

Well intervention equipment

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NORSOK Standard

D-002

Well intervention equipment

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Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure safety, value adding and cost effectiveness for petroleum industry developments and operations. Furthermore, NORSOK standards are, as far as possible, intended to replace oil company specifications and serve as references in the authorities' regulations.

The NORSOK standards are normally based on recognized international standards, adding the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardization process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with support by The Norwegian Oil and Gas Association, The Federation of Norwegian Industries, Norwegian Shipowners' Association and The Petroleum Safety Authority Norway. NORSOK standards are administered and published by Standards Norway.

Introduction

This revision was initiated to ensure a timely update of the standard and to harmonize it with applicable standards and regulations.

The following main changes are implemented in this revision:

- The well barrier terminology of the standard is harmonized to NORSOK D-010.
- The requirements of safety heads have been expanded to reflect current expectations and understanding.
- External references have been updated and the number of references has been reduced.
- Test requirements for pressure control equipment are further specified.
- The structure is revised to increase readability.

1 Scope

The objective for this NORSOK standard is to provide common requirements for well intervention equipment across all exploration and production companies and service companies operating on the Norwegian Continental Shelf.

The standard defines what is considered typical and ordinary well intervention equipment. New equipment, special operations and operations in certain environments may require additional requirements and specifications. These specific additions are excluded from the standard and should be addressed in the risk assessment of the particular job. The general requirements in chapter 4 and 5 of this standard also apply to well intervention equipment falling outside traditional snubbing, coiled tubing and wireline.

2 Normative and informative references

The following standards include provisions and guidelines which, through reference in this text, constitute provisions and guidelines of this NORSOK directive. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet the requirements of the referenced standards.

2.1 Normative references

API 5ST, *Specifications for Coiled Tubing*

API 16D, *Specification for Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment Second Edition*

API RP 16ST, *Coiled Tubing Well Control Equipment Systems*

ATEX Directive, *EU's directive 94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres*

DNV-OS-E101, *Drilling Plant*

ISO 9001, *Quality management systems – Requirements*

ISO 10423, *Petroleum and natural gas industries – Drilling and production equipment – Wellhead and Christmas tree equipment (API 6A)*

ISO 13533, *Petroleum and natural gas industries – Drilling and production equipment – Drill-through equipment (API 16A)*

ISO 13628-7, *Petroleum and natural gas industries – Design and operation of subsea production systems – Part 7: Completion/workover riser systems*

ISO 15156-1, *Petroleum and natural gas industries – Materials for use in H₂S-containing environments in oil and gas production – Part 1: General principles for selection of cracking-resistant materials (NACE MR0175)*

NORSOK D-001, *Drilling facilities*

NORSOK D-010, *Well integrity in drilling and well operations*

NORSOK N-001, *Integrity of offshore structures*

NORSOK S-001, *Technical safety*

NORSOK S-002, *Working environment*

NORSOK R-002, *Lifting equipment*

NORSOK R-003, *Safe use of lifting equipment*

NORSOK Z-015, *Temporary equipment*

Samarbeid for Sikkerhet, *Handbook – Best Practice – Dropped Object Management*

The Norwegian Oil and Gas Association, *070 – Application of IEC 61508 and IEC 61511 in the Norwegian petroleum industry*

The Norwegian Oil and Gas Association, *081 – Norwegian oil and gas recommended guidelines for remote pipe handling operations*

2.2 Informative references

API RP 5C8, Recommended Practice for Care, Maintenance and Inspection of Coiled Tubing (when published)

PSA, Regulations relating to conducting petroleum activities (The Activities Regulations)

3 Terms, definitions and abbreviations

For the purpose of this NORSOK standard, the following terms, definitions and abbreviations apply.

3.1 Definitions

3.1.1 can

verbal form used for statements of possibility and capability, whether material, physical or causal

3.1.2 coiled tubing

intervention using continuous tubing

3.1.3 intervention

well servicing operations conducted within a completed wellbore

3.1.4 may

verbal form used to indicate a course of action permissible within the limits of this NORSOK standard

3.1.5 maximum anticipated surface pressure

the highest pressure predicted to be encountered at the surface of the well. This pressure prediction should be based upon formation pressure minus a wellbore filled with native formation fluid at current conditions. If formation fluid information is unknown, this pressure prediction should be based upon formation pressure minus a wellbore filled with dry gas from the surface to the completion interval.

3.1.6 maximum anticipated operating pressure

the highest calculated pressure that a given equipment component will be subjected to during the execution of the prescribed service and/or during a contingency operation. The maximum anticipated operating pressure may be equal or greater than the maximum anticipated surface pressure.

3.1.7 rated working pressure

maximum internal pressure that the equipment is designed to contain and/or control

3.1.8 safety head

upper closure device of the secondary barrier

3.1.9 shall

verbal form used to indicate requirements strictly to be followed in order to conform to this NORSOK standard and from which no deviation is permitted, unless accepted by all involved parties

3.1.10 should

verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred, but not necessarily required

3.1.11 snubbing

intervention using jointed pipe and where the primary well control is at surface

3.1.12 wireline

intervention using a continuous wire or cable

3.1.13 work string

collective term for jointed pipe, coiled tubing and wireline, BHA excluded

3.2 Abbreviations

API	American Petroleum Institute
BHA	bottom hole assembly
BOP	blow out preventer
ESD	emergency shut down
ISO	International Organization for Standardization
IEC	International Electrotechnical Commission
PSA	Petroleum Safety Authority Norway
SIL	safety integrity level

4 General requirements

4.1 Design principles

An overall principle for well intervention activities shall be that no single failure shall entail a life-threatening situation for the involved personnel or lead to significant material or environmental damage. This shall constitute the basis for definition, revision, reduction and acceptance of risk with regards to well intervention activities.

The fulfilment of this principle shall be assessed on a system level. An intervention system includes, but is not limited to, equipment falling under the scope of this standard, auxiliary equipment, equipment permanently installed on the location and operational procedures.

Well intervention equipment shall be designed to withstand all loads it may be exposed to. Limitations shall be known to the users of the equipment.

The design and layout of well intervention equipment shall ensure a safe and efficient workplace.

4.2 External standards

Equipment under the scope of this standard will by default fall into at least one of the following categories and shall satisfy the requirements of the corresponding standards:

- topside pressure control equipment: ISO 10423 or ISO 13533;
- subsea pressure control equipment: ISO 13628-7;
- temporary equipment: NORSOK Z-015;
- supporting structures: NORSOK N-001.

Furthermore, the equipment shall fulfil the requirements of additional external standards through direct references throughout the text.

Equipment potentially exposed to H₂S shall be designed according to ISO 15156-1.

The intention of the above is not to provide an exhaustive list of all relevant standards and regulations. The majority of well intervention equipment will also fall within the scope of European directives and specific standards issued by API, ISO and IEC. It is the responsibility of the equipment manufacturers and those responsible for the use of the equipment to define the complete list of applicable standards and regulations for each individual product.

4.3 Applicability

This revision of NORSOK D-002 is applicable for all well intervention equipment manufactured after the 1st of July 2014. A gap analysis shall be available by the 1st of July 2014 for existing equipment to identify any non-conformances under NORSOK D-002 Revision 2.

All equipment under the scope of this standard shall comply with this revision no later than the 1st of July 2018.

4.4 Quality management systems

All suppliers that design, manufacture or sell well intervention equipment shall have a quality management system based on ISO 9001 or equivalent.