531-1 Electric submersible pump systems for artificial lift (Rev)

ISO 15546 Aluminium alloy drill pipe

ISO 10855-1 Offshore containers design, manufacture and marking

ISO 10855-2 Offshore containers lifting sets

ISO 10855-3 Offshore containers periodic inspection

ISO 10867 Modular drilling rigs

ISO 10867 Elastomeric coating of risers – polybutadiene or EPDM Maintenance and field repair (Rev)

ISO 10900 General requirements for offshore structures

ISO 19901-1 Metocean design and operating considerations

ISO 19901-2 Seismic design procedures and criteria (Rev)

ISO 19901-3 Topside structure (Rev)

ISO 19901-4 Geotechnical and foundation design (Rev)

ISO 19901-5 Weight control (Rev)

ISO 19901-6 Marine operations

ISO 19901-8 Marine soil investigations (Rev)

ISO 19901-9 Structural Integrity Management

ISO 19901-10 Marine geophysical investigations (New)

ISO 19902 Fixed steel offshore structures

ISO 19903 Fixed concrete offshore structures

ISO 19904-1 Monohulls, semi-submersibles and spars

ISO 19905-1 Site-specific assessment of jack-ups (Rev)

ISO 19905-2 Jack-ups commentary

ISO 19905-3 Site-specific assessment of mobile offshore units (Rev)

ISO 19906 Arctic offshore structure

ISO 35101 Arctic Working environment

ISO 35102 Arctic Operations Escape, evacuation and rescue

ISO 35103 Arctic Environmental monitoring

ISO 35104 Arctic operations – ice management

ISO 35105 Arctic material

ISO 35106 Arctic metocean, ice and seabed data

ISO 3977-5 Gasturbines – procurement

ISO 6368 Compressors – dry gas sealing systems (New)

ISO 10428 Sucker rods

ISO 10431 Pumping units

ISO 10434 Bolted bonnet steel gate valves

ISO 10436 Replaced by API Std 611

ISO 10437 Special purpose steam turbines

ISO 10438 Lubrication, shaft sealing and control-oil systems, Parts 1-4

ISO 10439 Centrifugal compressors

ISO 10440-1 Rotary type positive-displacement process compressors

ISO 10440-2 Rotary PD packaged air compressors

ISO 10441 Flexible couplings – special

ISO 10442 Integrally geared air compressors

ISO 12211 Spiral plate heat exchangers

ISO 12212 Hairpin heat exchangers

ISO 13631 Reciprocating gas compressors

ISO 13691 High speed enclosed gear units

ISO 13704 Calculation of heater tube thickness (Rev)

ISO 13705 Fired heaters for general service

ISO 13706 Air-cooled heat exchangers

ISO 13707 Reciprocating compressors

ISO 13709 Centrifugal pumps

ISO 13710 Reciprocating positive displacement pumps

ISO 13691 Flexible couplings – general

ISO 15547 Heat exchangers, Parts 3-2

ISO 15649 Piping

ISO 15385-1 Cathodic protection of on land pipelines

ISO 15585-2 Cathodic protection for offshore pipelines (Rev)

ISO 15590-1 Pipeline induction bends

ISO 15590-2 Pipeline fittings (Rev)

ISO 15590-3 Pipeline flanges (Rev)*

ISO 15590-4 Pipeline factory cold bend

ISO 16440 Steel cased pipelines

ISO 16708 Pipeline reliability based limit state design

ISO 19345-1 Full life cycle integrity management for onshore pipeline

ISO 19345-2 Full life cycle integrity management for offshore pipeline

ISO 20074 Geological hazards risk management of pipelines

ISO 21229 Test procedures for pipeline mechanical connectors (Rev)

ISO 21809-1 Polyolefin coatings (3-layer PE and 3-layer PF)

ISO 16070 Lock mandrels and landing nipples

ISO 16530-1 Well integrity manual

ISO 17078-1 Side-pocket mandrels

ISO 17078-2 Flow control devices for side-pocket mandrels

ISO 17078-3 Latches & seals for side-pocket mandrels & flow control devices

ISO 17078-4 Side-pocket mandrels and related equipment

ISO 17824 Sand control screens

ISO 22512 Design of aluminium drill string

ISO 27627 Aluminium alloy drill pipe thread gauging

ISO 28781 Subsurface tubing mounted formation barriers

ISO 3183 Steel pipe for pipeline transportation systems

ISO 12490 Actuation, mechanical integrity and staking for pipeline valves

ISO 12736 Wet thermal insulation coatings (Rev)

ISO 12747 Pipeline life extension (Rev)

ISO 13623 Pipeline transportation systems (Amd)

ISO 13847 Welding of pipelines

ISO 14813 Pipeline valves

ISO 14723 Subsea pipeline valves

ISO 21809-2 Fusion bonded epoxy coatings (Rev) ISO 21809-3 Pipeline field joint coatings (Rev) ISO 21809-4 Polyethylene coatings (2-layer PE) ISO 21809-5 Pipeline external concrete coatings (Rev) ISO 21809-11 Pipeline Coating repairs ISO 21857 Corrosion prevention of pipeline systems by stray currents (New) ISO 22504 Pig trap (New) ISO 22974 Pipeline integrity (New) ISO 24139-1 Clad bends (New) ISO 24139-2 Clad fittings (New) ISO 24177 Internal coatings for corrosion protection (New) ISO 24200 Pipe support (New) ISO 24302 Monorail beam and padeye (New) ISO 24565 Ceramic lined tubing (New)*

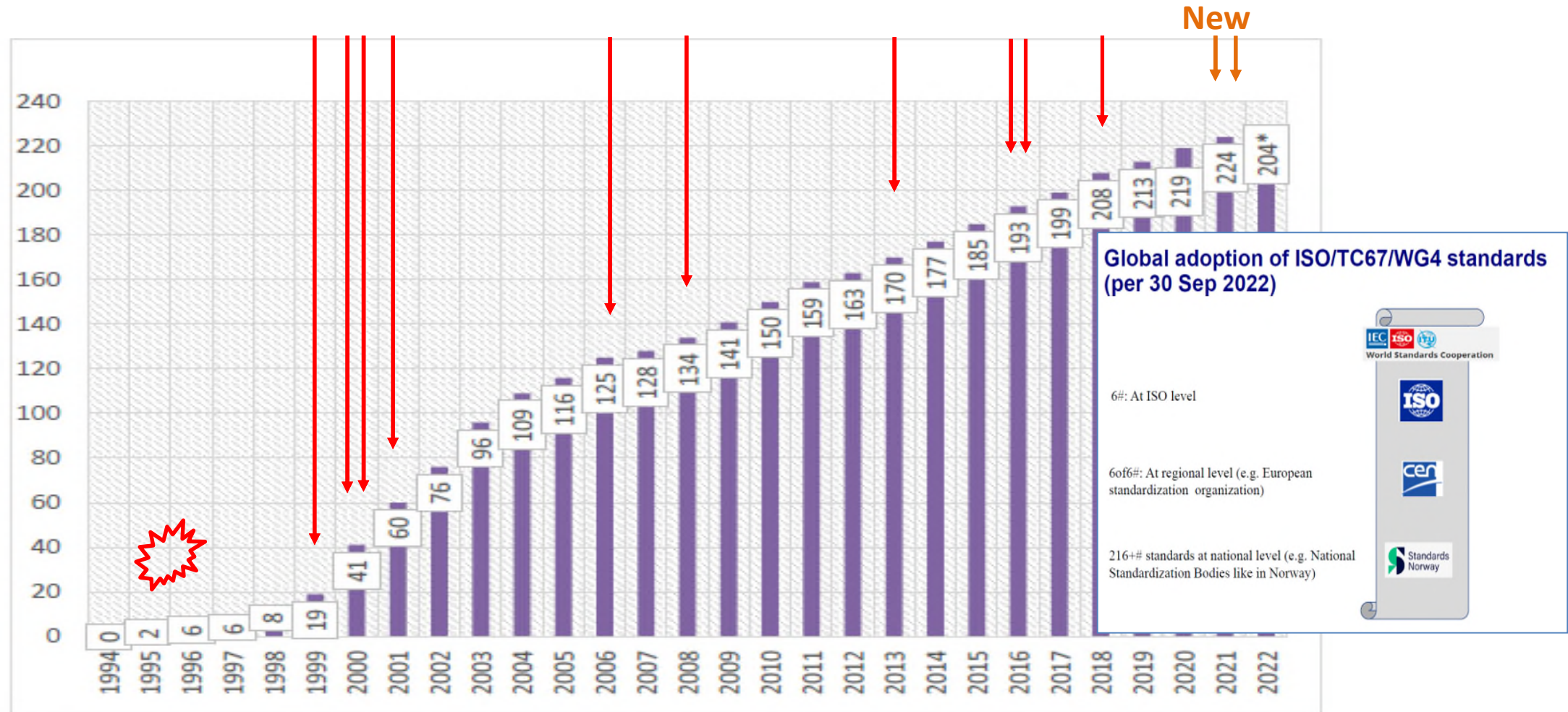
Standards in purple* issued in 2021
 Standards in blue are a priority for 2022 issue
 * already published in 2022 (reference date 2022-04-26)

These ISO standards, TR and TS (abbreviated titles) are only a core collection of several hundreds of standards available for the oil & gas industry from ABNT, ANSI, API, AS, BSI, CSA, NORSOK, NF, SOST, SAC etc. Some ISO/TC67 standards have been withdrawn and the relevant API standard is referenced above

ISO Standards for use in the oil & gas industry - A3 poster (ISO/TC67 Standards Committee website - April 2022)

ISO/TC67 standards published

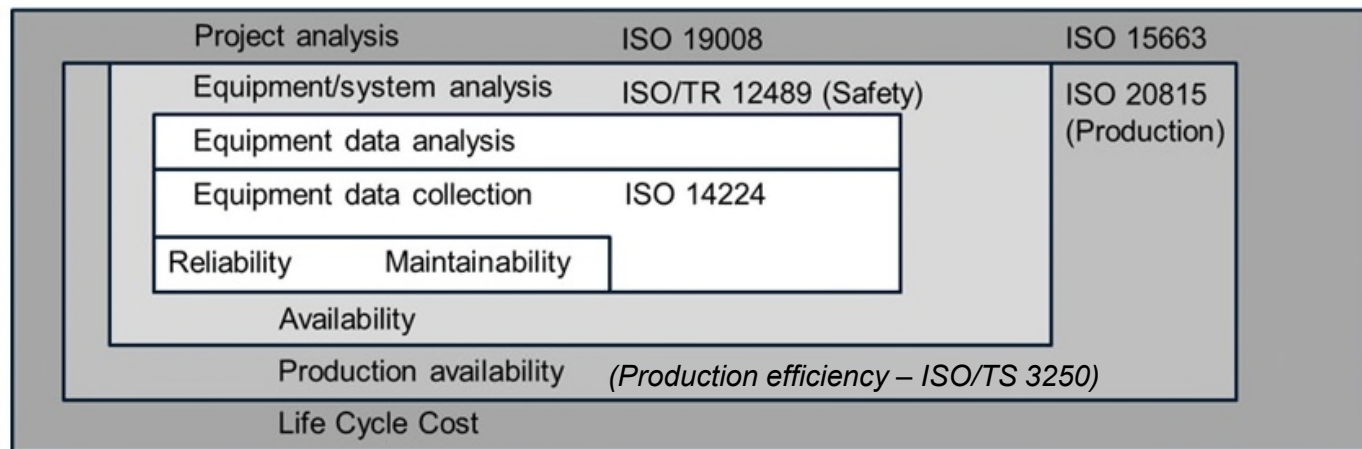
ISO standards development by ISO/TC67/WG4
(20+ years industry applications and integrated portfolio)



ISO/TC67/WG4 Standards portfolio



– Reliability and cost related standards



Source: ISO 20815:2018, Figure D.2. Adjusted to also reflect new ISO/TS 3250:2021

- [ISO 14224:2016](#) “Collection and exchange of reliability and maintenance data for equipment”
- [ISO 20815:2018](#) “Production assurance and reliability management”
- [ISO/TR 12489:2013](#) “Reliability modelling and calculation of safety systems”
- [ISO 15663:2021](#) “Life cycle costing”
- [ISO 19008:2016](#) “Standard Cost Coding System for oil and gas production and processing facilities”
- [ISO/TS 3250:2021](#) “Calculation and reporting production efficiency in the operating phase”

[ISO Guide 84:2020](#)
Also applied when developing ISO 15663 and ISO/TS 3250

New in
2021

New in
2021

Translation memo of 63 reliability terms in ISO 14224, ISO 20815 and ISO/TR 12489

- See [ISO/TC67 N1714](#) (April 2019)

N 1714

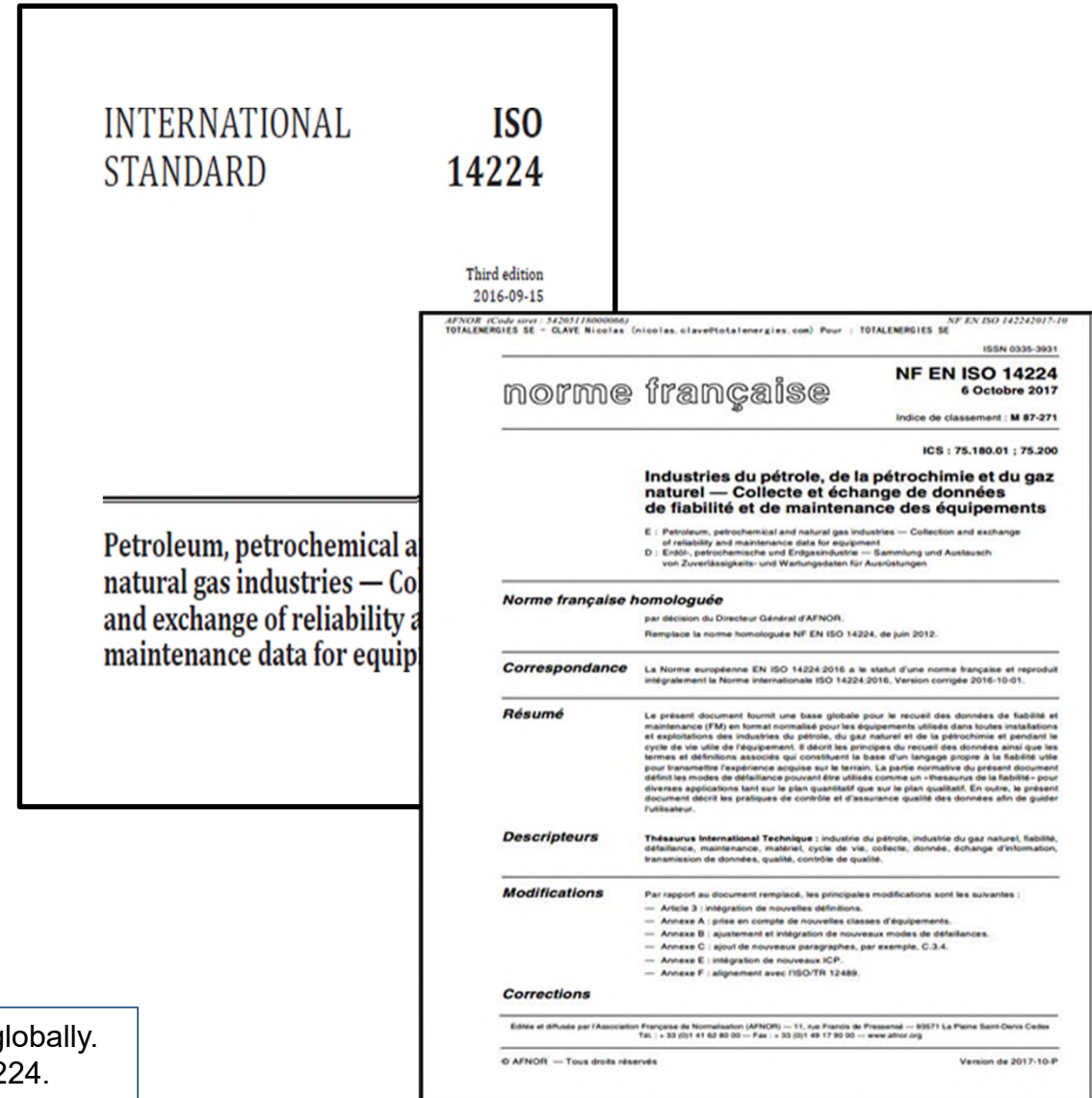
Annex A - Translation of selected terms in ISO 14224:2016 and ISO 20815:2018 and ISO/TR 12489:2013							
English Term (Abbreviation)	References	Finnish	French	Italian	Norwegian	Portuguese	Spanish
1. availability	ISO 14224:2016, 3.3 ISO 20815:2018, 3.1.2 IEC 60050-192:2015, 192-01-23	käytettävyys	disponibilité	disponibilità	tilgjengelighet	disponibilidade	disponibilidad
2. technical availability	ISO 14224:2016, Annex C.2.3.2 + Table E.3 IEC 60050-192:2015, 192-08-02	tekninen käytettävyys	disponibilité technique	disponibilità tecnica	teknisk tilgjenglighet	disponibilidade técnica	disponibilidad técnica
3. operational availability	ISO 14224:2016, Annex C.2.3.2 + Table E.3 IEC 60050-192:2015, 192-08-03	toiminnallinen käytettävyys	disponibilité opérationnelle	disponibilità operativa	operasjonell tilgjengelighet	disponibilidade operacional	disponibilidad operacional
4. production availability	ISO 20815:2018, 3.1.46	tuotannon määrään perustuva käytettävyys	disponibilité de production	disponibilità di produzione	produksjonstilgjengelighet	disponibilidade de produção	disponibilidad de producción
5. deliverability	ISO 20815:2018, 3.1.8	toimituskyky	productibilité	erogabilità	leveransetilgjengelighet	capacidade de entrega	capacidad de entrega

Likewise, see [ISO/TC67 N1952 \(July 2021\)](#) regarding translation of 21 cost terms in ISO 19008:2016 and ISO 15663:2021

ISO 14224:2016 – Scope and key content

Scope

- Specifies requirements and gives guidance for collection, analysis and exchange of Reliability and Maintenance (RM) data
- Provides key definitions of key terms used by data analytics methods
- Enables communicating equipment experience: «**reliability esperanto**»
- Contains normative terminology, e.g.
 - **Failure modes (per equipment class)**
See ISO Standards Maintenance Portal: <http://standards.iso.org/iso/14224>
 - **Failure mechanism and failure cause (generic across all equipment classes)**
- Provides a list of **Key Performance Indicators (KPI)**
- **Equipment class library** in Annex A - for all types of facilities and operations in upstream, midstream, downstream and petrochemical business categories



The ISO 14224 Systematic Review per Feb 2022 shows 45 countries has adopted ed. 3 globally. Per 28 Nov 2022: 46+ countries have adopted and approx.50 countries are using ISO 14224.

ISO 14224:2016 - Taxonomy for all oil & gas business categories

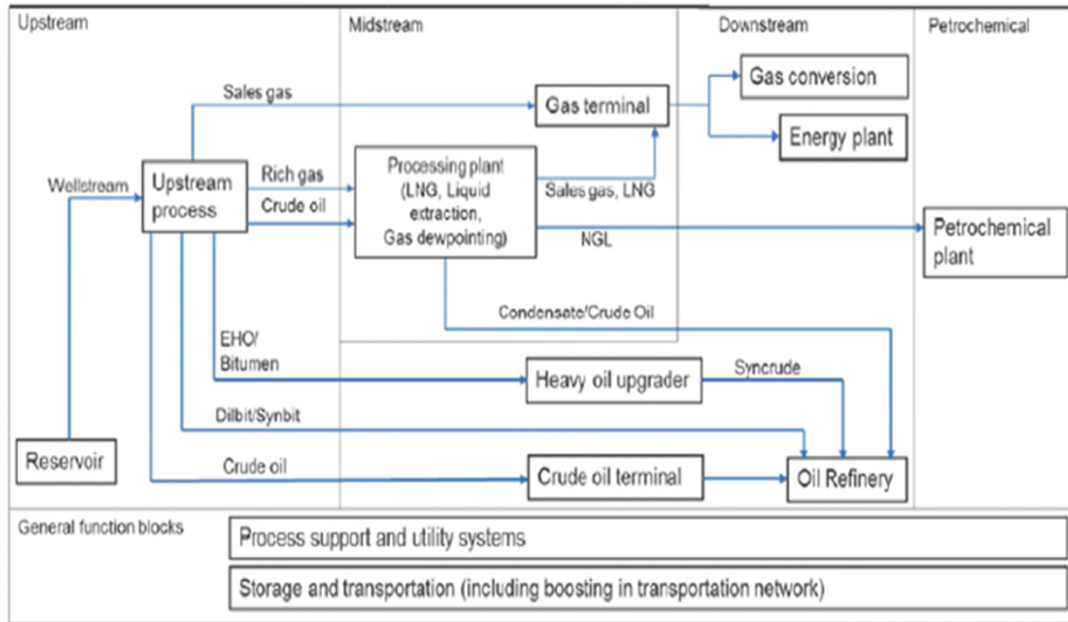


Figure A.1 — Process technology function blocks in the oil and gas value chain — Level 3

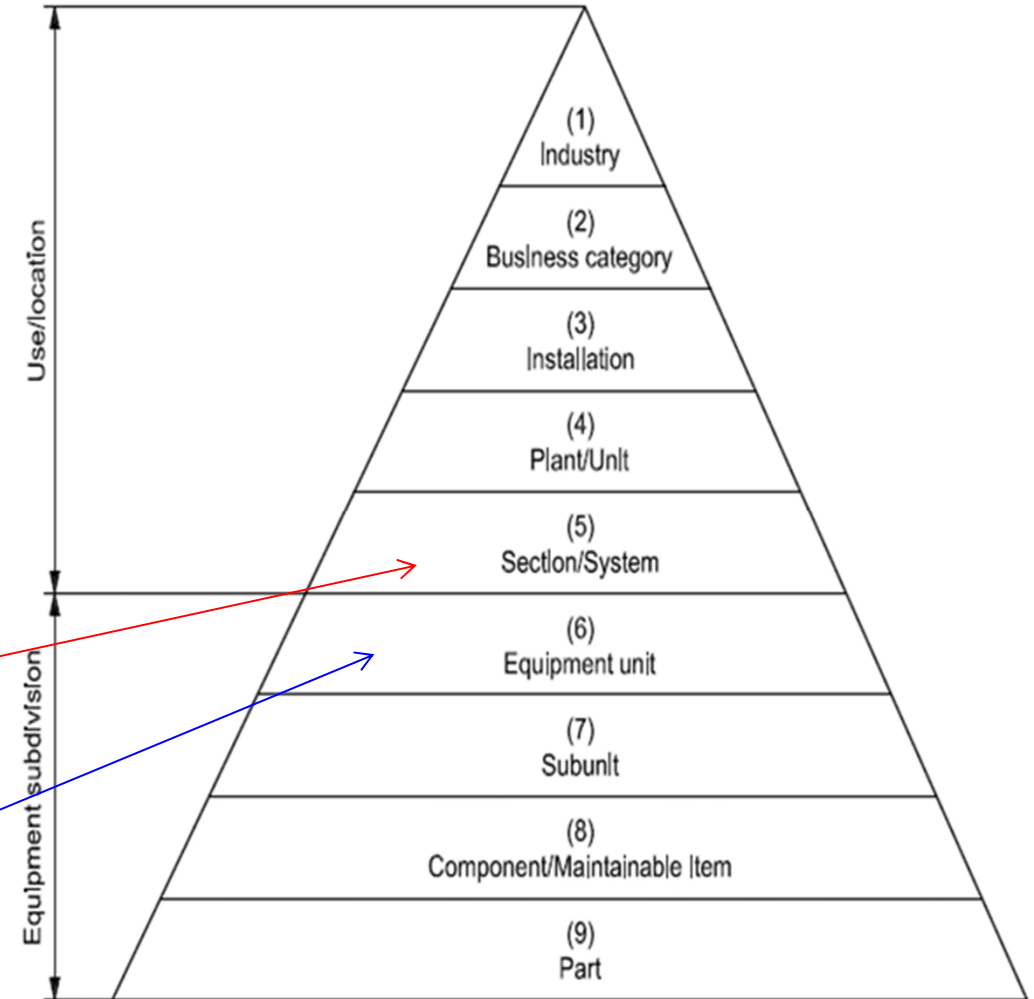


Figure 3 — Taxonomy classification with taxonomic levels

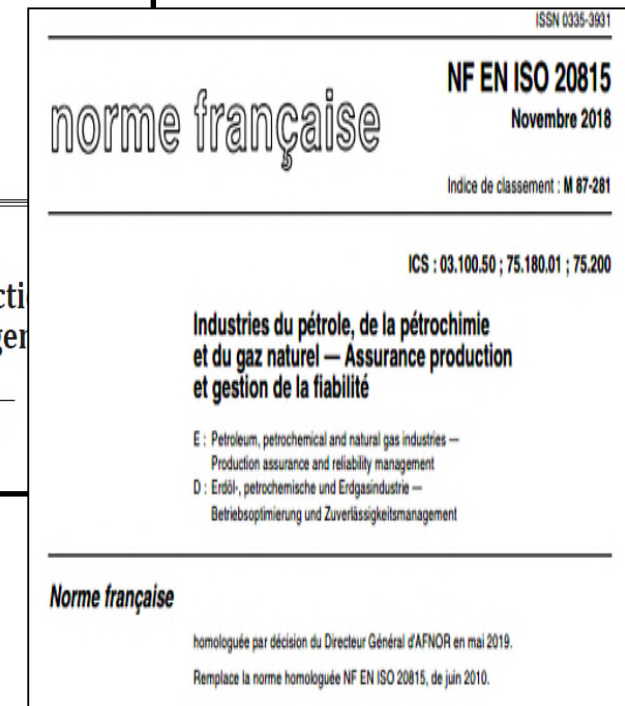
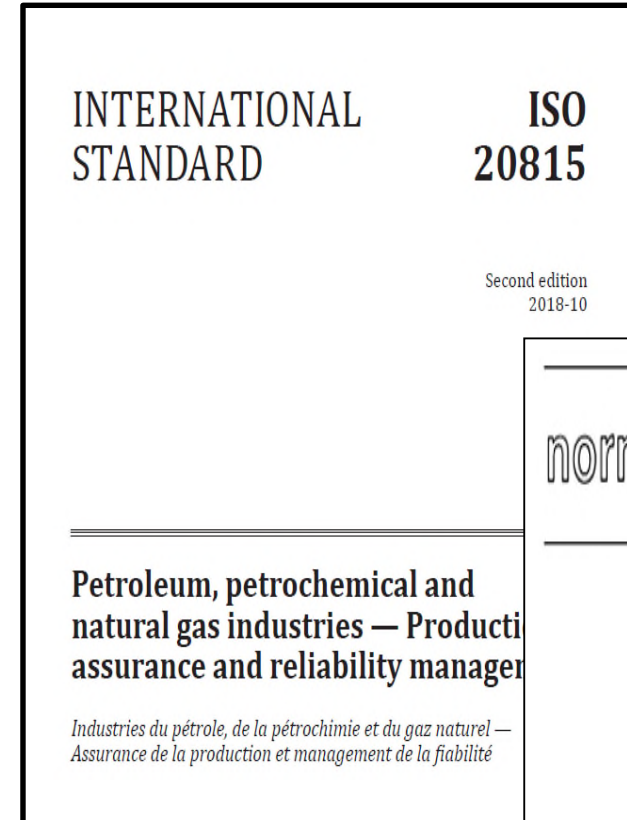
- 97 systems (Level 5) («ISO engineering numbering system»)
- 108 equipment classes (Level 6)
 - 46 addressed on level 6-8.
 - 60 failure modes for all equipment

“Production assurance and reliability management”

Scope

- Production assurance and reliability management
 - **Production Assurance Programme (PAP)** (operating companies)
 - **Reliability Management Programme (RMP)** (equipment suppliers)
- Definitions including
 - **Technology Readiness Level (TRL)**
 - **Production and Time loss categorization**
 - interacting with ISO 14224 (now supplemented by ISO/TS 3250:2021)
- Guidance on **performance objectives and performance requirements**, for use in for example contractual reliability framing (targeting).
- Outline of **analysis techniques (Annex I)** and Guidance on **reliability data qualification (Annex E)**

Regulatory example: NS-EN ISO 20815 quoted also in PSA (e.g. Maintenance programme in [Activity Regulations](#) - § 47).



ISO 20815:2018 - Production assurance terms

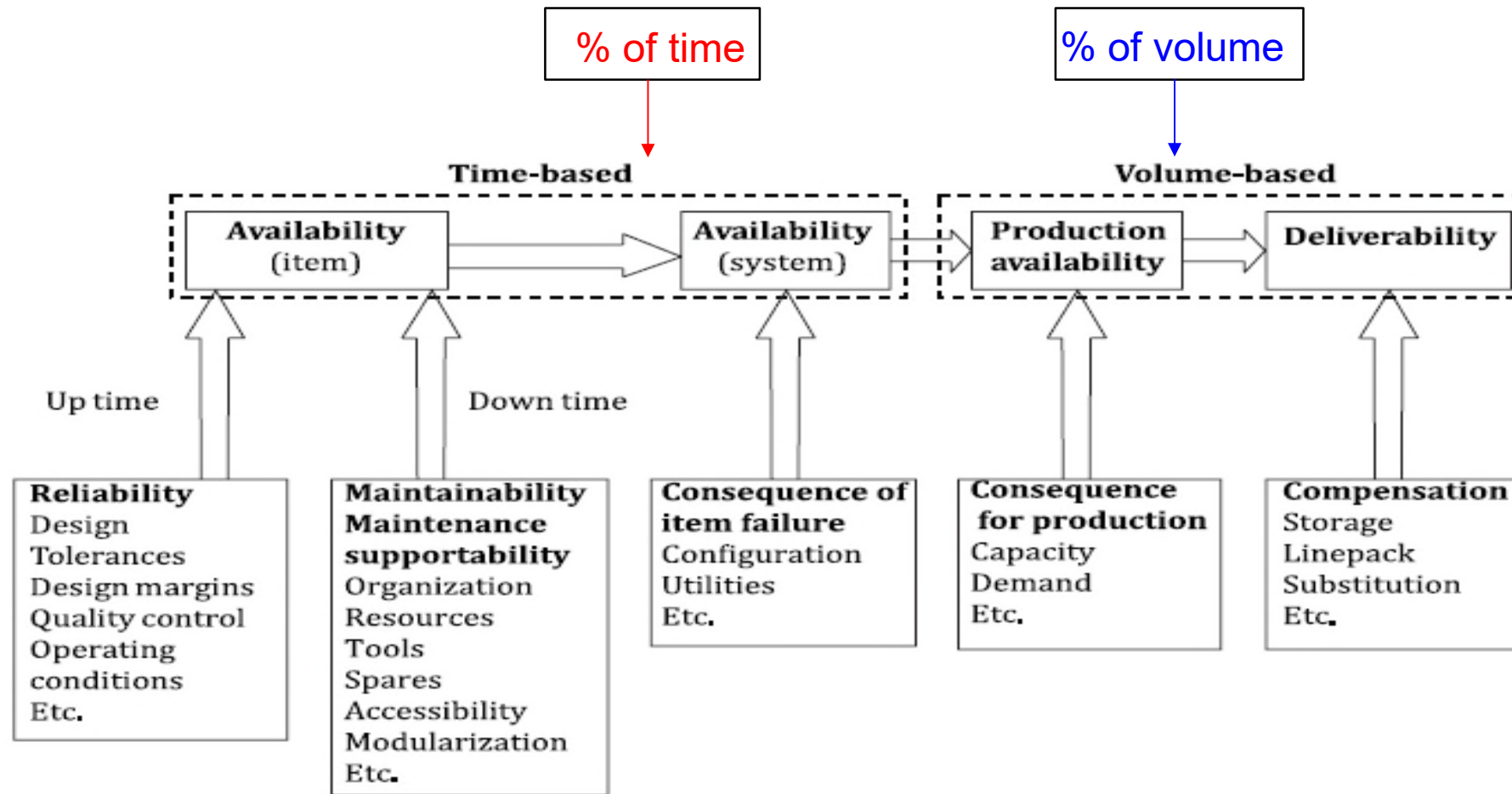
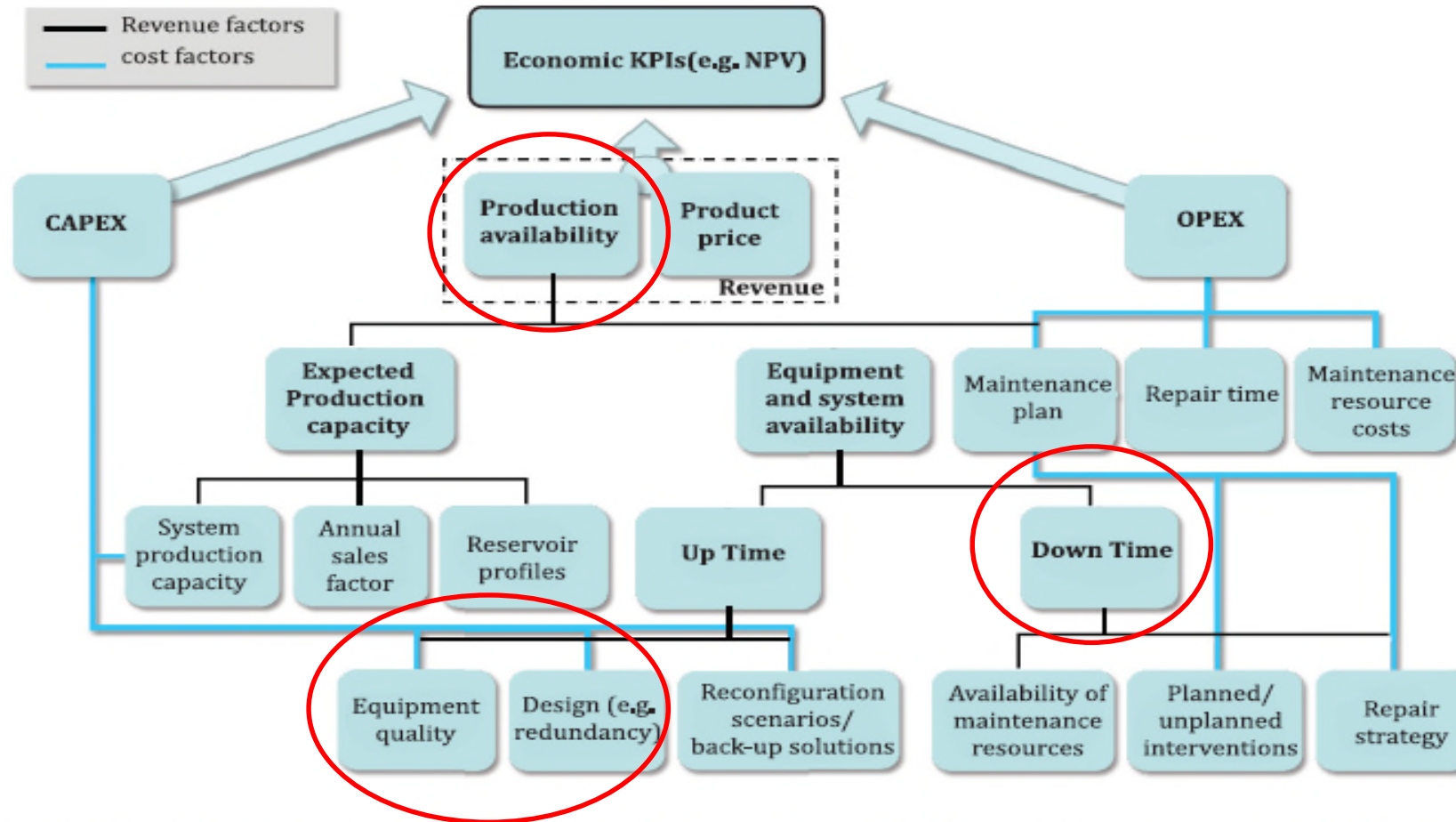


Figure G.1 — Illustration of the relationship between some time-based and volume-based production assurance terms

ISO 20815:2018 - Life cycle costing perspectives



Production availability analysis techniques are described in ISO 20815:2018, Annex I. See also ISO 15663:2021, C.4.3. For **production loss categories** for upstream business categories, see ISO/TS 3250:2021.

Figure 2 — Business model: Influence factors of production assurance on project economy

Technology maturity assessment and technology qualification

- Technology Novelty Categorization (TNC) and Technology Readiness Level (TRL)



ISO 20815:2018

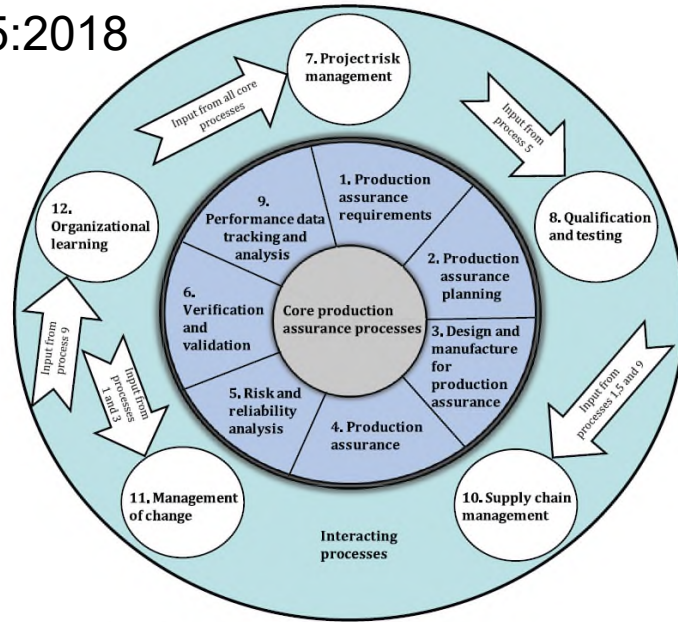


Figure 4 — Core and interacting production assurance processes

Table I.9 — Technology novelty categorization

Application area	Degree of technology novelty ^a		
	No new technical elements	Technical elements with limited industry history	New technical elements with no industry history
Known	1 or 2a	2c	3
New	2b or 2c	3	4

^a Table I.9 provides an explanation of different technology novelty categories.

Table I.8 — Technology readiness levels for technology development and qualification

Level	Development stage	TRL description
TRL 0	Unproven idea/proposal	Paper concept. No analysis or testing has been performed.
TRL 1	Concept demonstrated	Basic functionality demonstrated by analysis, reference to features shared with existing technology or through testing on individual subcomponents/ subsystems. Should show that the technology is likely to meet specified objectives with additional testing.
TRL 2	Concept validated	Concept design or novel features of design validated through model or small scale testing in laboratory environment. Should show that the technology can meet specified acceptance criteria with additional testing.
TRL 3	New technology tested	First version of technology built, and functionality demonstrated through testing over a limited range of operating conditions. These tests may be done on a scaled version, if scalable. If the technology is tested as a small-scale version, it is important that the scale effects compared to a large-scale version are sufficiently well understood and predicted.
TRL 4	Technology qualified for first use	Large scale version of technology built, and technology qualified for use within specified operating conditions/limits, through testing in intended environment, simulated or actual. The new technology is now ready for first use. If the technology is qualified as a large-scale version, it is important that the scale effects compared to a full-scale version are sufficiently well understood and predicted.
TRL 5	Technology integration tested	Full-scale technology built and integrated into the environment where it is intended to operate, with full interface and functionality tests.
TRL 6	Technology in operation	Full-scale technology built and integrated into the environment where it is intended to operate, with full interface and functionality tests. The technology has operated in accordance with predefined performance criteria over a limited period of time.
TRL 7	Proven technology	The technology has operated in accordance with predefined performance and reliability criteria, over a period of time sufficient to reveal time-related effects. Required duration of operation is one of the pre-defined criteria. The technology is now proven for use within specified operating conditions/limits.

ISO Technical Report 12489:2013

”Reliability modelling and calculation of safety systems”

Scope

- Provide guidelines with **to ensure correct modelling & calculations.**
- ISO/TR 12489 is an important supplement of IEC 61508-part 6 (functional safety).

See: [ISO/TR 12489 – Information sheet, 26 Aug 2022](#)

ISO/TR 12489:2013 is also quoted in:

Norway: [“Norwegian Oil and Gas Association, 070 –Norwegian Oil and Gas recommended guidelines for application of IEC 61508 and IEC 61511 in the Norwegian petroleum industry \(Recommended SIL requirements\), Rev. 4, April 2020”](#). ISO references were introduced in Rev. 3, June 2018.

USA: International Society of Automation (ISA), [”ISA-TR84.00.02-2022, Safety Integrity Level \(SIL\) Verification of Safety Instrumented Functions. Ed. 3, April 2022”](#). It now includes ISO/TR 12489 as an “authoritative source”.

ISO/TR 12489:2013(E)

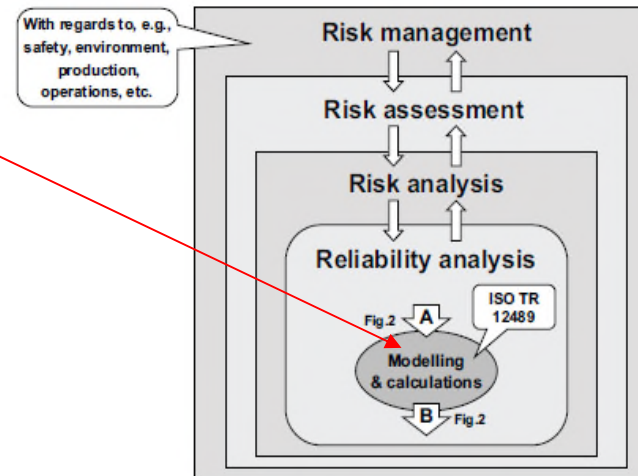
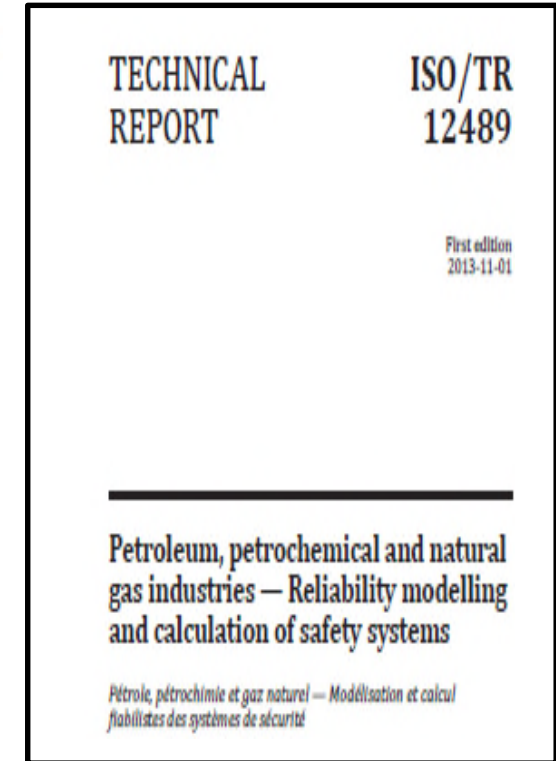


Figure 1 — ISO/TR 12489 within the framework of risk management



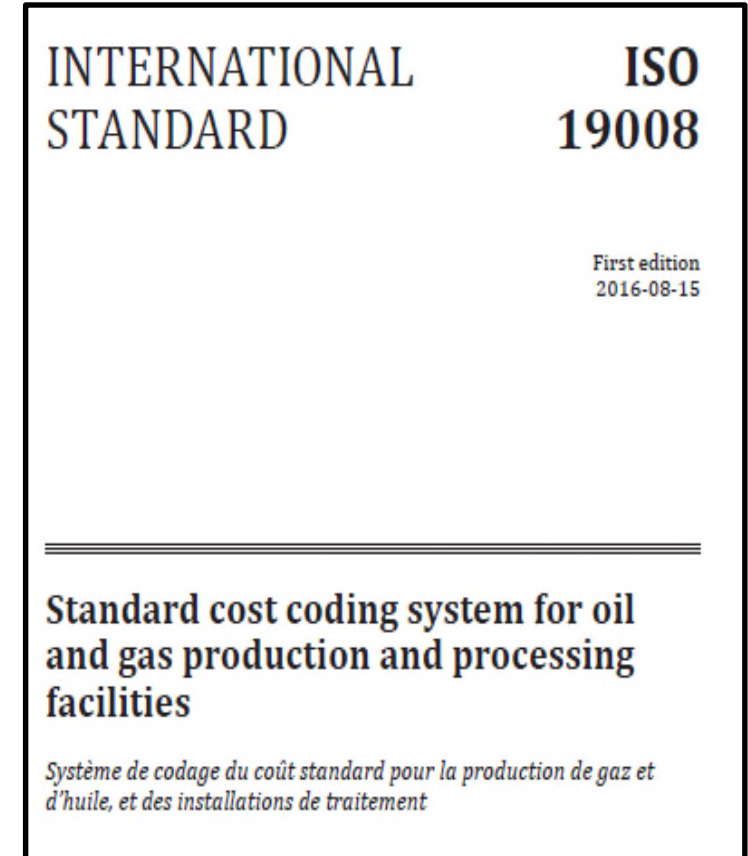
ISO 19008:2016

“Standard Cost Coding System for oil and gas production and processing facilities”

Scope

- Provide standard cost coding for classification and coding of:
 - Cost (e.g. equipment purchase cost)
 - Activities (e.g. duration of construction)
 - Physical quantities (e.g. equipment weight and pipeline length)
- Excel files with codes can be found in the ISO Standards Maintenance Portal: <http://standards.iso.org/iso/19008>

PDO/PIO Guidance, for Norway (13 Sep 2022):
NS-EN-ISO 19008 shall be used for cost estimation.



ISO 15663:2021 - Scope and key content

Scope

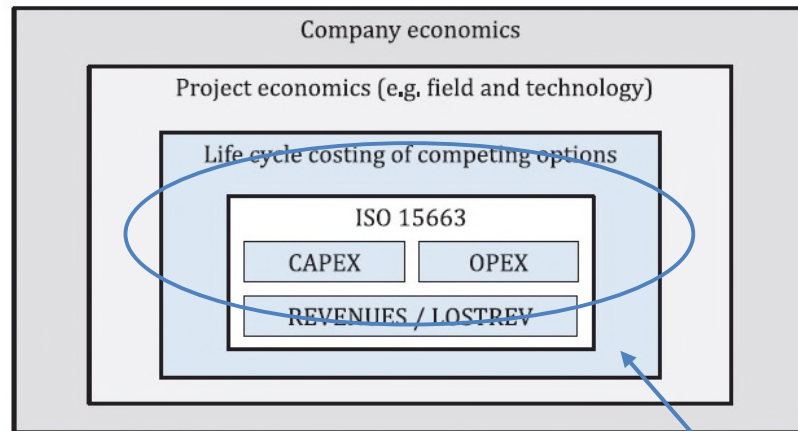
- Specifies **requirements** for and gives **guidance** on application of life cycle costing to **create value**
- The life cycle costing process applies when comparing **competing options** that are differentiated by cost and/or economic value implications
- Guidance on the management methodology and application of life cycle costing in support of **decision-making** across **life cycle phases**
- Definitions of **key cost terms**
- Applicable for Oil & Gas industry (and also for Energy Transition, e.g. offshore wind)
- Replaces previous ed.1 from 2000 & 2001 (3 parts)



CEN version approval of revised 1st edition ([adopted by 36 European countries](#), e.g. in Norway as NS-EN ISO 15663:2021).

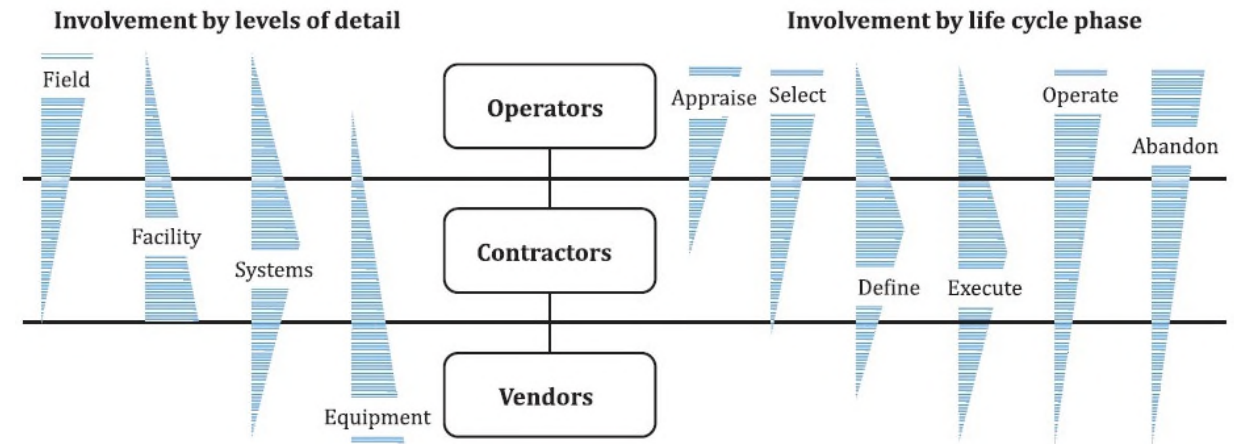
Decision-support framework arena and key users

Framework conditions for life cycle costing



Source: ISO 15663:2021, Figure 1

Participants - level of detail vs life cycle phases



Source: ISO 15663:2021, Figure 2

ISO 15663:2021 – Life cycle costing

Life cycle costing and Life cycle cost (LCC) are different terms



ISO 15663:2021, 3.1.27

life cycle costing

process of evaluating the difference between the life cycle cost of two or more alternative options



ISO 15663:2021, 3.1.24

life cycle cost

LCC

L_{CC}

total cost incurred during the life cycle

Note 1 to entry: LCC is the discounted sum of CAPEX, OPEX and LOSTREV, see C.6.3.3.

ISO/TS 3250:2021 - Scope and key content

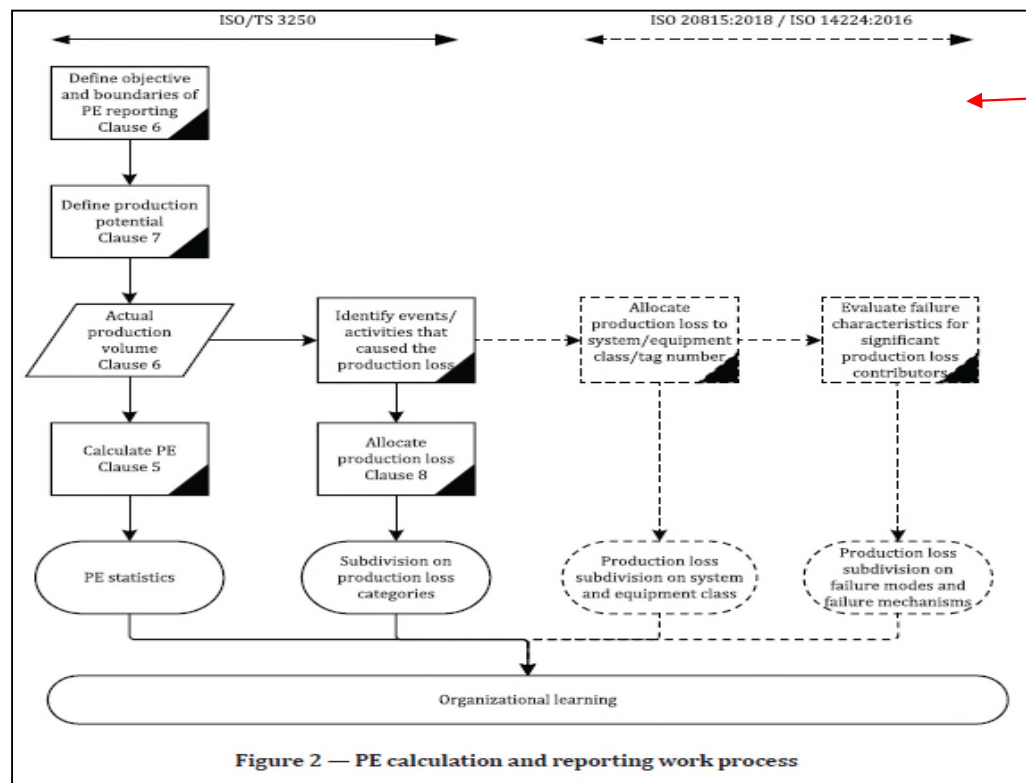


Scope

- Requirements and guidance for calculation and reporting of production performance data and production loss data in the operating phase
- **Production efficiency (PE) + Injection efficiency (IE)**

TECHNICAL SPECIFICATION	ISO/TS 3250
First edition 2021-08	
Petroleum, petrochemical and natural gas industries — Calculation and reporting production efficiency in the operating phase	
<i>Industries du pétrole, de la pétrochimie et du gaz naturel — Calcul et rapport d'efficacité de la production dans la phase d'exploitation</i>	

ISO 14224:2016 is a normative reference in ISO/TS 3250:2021.



[OTC-32056 paper](#) presented at [OTC - 4 May 2022](#)

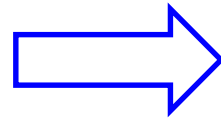
32056

ISO Standardization As An Enabler For Production Efficiency In The Operating Phase

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Closing remarks

ISO/TC67 Vision



Oil and gas industry: Standards actively used and integrated in governance systems

- Reduce risk (safety and environment) and optimize production assurance
- Ensure cost-efficiency and operational excellence
- Minimize company own specifications

The use of international standards developed by the Oil & Gas industry is a responsibility for this industry and the associated stakeholders – for affordable and sustainable energy supply needs and unlocking business opportunities.

For an efficient energy transition (energy supply, cost management and lower carbon) examples of industry needs & actions arising from ISO/IOGP standardization session at OTC 2022 & ONS 2022 are:

- Industry collaboration and alignment, with involvement of the new generation engineers
- Development of a global digital vocabulary (Standardised Reference Data Libraries (RDL)) unlocking digitalization values
- Collaborate to develop and maintain cost effective and relevant international standards that can be used world-wide
- Drive existing standards to an essential minimum enabling safety and cost-efficiency serving also lower carbon and renewable industries



Source: ISO 15663:2021, Figure C.2