SLOVENSKI STANDARD
oSIST prEN ISO 16530:2025

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Naftna in plinska industrija, vključno z nizkoogljično energijo - Celovitost vrtine - Upravljanje življenjskega cikla (ISO/DIS 16530:2024)

Oil and gas industries including lower carbon energy - Well integrity - Life cycle governance (ISO/DIS 16530:2024)

Öl- und Gasindustrie einschließlich kohlenstoffarmer Energieträger - Bohrungsintegrität - Lebenszykluslenkung (ISO/DIS 16530:2024)

Industries du pétrole et du gaz, y compris les énergies à faible teneur en carbone - Intégrité du puits - Gouvernance du cycle de vie (ISO/DIS 16530:2024)

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75.180.10	Oprema za raziskovanje, vrtanje in odkopavanje	Exploratory, drilling and extraction equipment

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Oil and gas industries including lower carbon energy — Well integrity — Life cycle governance

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, Oil and gas industries including lower carbon energy, Subcommittee SC 4, *Drilling, production and injection equipment*.

Introduction

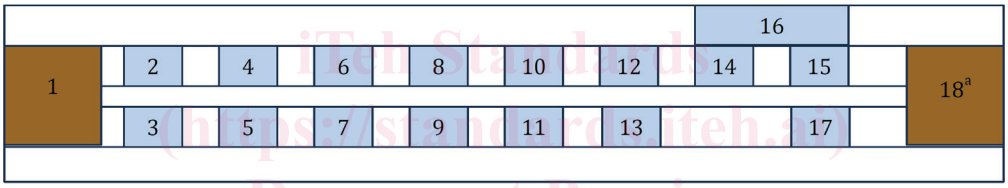
This document has been developed by oil and gas producing operating companies and is intended for use in the petroleum and natural gas industries worldwide. This document is intended to provide guidance to the well operator on managing well integrity throughout the well life cycle. Furthermore, this document addresses the minimum compliance requirements for the well operator in order to claim conformity with this document.

The principles for well integrity defined in this document can be applied for wells that are not classed as petroleum related, but the level of risk presented by the particular well type should be understood in order to make an informed decision on the applicability of the standard.

It is necessary that users of this document are aware that requirements over and above those outlined herein may be needed for individual applications.

This document addresses the process of managing well integrity during each of the well life cycle phases, namely: basis of design; design; construction; operation; intervention (including work-over) and abandonment.

The phases of a well life cycle have separate and distinct requirements for achieving well integrity management objectives, but all phases have common elements and techniques. Clause 6 discusses these common elements and techniques. Clauses 7 to 12 discuss each individual phase and its requirements. Additionally, each clause highlights the aspects to be considered within the common elements and techniques as applicable to that phase.



Key

1	Reservoir	7	Production casing	13	Wellhead Penetrations
2	Production Liner / casing	8	Downhole Safety Valve	14	Master Valve(s)
3	Wellbore	9	Intermediate Casing	15	Wing Valve
4	Production Packer	10	Wellhead	16	Swab Valve / Tree Cap
5	Cement Shoe	11	Wellhead Seals	17	Annulus Valves
6	Tubing	12	Tree Flange	18	Production System

[a] The choke valve is typically part of the production system.

Figure 1 — Well pressure system and boundaries

The figure gives an example of how the well system can be represented, from the reservoir to the wing valves, in this case assuming the production choke is part of the production system.

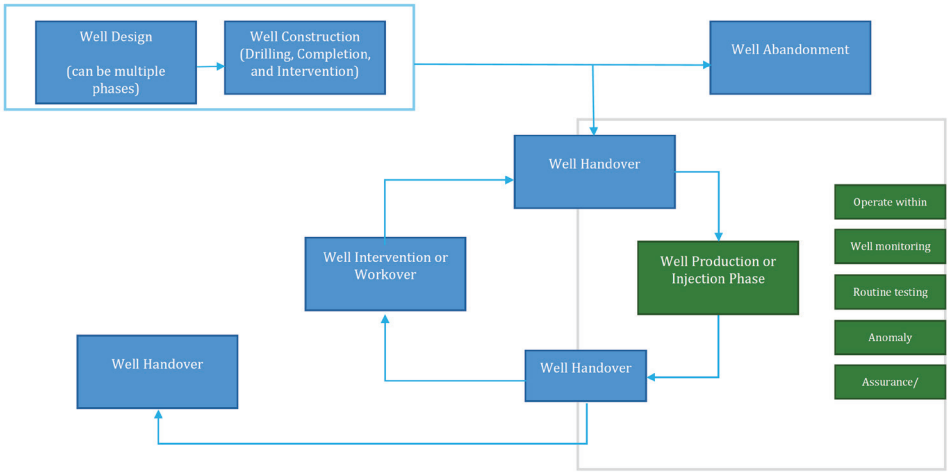
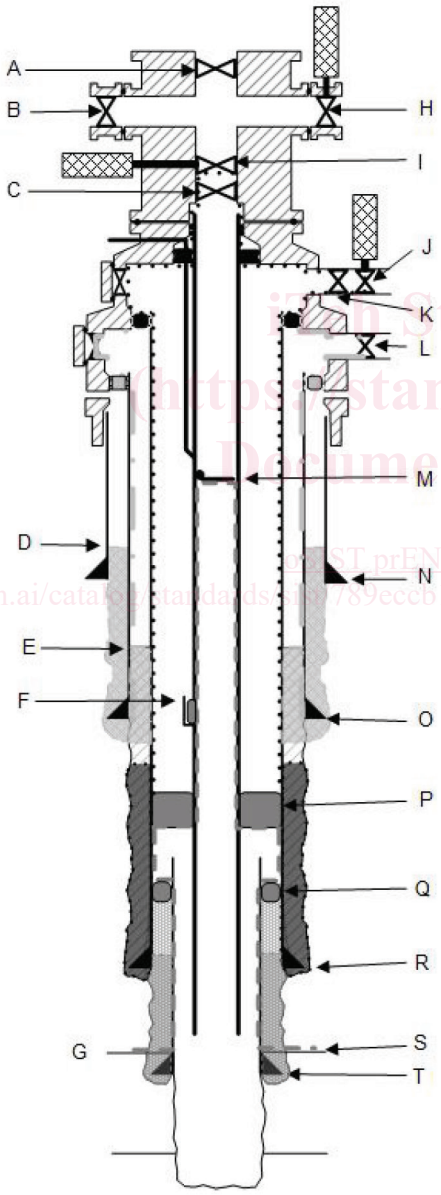


Figure 2 — The well integrity lifecycle

A well lifecycle diagram can be used to explain how the responsibility for the well is transferred at different stages in the well life

Example Well Barrier Schematic – Gas Lifted Producer Well

ABC Oil and Gas Operator				
XYZ Field	Well: AA-01	Prepared by:	Date:	Primary Well Barrier to the Reservoir
Welltype: Gas Lifted Oil Producer		Approved by:	Date:	Secondary Well Barrier to the Reservoir, also Primary Barrier to the Lift Gas
Date Original Well Completed		X-mas Tree is rated to:	psi	
Date Workover 1 Completed		Wellhead is rated to:	psi	Secondary Well Barrier to the Lift Gas
Date Workover 2 Completed		Tubing is rated to:	psi	A-annulus MAASP:
Drawing Ref:	Rev.	N.O. = Normally Open	N.C. = Normally Closed	B-annulus MAASP:
Current Well Status: Producing with Lift Gas		Date:		C-annulus MAASP:



Barrier Element Table	
Barrier Element	Element Verification
Primary Well Barrier to Reservoir	
Cap Rock	Xxx Equivalent Mud Wt s.g.
7" Liner Cement	TOC xxx ft; Total Cmt length xxx ft
7" Liner Hanger/Packer	PT to xxx psi w/ MW yy s.g.
7" Liner	PT to xxx psi w/ MW yy s.g.
9-5/8" Casing (below Packer)	PT to xxx psi w/ MW yy s.g.
9-5/8" Production Packer	PT to xxx psi w/ MW yy s.g.
Gas Lift Valve	PT to xxx psi w/ MW yy s.g.
4-½" Tubing	PT to xxx psi w/ MW yy s.g.
TR SSSV Flapper	PT to xxx psi w/ MW yy s.g.
Secondary Well Barrier to the Reservoir	
9-5/8" Casing Shoe Strength	Xxx Equivalent Mud Wt s.g.
9-5/8" Cement inside 13-3/8"	TOC xxx ft; Total Cmt length xxx ft
9-5/8" Casing	PT to xxx psi w/ MW yy s.g.
9-5/8" Casing Hanger seals	PT to xxx psi w/ MW yy s.g.
9-5/8" Wellhead section	PT to xxx psi w/ MW yy s.g.
9-5/8" Wellhead Annulus Valves	PT to xxx psi w/ MW yy s.g.
Tubing Hanger Seals	PT to xxx psi w/ MW yy s.g.
X-mas Tree Connector	PT to xxx psi w/ MW yy s.g.
Hydraulic Master Valve	PT to xxx psi w/ MW yy s.g.
Secondary Well Barrier to the Lift Gas	
13-3/8"" Casing Shoe Strength	Xxx Equivalent Mud Wt s.g.
13-3/8"" Cement	TOC xxx ft; Total Cmt length xxx ft
13-3/8" Casing	PT to xxx psi w/ MW yy s.g.
13-3/8" Casing Hanger seals	PT to xxx psi w/ MW yy s.g.
13-3/8" Wellhead section	PT to xxx psi w/ MW yy s.g.
13-3/8" Wellhead Annulus Valves	PT to xxx psi w/ MW yy s.g.
Well Integrity Notes:	
1. the 410 ft of cement overlap inside the 13-3/8" is considered good cement	

Key

A	Swab Valve N.C.	H	Actuated Wing Valve	O	13-3/8 Intermediate Casing Shoe 4 910 ft.
B	Kill Wing Valve N.C.	I	Actuated Master Valve	P	Production Packer 5 100 ft.
C	Lower Master Valve N.O.	J	Actuated lift gas wing valve	Q	Liner Hanger 5 430 ft.
D	Top of 13-3/8 Cement 3 090 ft.	K	Manual lift gas wing valve N.O.	R	9-5/8 Production Casing Shoe 5 950 ft.
E	Top of 9-5/8 Cement 4 500 ft.	L	Intermediate Annulus Valve N.C.	S	Reservoir 8 250 ft.
F	Gas Lift Valve 4 905 ft.	M	Sub Surface Safety Valve 1 950 ft.	T	7” liner shoe 8 270 ft.
G	Cap Rock	N	20 in. Surface Casing Shoe 3 250 ft.		

Figure 3 — An example of a well barrier diagram, highlighting the physical well barriers.