

# Guidelines regarding the facilities regulations

<b>CHAPTER I INTRODUCTORY PROVISIONS</b> .....	<b>4</b>
Re Section 1 Scope .....	4
Re Section 2 Responsibilities .....	4
Re Section 3 Definitions .....	4
<b>CHAPTER II GENERAL PROVISIONS</b> .....	<b>5</b>
Re Section 4 Choice of development concept.....	5
Re Section 5 Design of facilities .....	5
Re Section 6 Design of simpler facilities without accommodation.....	6
Re Section 7 Main safety functions .....	6
Re Section 8 Safety functions .....	6
<b>CHAPTER III OVERALL JOINT REQUIREMENTS</b> .....	<b>7</b>
Re Section 9 Qualification and use of new technology and new methods.....	7
Re Section 10 Installations, systems and equipment .....	7
Re Section 11 Loads/actions, load/action effects and resistance.....	8
Re Section 12 Materials .....	8
Re Section 13 Materials handling and transport routes, access and evacuation routes .....	9
Re Section 14 Ventilation and indoor climate.....	10
Re Section 15 Chemicals and chemical exposure .....	10
Re Section 16 (This section has been repealed) .....	11
Re Section 17 Instrumentation for monitoring and registration.....	11
Re Section 18 Systems for internal and external communication .....	11
Re Section 19 Communication equipment.....	12
<b>CHAPTER IV DESIGN OF WORK AND COMMON AREAS</b> .....	<b>13</b>
Re Section 20 Ergonomic design .....	13
Re Section 21 Human-machine interface and information presentation.....	13
Re Section 22 Outdoor work areas .....	13
Re Section 23 Noise and acoustics .....	13
Re Section 24 Vibrations .....	14
Re Section 25 Lighting .....	14
Re Section 26 Radiation .....	14
Re Section 27 Personnel transport equipment.....	14
Re Section 28 Safety signs .....	15
<b>CHAPTER V PHYSICAL BARRIERS</b> .....	<b>15</b>
Re Section 29 Passive fire protection .....	15
Re Section 30 Fire divisions .....	15
Re Section 31 Fire divisions in living quarters .....	16
Re Section 32 Fire and gas detection systems.....	16
Re Section 33 Emergency shutdown system.....	16
Re Section 34 Process safety system.....	17
Re Section 34a Control and monitoring system .....	17
Re Section 35 Gas release system .....	17
Re Section 36 Firewater supply.....	18
Re Section 37 Fixed fire-fighting systems .....	18
Re Section 38 Emergency power and emergency lighting .....	19
Re Section 39 Ballast system .....	19
Re Section 40 Open drainage systems.....	19
<b>CHAPTER VI EMERGENCY PREPAREDNESS</b> .....	<b>19</b>

Re Section 41 Equipment for rescue of personnel.....	19
Re Section 41a Evacuation and rescue equipment for manned underwater operations.....	19
Section 42 Materials for action against acute pollution.....	20
Re Section 43 Emergency preparedness vessels .....	20
Re Section 44 Means of evacuation.....	20
Re Section 45 Rescue suits and life jackets, etc.....	21
Re Section 46 Manual fire-fighting and firefighters' equipment .....	21
<b>CHAPTER VII ELECTRICAL INSTALLATIONS.....</b>	<b>21</b>
Re Section 47 Electrical installations .....	21
<b>CHAPTER VIII DRILLING AND WELL SYSTEMS .....</b>	<b>22</b>
Re Section 48 Well barriers .....	22
Re Section 49 Well control equipment .....	22
Re Section 50 Compensator and disconnection systems .....	23
Re Section 51 Drilling fluid system.....	23
Re Section 52 Cementing unit.....	24
Re Section 53 Equipment for completion and well flow.....	24
Re Section 54 Christmas tree and wellhead.....	24
<b>CHAPTER IX PRODUCTION PLANTS.....</b>	<b>25</b>
Re Section 55 Production facility.....	25
<b>CHAPTER X LOAD-BEARING STRUCTURES AND PIPELINE SYSTEMS.....</b>	<b>25</b>
Re Section 56 Load-bearing structures and maritime systems.....	25
Re Section 57 Pipeline systems .....	25
<b>CHAPTER XI LIVING QUARTERS.....</b>	<b>25</b>
Re Section 58 Living quarters .....	25
Re Section 59 Health department .....	26
Re Section 60 Emergency sickbay .....	26
Re Section 61 Supply of food and drinking water.....	27
<b>CHAPTER XII MARITIME FACILITIES.....</b>	<b>27</b>
Re Section 62 Stability .....	27
Re Section 63 Anchoring, mooring and positioning.....	27
Re Section 64 Turrets .....	27
<b>CHAPTER XIII DIVING FACILITIES.....</b>	<b>27</b>
Re Section 65 Facilities and equipment for manned underwater operations .....	27
<b>CHAPTER XIV ADDITIONAL PROVISIONS.....</b>	<b>28</b>
Re Section 66 Loading and offloading systems .....	28
Re Section 67 Waste.....	28
Re Section 68 Exhaust ducts .....	28
Re Section 69 Lifting appliances and lifting gear .....	28
Re Section 70 Helicopter deck .....	28
Re Section 71 Marking of facilities .....	29
Re Section 72 Marking of equipment and cargo .....	29
Re Section 73 Lifts .....	29
<b>CHAPTER XV IMPLEMENTATION OF EEA REGULATIONS.....</b>	<b>29</b>
Re Section 74 Simple pressure vessels .....	29
Re Section 75 Personal protective equipment .....	29
Re Section 76 Aerosol containers.....	29
Re Section 77 EMC.....	29
Re Section 78 ATEX .....	30
Re Section 79 Pressure equipment that is not covered by the Facilities Regulations.....	30

Re Section 80 Products that are not covered by the Facilities Regulations ..... 30

**CHAPTER XVI CONCLUDING PROVISIONS..... 30**

Re Section 81 Supervision, decisions, enforcement, etc..... 30

Re Section 82 Entry into force ..... 30

**LIST OF REFERENCES..... 31**

## CHAPTER I INTRODUCTORY PROVISIONS

### Re Section 1 Scope

The scope of these regulations has been limited compared with the [Framework Regulations](#), so that they only apply to offshore petroleum activities.

The second subsection makes individual requirements in these regulations applicable also for installations and equipment for conducting manned underwater operations from vessels.

For comments to the third subsection of this section, see the guidelines regarding [Section 3 of the Framework Regulations](#).

### Re Section 2 Responsibilities

No comments.

### Re Section 3 Definitions

Definitions and abbreviations set out in the [Framework Regulations](#) are not repeated in these regulations. These guidelines explain or provide supplementary information to definitions as listed in this section.

#### *Fire divisions – Classes A and H:*

The ISO 834 standard should be used for standardised fire tests.

#### *Simpler facilities without accommodation:*

Integrated development concept as mentioned under simpler facilities without accommodation litera c, means facilities with gangway connections. The simpler facility can, however, be connected to other facilities through a pipeline system.

Not constituting a danger to other facilities as mentioned under simpler facilities without accommodation litera c, includes the meaning that fire on the facility does not jeopardise the safety of other facilities, e.g. through the possibility of the fire spreading or thermal stress.

#### *Pipeline systems:*

Fluids mean liquids and gases.

On a subsea facility, the subsea pipeline normally terminates at the connection to a christmas tree or wing valve. The christmas tree is not considered part of the pipeline system.

On a subsea facility where the above definition cannot be applied, the subsea pipeline ends at the connection to the subsea facility. The connection piece is part of the subsea pipeline.

Subsea pipelines and risers up to and including the chamber for launching or receiving tools for internal maintenance (including inspection), with associated equipment, are considered to belong to the pipeline system. If such a chamber has not been installed, the pipeline system is considered to extend to the first automatic shutdown valve above water.

#### *Safety functions:*

Safety functions include

- a) sectioning of the process,
- b) fire detection,
- c) gas detection,
- d) ignition source disconnection,
- e) maintaining overpressure in unclassified rooms,
- f) starting and stopping fire pumps, both manually and automatically,
- g) active fire-fighting
- h) active smoke control,

- i) process safety system,
- j) securing of wells,
- k) depressurisation,
- l) general alarm and evacuation alarm,
- m) production and distribution of emergency power,
- n) emergency lighting,
- o) emergency bilging,
- p) ballasting for floating facilities,
- q) maintenance of correct pressure, humidity, temperature and gas composition in diving facilities.

Well safety as mentioned in litera j, means blowout prevention, choke and pressure control systems, diverter systems, subsurface safety valves and quick release coupling system.

## **CHAPTER II GENERAL PROVISIONS**

### **Re Section 4**

#### **Choice of development concept**

The following should be taken into account when choosing a development concept:

- litera a: important risk contributors, cf. [Section 4](#) and [17 of the Management Regulations](#),
- litera b: organisation, staffing, maintenance, transport solution, working environment, any manned underwater operations,
- litera c: operational discharges and emissions, cf. [Sections 4](#) and [17 of the Management Regulations](#) and applicable objectives (cf. Storting White Paper 25 (2002-2003) The Government's environmental policy and the state of the environment in Norway) relating to reduction of emissions and discharges,
- litera d: infrastructure, other fields and facilities, distance to land and bases, fishery activities and shipping lanes,
- litera e: route, sea depth, seabed conditions, wave height, wind and other natural conditions,
- litera f: recovery rate, pressure, temperature, oil or gas, corrosiveness and shallow gas,
- litera g: delivery obligations and economy,
- litera h: flexibility and expected changes in operating conditions, as well as future use,
- litera i: removal and reuse.

The need to qualify new technology should also be taken into account, cf. [Section 9](#).

### **Re Section 5**

#### **Design of facilities**

For general requirements related to risk reduction, see [Section 11 of the Framework Regulations](#) and [Chapters II and V of the Management Regulations](#).

To fulfil the design requirements as mentioned in the first subsection, the standards NS-EN ISO 13702 with appendices, [NORSOK S-001](#) and [S-002](#) should be used for the health and safety sections. For lifting equipment, the [NORSOK R-002](#) standard should be used.

For mobile facilities that are not production facilities and that are registered in a national shipping register, [DNV-OS-A101](#) can be used as an alternative in the area covered by the standard.

In order to fulfil the strategy requirement as mentioned in the third subsection, the principles in the NS-EN ISO 13702 standard should be used for all hazard and accident situations.

In order to fulfil the requirements for design and siting referred to in the fourth subsection, the facility should be designed so that the potential for and consequences of accidents are reduced. Areas, equipment and functions should be arranged, sited and organised so as to, as far as possible:

- a) restrict the potential for the accumulation and spread of hazardous materials,
- b) restrict the potential for ignition,
- c) separate areas containing hazardous materials from each other and from other areas and
- d) reduce potential consequences of and the potential for escalation in the event of fire and explosion.

For classification of areas at risk of explosion referred to the fifth subsection, the IEC 61892-7 standard should be used.

Area requirements as mentioned in the sixth subsection, can be fulfilled through both technical and operational measures.

For the design of the area for storing items referred to in the seventh subsection, the [regulations on hazardous substances \(in Norwegian only\)](#), the [regulations on explosive materials \(in Norwegian only\)](#) and Chapter 5.4.7 of the [NORSOK S-001](#) standard should be used. For manned underwater operations, Chapter 7.6 of the [NORSOK U-100N](#) standard should be used in addition.

In the eighth subsection, available means that it is practicable to procure such equipment for use on the facility. This means that the facility is spatially and structurally suited for the siting of such plant, including in respect of weight and other loads. Alternatively, access to necessary pumping and fluid capacity may be arranged by other means. The requirement in the eighth subsection entails that necessary pumping and fluid capacity must be operationally available within a period of time that is considered prudent for assuring the function that the plant is to have.

## **Re Section 6**

### **Design of simpler facilities without accommodation**

Specific assessments as mentioned in the second subsection, mean assessments of the overall risk for all activities related to operation and maintenance of the facilities, including transport of employees.

Examples of specific solutions as mentioned in the second subsection, are [Sections 14, 32, 37, 41 and 44](#).

Examples of sections where simpler solutions can be considered than those indicated in the guidelines as mentioned in the third subsection, are [Sections 20, 25 and 45](#).

With regard to the design of simpler facilities without accommodation, the Danish Energy Agency's guidelines for design of fixed offshore facilities, (2008) Chapter 2 on design of unmanned production facilities, may be used.

## **Re Section 7**

### **Main safety functions**

The main safety functions as mentioned in the first subsection, should be designed on the basis of each facility's characteristics. The main safety functions that shall be intact both during and after an accident situation, should be indicated.

The requirement regarding maintenance of main safety functions as mentioned in literas a and e, applies for the time until the areas outside of the immediate vicinity of the accident site have been evacuated, including the time it takes to carry out the search and rescue efforts in these areas.

The requirement regarding maintenance of main safety functions as mentioned in literas b, c and d, applies to the time until the facility has been evacuated, including the time it takes to carry out search and rescue efforts.

## **Re Section 8**

### **Safety functions**

Safety functions as mentioned in the first subsection, are included as barriers against hazard and accident situations as mentioned in [Section 5](#), and [Sections 4 and 5 of the Management Regulations](#).

Safety functions can be divided into active and passive functions.

The design of active safety functions as mentioned in the first subsection should be based on the standards [NORSOK S-001](#), [NS-EN ISO 13702](#), [IEC 61508](#) and [ISO 13489](#). The [Norwegian Oil and Gas' Guideline No. 070](#) should also be used.

To ensure that the active safety functions are always able to function as mentioned in the first subsection, they should be designed so that they can be tested and maintained without impairing the performance. For disconnection of safety functions, see [Section 26 of the Activities Regulations](#).

In order to stipulate the performance for the safety functions as mentioned in the second subsection, the [IEC 61508](#) standard and [Norwegian Oil and Gas' Guideline No. 070](#) should be used where electrical, electronic and programmable electronic systems are used in the structure of the functions.

In order to fulfil the requirement for available status as mentioned in the third subsection, the [NORSOK I-002](#) standard, Chapter 4 should be used.

## **CHAPTER III OVERALL JOINT REQUIREMENTS**

### **Re Section 9**

#### **Qualification and use of new technology and new methods**

New technology as mentioned in the first subsection, may be new products, analysis tools or known products used in a new way.

The qualification as mentioned in the second subsection, includes investigation and obtaining objective proof that the needs for a specific intended use are covered, cf. [Section 21 of the Management Regulations](#).

The methodology, procedures and equipment used in connection with the qualification, should also be used in the further work.

[DNV RP-A203](#) Qualification Procedures for New Technology can be used to fulfil the requirements regarding methods for the qualification of new technology.

### **Re Section 10**

#### **Installations, systems and equipment**

Regulations laid down by the Ministry of Labour 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013, including Regulations relating to conduct of work, use of work equipment and appurtenant technical requirements (Conduct of Work Regulations), contain further provisions on certain types of work equipment which is also used in the petroleum activities. Clarification of the scope is directly evident from the individual regulations. In addition, reference is made to the [lawmirror](#) (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

With regard to the design of installations, systems and equipment, the following standards should be used in the area of health, working environment and safety:

- a) [NORSOK D-001](#) and [D-002](#) for facilities used in drilling and well activities,
- b) [NORSOK L-002](#) and [L-004](#) for pipes and valves,
- c) [NORSOK P-001](#) and [P-100](#) for process facilities,
- d) [NORSOK R-001](#) for mechanical equipment,
- e) [NORSOK R-002](#) for lifting equipment,
- f) [NORSOK S-005](#) for machines,
- g) [NORSOK Z-015](#) for temporary equipment,
- h) [NORSOK U-100](#) and [U-101](#) for diving facilities and breathing equipment,
- i) [NORSOK U-001](#) and ISO 13628 for subsea facilities,
- j) IMCA/AODC 035 for electrical installations for use under water,
- k) IEC 61892 for electrical installations and electrical equipment,
- l) NS-EN ISO 11064 as regards human error.

The NS-EN ISO 20815:2008 standard can be used for the design of installations, systems and equipment with regard to regularity and reliability.

For installations, systems and equipment on mobile facilities that are registered in a national shipping register, the following standards may be used as alternatives in the area of health, working environment and safety:

- a) [DNV-OS-D101](#) for marine machinery, pipe systems and mechanical equipment,
- b) [DNV-OS-D201](#) for electrical systems and equipment, with the exception of production facilities,
- c) [DNV-OS-D202](#) for instrumentation and control systems, with the exception of production facilities,
- d) [DNV-OS-E101](#) for facilities used in drilling and well activities.

In order to fulfil the requirement regarding markings as mentioned in the second subsection, the [NORSOK Z-DP-002](#) standard should be used, with the following addition: main components in the

installations should be marked with function, and pipe systems should be marked with the relevant fluid and flow direction.

See also [Section 5](#).

## Re Section 11

### Loads/actions, load/action effects and resistance

The requirement regarding loads/actions with an annual probability greater than or equal to  $1 \times 10^{-4}$  as mentioned in the first subsection, applies to each individual type of load/action and not the sum total of the loads/actions.

For load-bearing structures, functional loads/actions as mentioned in the third subsection, mean permanent and variable loads/actions.

Design loads/actions as mentioned in the fourth subsection, includes functional, environmental and accidental loads/actions, including fire and explosion loads/actions.

In order to fulfil the requirements related to **load-bearing structures**, the standards [NORSOK N-001](#) and [NORSOK N-003](#) should be used. In addition, [NORSOK N-004](#) should be used for steel structures, and NS 3473 for concrete structures.

The [NORSOK S-001](#) standard should be used for **accidental loads/actions**, in particular Chapter 4.7, in addition to other standards mentioned in these instructions. Special fire conditions such as jet fires, under-ventilated fires in modules, fire on the sea and the like may require additional calculation of fire loads/actions. For mobile facilities that are not production facilities, and that are registered in a national ships' register, [DNV-OS-A101](#) Paragraph 2 can be used as an alternative.

For facilities that are intended to leave the field due to bad weather forecasts, the values for environmental loads/actions connected with the least favourable of the following factors may be used:

- a) conditions on the field when moving,
- b) conditions during moving,
- c) weather conditions at the planned new location, with the specified annual probabilities in [NORSOK N-003](#).

For mobile facilities registered in a national ships' register, the loads/actions that the facility has been exposed to and the expected loads/actions during the period for which the consent for use is applied for, should be taken into account.

To fulfil the requirement regarding loads/actions, load/action effects, resistance and load combinations, the following standards should be used for **pipeline systems**: ISO 13623 Chapter 6 and [DNV-OS-F101](#) Paragraphs 3, 4 and 5 for steel pipelines, [DNV-OS-F201](#) Paragraphs 3, 4 and 5 for catenary metallic risers and API 17J Chapter 5 for flexible pipeline systems.

To fulfil the requirements regarding loads/actions, [NORSOK D-001](#) Chapters 5 and 6 and [D-010](#) Chapters 4 and 5 should be used for equipment for conduct of **drilling and well activities** and other well-related equipment, for example drilling risers, compensators, well control equipment, completion equipment and intervention equipment.

To fulfil the requirement regarding loads/actions, the [NORSOK standard L-002](#), Chapter 6 should be used for **pipeline systems in production plants**.

If the loads/actions, load/action effects or resistance factors are uncertain, measurements or model experiments should be conducted to increase the quality of the analyses. The [NORSOK standard N-003](#), Chapter 10.2.7 should be used for **load-bearing structures**.

## Re Section 12

### Materials

In order to fulfil the requirement regarding materials and material protection as mentioned in literas a, b and c, the following standards should be used in the area of health, working environment and safety:

- a) [NORSOK M-001](#) for material selection,
- b) [NORSOK M-101](#) for steel structures,
- c) ISO 13623 Chapter 8 and [DNV-OS-F101](#) Paragraphs 6 and 7 for pipeline systems,
- d) [DNV-OS-F201](#) Paragraph 7 for catenary metallic risers,
- e) API 17J Chapter 6 for flexible pipeline systems,
- f) [NORSOK N-001](#) for concrete structures,
- g) [NORSOK M-501](#) for choice of coating, pre-processing, application and inspection,



- h) [NORSOK M-503](#) for cathodic protection,
- i) [NORSOK M-601](#) for pipelines,
- j) [NORSOK R-004](#) for insulation of equipment.

For **mobile facilities** registered in a national ships' register, the following standards can be used as an alternative in the area of health, working environment and safety: [DNV-OS-B101](#) for metallic materials, OS-C102 Paragraph 2 for ship-shaped facilities, OS-C103 Paragraph 2 for semi-submersible facilities and OS-C104 Paragraph 2 for jack-up facilities.

Methods for control of manufacture and assembly as mentioned in litera b, may include materials control where the sample materials represent the product with regard to manufacture processes, geometrical design and dimensions. Requirements regarding surface quality should be specified in connection with carrying out non-destructive testing of forged and cast goods.

When choosing materials as regards **fire-resistance characteristics** as mentioned in litera d, inflammable materials should be chosen. Where flammable materials are used, they should limit the spread of fire and produce little smoke, heat and toxic substances. In living quarters, electrical installations should be constructed of halon-free materials. The flame spread and smoke development qualities of the materials should be considered when textiles or surface treatment with paint or other coating is used. The following standards should be used to determine the technical fire qualities of materials:

- a) ISO 1182 for inflammability,
- b) ISO 1716 for limited flammability,
- c) ISO 5657 for ignitability,
- d) ISO 5660-1 for heat emission,
- e) ISO 5660-1 for smoke development,
- f) IMO Resolution A.653 (16) for spreading of flames,
- g) ISO 9705 for testing of surface products,
- h) NT Fire 036 for testing of pipeline insulation,
- i) in) IMO Resolution A.471 (XII) for textiles
- j) IEC 60331 for cables which shall function during a fire,
- k) IEC 60332 for self-extinguishing cables in areas with explosion hazard.

When choosing materials in light of the employees' **health and working environment** as mentioned in litera h, materials should be used which are not harmful to the employees alone or in combination with other materials or gases. When choosing materials and surfaces, emphasis should be placed on comprehensive solutions adapted to the intended use and cleaning and maintenance requirements.

### **Re Section 13**

#### **Materials handling and transport routes, access and evacuation routes**

The terms transport, access and evacuation routes also include stairs, doors, hatches, etc.

When designing for **materials handling and personnel traffic** as mentioned in the first subsection, the following factors should be taken into consideration:

- a) the need for types and number of lifting and transport equipment units, including cranes and elevators,
- b) the need for loading and unloading areas, facilitation for forklifts, trolleys, etc.
- c) access to areas and work sites in connection with operations and maintenance,
- d) safe handling of cargo.

For handling of materials by means of lifting equipment the standard [NORSOK R-002](#) Appendix B should be used.

The various work sites should be designed so that they can be serviced and maintained without the use of temporary equipment such as scaffolding, ladders, etc. For permanent solutions, stair ladders should be chosen over vertical ladders.

For mobile facilities that are registered in a national ships' register, the Norwegian Maritime Authority's [Regulations relating to the construction of mobile facilities Sections 14, 15, 16 and 17](#) can be used for access and transport routes, with the following additions:

- a) thresholds in access routes should be avoided or made as low as possible, cf. [Section 20](#),
- b) ladders, where there is danger of falling to a lower level, should have self-closing gates, cf. [NORSOK S-002](#) Chapter 5.1.2.

The following standards should be used for design of the **transport routes** as mentioned in the first subsections and **access** as mentioned in the second subsection:

- a) [NORSOK S-002](#) Chapters 5.1, 5.2.1. and Appendix B,
- b) [NORSOK C-002](#) Chapters 5 (for main stairs) and 6,
- c) [NORSOK C-001](#) Chapters 7.22 and 9.4.

Regulations laid down by the Ministry of Labour 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013, contain further provisions on use of scaffolding etc., and can be used as a recognised norm in the petroleum activities also.

For design of scaffolding, reference is made to the Norwegian Labour Inspection Authority's [Regulations relating to scaffolding, ladders and work on roofs, etc \(in Norwegian only\)](#).

To fulfil the requirement for **escape routes** as mentioned in the third subsection, the [NORSOK S-001](#) standard, Chapters 5, 6 and in particular 21, should be used with the following addition: evacuation routes should be designed so that there is free passage for personnel wearing smoke-diver and/or fire-fighting equipment.

For mobile facilities that are not production facilities, and that are registered in a national ships' register, [DNV-OS-A101](#) can be used as an alternative in the area covered by the standard. For requirements related to escape routes from helicopter decks, see [Section 70](#).

The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002N](#) for those areas covered by the norm.

#### **Re Section 14 Ventilation and indoor climate**

To fulfil the requirement regarding **ventilation** as mentioned in the first subsection, the standards NS-EN ISO 15138, [NORSOK H-003](#) and [S-001](#) Chapter 16.4 should be used, with the following addition: when stipulating the need for air exchange, account should be taken of both the risk of accumulation of hazardous and flammable gases and the need for weather protection, cf. [Section 22](#).

For mobile facilities that are not production facilities, and that are registered in a national ships' register, [DNV-OS-D101](#) Chapter 2, Paragraph 4 can be used as an alternative.

The requirements related to **indoor climate** as mentioned in the second subsection, apply to living quarters and indoor work areas, including chambers for manned underwater operations. The requirements entail that account is taken of the fact that air quality is affected by construction materials, furniture and fittings, personnel, activities and processes, cleaning and maintenance. In order to fulfil these requirements, the following should be used:

- a) the Norwegian Labour Inspection Authority's guidelines on climate and air quality in the workplace,
- b) The National Institute of Public Health - recommended technical standards for indoor climate,
- c) [NORSOK S-002](#) Chapter 5.7 and Appendix A,
- d) [NORSOK U-100](#) Chapters 5.2.2 and 5.2.3.

The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002](#) for the areas covered by the norm.

#### **Re Section 15 Chemicals and chemical exposure**

This section covers technical provisions to reduce acute and prolonged chemical exposure related to transport, transfer, use and disposal of chemicals. The section also covers processes that emit chemical components.

To fulfil the requirements for technical solutions that prevent harmful chemical influences on people as mentioned in the first subsection, the [NORSOK S-002 standard](#), Chapters 4.4.6, 5.4 and Appendices C2 and G 1.2 should be used.

To fulfil the requirements related to design and location of installations for storage and use as mentioned in the second subsection, the [NORSOK P-100 standard](#), Chapter 15 should be used in the area health, working environment and safety.

For use of chemicals, see [Section 36](#) and [Chapter XI of the Activities Regulations](#).

For design and location as regards fire and explosion hazard as mentioned in the second subsection litera c, reference is made to [Section 5](#) and the [Regulations relating to explosive substances \(in Norwegian only\) Chapter 7](#).

Regulations laid down by the Ministry of Labour 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013, contain further provisions on soluble chromium VI in cement. Clarification of the scope is directly evident from the individual regulations. In addition, reference is made to the [lawmirror \(in Norwegian only\)](#) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002](#) for the areas covered by the norm.

## **Re Section 16** **(This section has been repealed)**

### **Re Section 17** **Instrumentation for monitoring and registration**

For requirements related to collecting and making data available, see [Section 19 of the Management Regulations](#).

The instrumentation as mentioned in the first subsection, should be designed so that it can monitor and record:

- a) **structural integrity for load-bearing structures and pipeline systems**  
Monitoring of structural integrity includes recording parameters that result in significant tension or compression stress, or large movements as a result of waves and currents.
- b) **critical degradation of materials**  
Critical degradation may include corrosion and erosion. In order to monitor corrosion, multiple independent corrosion monitoring systems may be relevant if maintenance, including inspection, is difficult to perform.
- c) **critical operational parameters**  
Critical operational parameters can include the drilling fluid's properties, pressure and particle content in the production stream, pressure in seal oils in swivels and gas composition and pressure in facilities for manned underwater operations.

Data on natural conditions (environmental data) as mentioned in the second subsection, means data on oceanography, seismology and meteorology, including data that is of significance for the flight weather service.

In order to fulfil the requirement relating to instrumentation for meteorological and oceanographic data, the [NORSOK N-002](#) standard should be used. Measurement of seismological data should be carried out on land or on the seabed, at a sufficient distance from the facilities to ensure that the recording of data can take place without significant interference from the activities on the facilities. The measurement station should preferably be located on land since this usually provides more reliable and better data than a measurement station on the seabed.

For instrumentation related to monitoring and registration of pollution, see [Chapter X of the Activities Regulations](#). New type as mentioned in the third subsection, means a type that deviates materially from previous structural solutions, i.e. a prototype. When facilities have instruments to measure structural behaviour, environmental data should be measured simultaneously.

### **Re Section 18** **Systems for internal and external communication**

In order to fulfil the requirements relating to design of internal communication and alarm systems as mentioned in the first subsection, the following standards should be used: [NORSOK S-001](#), Chapter 17 for universal audio and visual alarms, [T-001](#) and [T-100](#) for alarm and communication systems and [U-100](#) Chapter 7.14 for internal communication systems in manned underwater operations. In addition:

- a) two-way communication systems or internal radio communication should be used where necessary to communicate important information or to quickly establish contact with personnel,
- b) 112 should be used as the internal emergency number on the facility,
- c) PA systems that can be operated from strategic locations on the facility should be used, so that all personnel can be notified of hazard and accident situations, see also [Section 77 of the Activities Regulations](#). The central control room or the bridge should be given priority to send messages via the PA system,
- d) general alarm and evacuation alarm should be possible to trigger from the central control room and the command bridge, and the evacuation alarm should be possible to trigger from the radio room.

The requirement for two independent chains of notification as mentioned in the second subsection, means that the alternative chains of notification should be independent from the primary chain of notification as regards power supply and availability during hazard and accident situations, including being resistant against the design accidental loads/actions in a defined period of time. Permanent communication systems such as fibre optic cables, radio lines or satellite systems should be used if the position of the facility makes this possible. If two independent chains of notification through permanent communication connections cannot be realised, one of the permanent communication connections should be replaced by communication through the maritime mobile service.

### **Re Section 19 Communication equipment**

When selecting equipment as mentioned in the first subsection, temporarily and permanently manned facilities should be provided with the following equipment:

- a) two separate permanently installed maritime VHF radios with DSC,
- b) radio beacons for helicopter navigation,
- c) two separate permanently installed aeromobile VHF radios, as well as portable aeromobile VHF radios,
- d) one NAVTEX receiver, alternatively other accepted arrangements for reception of maritime safety information (MSI=Maritime Safety Information).

When selecting equipment as mentioned in the first subsection, **evacuation and rescue equipment** should be provided with the following equipment that is approved for such use in accordance with international and national standards:

- a) lifeboats: one permanently installed VHF radio and one RADAR-SART or AIS-SART,
- b) rafts: a necessary number of portable VHF radio sets and RADAR-SART or AIS-SART located so that they are easily accessible for bringing along in rafts, e.g. in escape chute containers,
- c) man overboard boats (MOB boats): watertight VHF that maintains communication under the conditions that the MOB boat is intended to operate under, and which does not prevent the crew from using both hands for manoeuvring the boat or to take part in rescue operations. A permanently installed VHF or an extra VHF.

Protection as mentioned in the second subsection, means, inter alia, that the equipment shall be located in such a manner that communication is not disrupted. The two maritime VHF radios with DSC should be located in separate rooms so that they cannot be made inoperable by a single incident. This also applies to the permanently installed aeromobile radios. VHF stations in lifeboats or MOB boats should be designed and located so that they can be used at the same time as the boats are manoeuvred with the engine at maximum revolutions.

With regard to the selection and design of communication equipment as mentioned in the first and second subsections, the [NORSOK U-100](#) standard, Chapter 7.14 should be used for **manned underwater operations**.

It follows from the rules and regulations of the Norwegian Post and Telecommunications Authority that any work on or modification of approved equipment is not allowed. If these rules are violated, the approval will cease.

## **CHAPTER IV DESIGN OF WORK AND COMMON AREAS**

### **Re Section 20 Ergonomic design**

In order to fulfil the requirements relating to design as mentioned in the first and second subsections, the following standards should be used: [NORSOK S-002](#), Chapters 5.2, 4.4.4, 4.4.5 and Appendices B and C and ISO 6385, with the following additions:

- a) there should be easy access for service, inspection, readings and maintenance,
- b) it should be possible to operate outdoor handles, switches, etc. while wearing gloves.

For workplaces in front of screens, see [Section 34 of the Activities Regulations](#). See also [Section 21](#).

The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002](#) for the areas covered by the norm.

### **Re Section 21 Human-machine interface and information presentation**

During design as mentioned in the first subsection, an analysis should be conducted of the human-machine interface, including necessary task and function analyses. The standards [NORSOK S-002](#) Chapter 4.4.5 and NS-EN 614 Part 2 should be used for such analyses. The NS-EN ISO 11064 standard should be used for design of the central control room. [NORSOK S-002](#) Chapter 5.2.2 should be used for requirements regarding human-machine interfaces.

In order to fulfil the requirement for information as mentioned in the second subsection, the standards EN 894 Part 1-3 and NS-EN 614 Part 1 should be used, with the following addition: the information should be suitably structured and consistent with regard to the use of colour, text and symbols.

The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002](#) for the areas covered by the norm.

For the design of alarm systems, refer to [Section 34a](#) on control and monitoring systems.

### **Re Section 22 Outdoor work areas**

In order to fulfil the requirement relating to weather protection as mentioned in the first subsection, the [NORSOK S-002](#) standard Chapters 4.4.9 and 5.8 should be used.

Risks as mentioned in the second subsection, may include accumulation of flammable gases, risk of increased explosion pressure and potential reduced access for firefighting.

With regard to new constructions and modifications, weather protection requirements should be specified at an early stage.

### **Re Section 23 Noise and acoustics**

In order to prevent noise that is harmful to hearing as mentioned in the first subsection, the [NORSOK S-002](#) standard Chapters 4.4.7, 5.5 and Appendices F and H should be used for the design of facilities, with the following addition: during planning, consideration should be given to the fact that the use of ear protection is not a means of fulfilling the noise requirements, cf. [Sections 38 and 42 of the Activities Regulations](#).

In order to fulfil the requirements regarding noise in the individual areas as mentioned in the second subsection, the [NORSOK S-002](#) standard Chapter 5.5 and Appendix A should be used, with the following additions:

- a) as a consequence of varying operational conditions and uncertainty in the measurements, etc., deviations of up to 3 dB(A) from the values specified in [NORSOK S-002](#) Chapter 5.5 and Appendix A are acceptable,
- b) Work in areas with the highest noise limit ( $L_{max} = 110$  dB(A)), cf. [NORSOK S-002](#) Chapter 5.5 and Appendix A, should only be permitted during brief inspections or work tasks which will be performed in an area that does not have through traffic to other areas. Provisions should be made for noise-

deflection of noisy equipment during maintenance or other work in the area, cf. [Section 33 of the Activities Regulations](#).

In order to fulfil the requirement relating to noise, the [NORSOK U-100](#) standard Chapter 5.2.2.6 should be used for manned underwater operations.

As regards requirements relating to acoustics as mentioned in the second subsection, the [NORSOK S-002](#) standard Chapter 5.3.3 should be used. With regard to sound insulation, the [NORSOK S-002](#) standard Chapter 5.5, Table 1 should be used.

The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002](#) for the areas covered by the norm.

#### **Re Section 24 Vibrations**

Regulations laid down by the Ministry of Labour 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013, contain further provisions on protection against mechanical vibrations. Clarification of the scope is directly evident from the individual regulations. In addition, reference is made to the [lawmirror](#) (in Norwegian only) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

In order to fulfil the requirements relating to vibrations, the [NORSOK S-002](#) standard Chapter 4.4.7, 5.5.5 and Appendices A and E should be used. For mobile facilities, this standard should be used for vibrations in the 5–80 Hz frequency range.

In order to assess the reaction of human beings to low-frequency vibrations, the NS 4931 standard should be used. The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002](#) for the areas covered by the norm.

#### **Re Section 25 Lighting**

Lighting can be artificial daylight, daylight or direct sunlight. The lighting should be particularly good and correct in the control room, cabins and other rooms where sight-intensive work takes place, where display screen equipment is used regularly and where the work requires good visibility during various weather conditions.

In order to fulfil the requirement relating to lighting, the [NORSOK S-002](#) standard Chapter 5.6, 4.4.8 and associated lighting values in Appendix A should be used for the individual rooms and areas on the facility. There should also be specific lighting if the general lighting is not adequate for readings, service and maintenance.

The Norwegian Shipowners' Association Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only) can be used as an alternative to [NORSOK S-002](#) for the areas covered by the norm.

#### **Re Section 26 Radiation**

Radiation as mentioned in the first subsection, means ionising and non-ionising radiation.

In order to fulfil the requirement relating to radiation as mentioned in the first subsection, the [NORSOK S-002](#) standard Chapters 5.9 and 5.10 should be used. See also [Section 37 of the Activities Regulations](#).

#### **Re Section 27 Personnel transport equipment**

Equipment as mentioned in the first subsection, includes personnel winches, personnel baskets and the like.

With regard to equipment that can be used for transport of personnel as mentioned in the first subsection, see also [Section 43 of the Activities Regulations](#), cf. [Section 92 of the Activities Regulations](#).

In order to fulfil the requirements regarding equipment as mentioned in the first subsection, the [NORSOK R-002](#) standard Appendix G should be used. There should be sufficient personnel winches to cover all drilling and well activities on the facility.

### **Re Section 28**

#### **Safety signs**

Regulations laid down by the Ministry of Labour 6 December 2011, pursuant to the Working Environment Act, and entering into force 1 January 2013, contain further provisions on safety signs and signalling. Clarification of the scope is directly evident from the individual regulations. In addition, reference is made to the [lawmirror \(in Norwegian only\)](#) of the Norwegian Labour Inspection Authority, in which the requirement of the regulations that are being repealed upon entering into force of the new regulations in pursuance of the Working Environment Act, are included.

For safety signs as referred to in the final subsection, the standards [NORSOK C-002](#) and NS 6033 can also be used.

## **CHAPTER V PHYSICAL BARRIERS**

### **Re Section 29**

#### **Passive fire protection**

For stipulation of fire loads/actions from design load/action fire as mentioned in the first subsection, see [Section 11](#).

Adequate fire resistance as mentioned in the first subsection, should be stipulated in relation to recognised standards or calculation models. When stipulating fire resistance for load-bearing structures, varying material utilisation can be taken into account.

To determine the fire resistance of a structure, the test methods in standards ISO 834, ISO 3008, ISO 3009 and NT Fire 021 should be used. To determine the ability of passive fire protection materials to withstand jet fires, the ISO 22899-1 standard Part 1 General requirements should be used.

In order to fulfil the requirements for loadbearing properties, integrity and insulation properties as mentioned in the first subsection, the [NORSOK S-001](#) standard Chapter 19 should be used, with the following addition: for gas and liquid-filled vessels and pipe sections, the passive fire protection should be sufficient to prevent rupture before depressurisation is carried out.

For mobile facilities that are not production facilities and that are registered in a national shipping register, DNV OS-A101 (2) Paragraph 2 and OS-D301 may be used as an alternative within the areas covered by the standards.

### **Re Section 30**

#### **Fire divisions**

For fire divisions in living quarters, see [Section 31](#).

For stipulation of design fire and explosion loads/actions as mentioned in the first and second subsections, see [Section 11](#).

The main fire divisions in closed areas should be able to withstand an explosion load of at least 70 kPa for 0.2 seconds. For other areas on the facility, the standard DNV OS-A101 Paragraph 2 D 600 should be used. Fire divisions with coated or sprayed-on fire protection material that does not fulfil the requirements for inflammability, may be used if an overall assessment indicates that this is prudent from a safety point of view, cf. [Section 12](#).

Fire divisions as mentioned in the second subsection, should satisfy fire class

- a) A-60 for control and emergency preparedness rooms, rooms for fire pump systems and rooms for emergency power source with associated distribution equipment and fuel tanks if these rooms are located in an area that cannot be exposed to hydrocarbon loads/actions. Fire class A-60 is the recommended solution for these rooms since the second subsection requires protection of technical barrier elements in the room. This means that the rooms should be specially protected against fire on

the outside of the room, and there should therefore be passive fire protection on the outside of the dividing section.

- b) A-0 for rooms for electrical equipment, fan rooms, rooms where flammable or easily ignited goods are stored and rooms for fire pumps that are located in pontoons and columns.

Special fire conditions may entail a need for fire divisions with higher fire resistance.

Examples of penetrations in fire divisions as mentioned in the last subsection, may include ventilation ducts, pipes, cables and beams, as well as windows and doors. The test methods in the following standards should be used for penetrations:

- a) ISO 3008 or NS 3907 for doors,
- b) ISO 3009 or NS 3908 for windows,
- c) IMO Resolution A.754 (18) for other types of penetrations such as ducts, pipes and cable penetrations.

Penetrations in main fire divisions and fire divisions with fire class H should be avoided to the extent possible.

For mobile facilities that are not production facilities and that are registered in a national ships' register, [DNV-OS-D301](#) Chapter 2, Paragraph 1 can be used as an alternative.

### **Re Section 31**

#### **Fire divisions in living quarters**

If the living quarters are located on a separate facility as mentioned in the first subsection litera c, external surfaces and distance to nearby facilities should nevertheless be such that a fire on these nearby facilities or in the surroundings (the sea) does not entail an unacceptable risk for personnel and functions in the living quarters.

In order to fulfil the requirement relating to interior design as mentioned in the second subsection, the [NORSOK S-001](#) standard Chapter 19.4.6 should be used.

### **Re Section 32**

#### **Fire and gas detection systems**

For design of the system as mentioned in the first subsection, the standards NS-EN ISO 13702 with Appendix B.6 and [NORSOK S-001](#) Chapters 12 and 13 should be used.

The requirement for independence as mentioned in the first subsection, entails that the fire and gas detection system comes in addition to systems for management and control and other safety systems. The fire and gas detection system may have an interface with other systems as long as it cannot be adversely affected as a consequence of system failures, failures or isolated incidents in these systems.

The requirement regarding limiting the consequences as mentioned in the second subsection, entails that relevant safety functions are activated, see [Sections 33, 36 and 37](#).

Facilities that are not permanently manned, should also have a dedicated gas detection function for the area around and on the helicopter deck. Detection of gas should be shown by means of a light signal that is visible at a safe distance from the facility.

For mobile facilities that are not production facilities, and that are registered in a national ships' register, [DNV-OS-D301](#) Chapter 2, Paragraph 4 can be used as an alternative.

### **Re Section 33**

#### **Emergency shutdown system**

When designing the emergency shutdown system, the standards NS-EN ISO 13702 Chapters 6 and 7 and Appendices B.2 and B.3 and [NORSOK S-001](#) Chapter 10 should be used.

The requirement for independence as mentioned in the first subsection, entails that the emergency shutdown system comes in addition to systems for management and control and other safety systems. The emergency shutdown system may have an interface with other systems if it cannot be adversely affected as a consequence of system failures, errors or isolated incidents in these systems.

An unambiguous command structure as mentioned in the second subsection, means that the flow of signals and command hierarchy are clearly stated. The requirement to be able to activate functions manually in the event of failure in the programmable parts of the system as mentioned in the second subsection, entails



that the activation of the functions shall be functionally designed and be physically different from the programmable parts of the system.

The requirement related to stopping and isolation as mentioned in the third subsection, means that the following valves normally will be emergency shutdown valves:

- a) subsurface safety valves
- b) wing valves and automatic master valves for production or injection wells,
- c) valves on the christmas tree in connection with chemical injection or gas lifting,
- d) sectioning valves in the processing plant,
- e) isolation valves against pipeline systems.

The number and location of sectioning valves in the processing plant should be determined on the basis of the fire and explosion strategy, cf. [Section 5](#).

For mobile facilities that are not production facilities, and that are registered in a national ships' register, [DNV-OS-A101](#) Paragraph 5 can be used as an alternative.

## **Re Section 34**

### **Process safety system**

The requirement for independence as mentioned in the first subsection, entails that the process safety system is in addition to systems for management and control and other safety systems. The process safety system can have an interface with other systems if it is not adversely affected as a consequence of system failures, errors or isolated incidents in these systems.

The ISO 10418 standard, in combination with [NORSOK P-001](#) and [NORSOK P-100](#), should be used for design of process safety systems. Auxiliary facilities containing flammable fluids should also be secured in accordance with the methods described in these standards. Overpressure protection should be designed in accordance with API RP 520/NS-EN ISO 4126 and API 521/NS-EN ISO 23251.

The requirement for two independent safety levels as mentioned in the third subsection, entails that the process safety levels shall be protected against dependent errors, so that an isolated error does not lead to the failure of both safety levels.

## **Re Section 34a**

### **Control and monitoring system**

Control and monitoring systems may be interfaced with other systems, but it should be ensured that this does not weaken the system. In addition, [Norwegian Oil and Gas' Guideline No. 104](#) should be used as a basis for protecting against ICT-related hazards.

Alarms should be defined and designed such that

- a) the alarms that are presented are relevant, easy to register and understand, and clearly show where any nonconformities and hazardous situations have arisen,
- b) the alarms are coded, categorised and assigned priority based on the safety significance of the alarms and how quickly measures must be taken to avoid undesirable consequences,
- c) the alarm systems allow for suppressing and reducing alarms, so as to avoid mental stress for control room personnel during interruptions in operations and accident incidents.

With regard to the design of the alarm systems, the principles of the Norwegian Petroleum Directorate's (now the Petroleum Safety Authority Norway's) [publication YA-710 \(English edition YA-711\)](#) should be applied.

## **Re Section 35**

### **Gas release system**

The requirement regarding the gas release system as mentioned in the first subsection, entails that gases that are flammable or harmful to health shall be routed to a safe emission site, and that any potential heat load/action shall be calculated, cf. [Section 11](#).

In order to fulfil the requirement regarding the gas release system as mentioned in the first subsection, the standards NS-EN ISO 13702 Chapter 6 and Appendix B.2, ISO 23251, [NORSOK S-001](#), Chapter 11 and [P-100](#) Chapter 16 should be used, with the following additions:

- a) rapid depressurisation should be selected rather than passive fire protection. For fire loads/actions, reference is made to [Section 11](#),
- b) when designing gas release systems, external environment considerations should be safeguarded by preferably flaring flammable, toxic or corrosive gases.

In addition to manual activation as mentioned in the second subsection, activation signals may also come from relevant safety systems such as the emergency shutdown system.

In order to secure liquid separators against overfilling as mentioned in the third subsection, the production should be shut down in the event of a high liquid level.

### **Re Section 36 Firewater supply**

Sufficient capacity as mentioned in the second subsection, means the capacity necessary to supply all firefighting equipment in the facility's largest fire area plus the largest of the adjacent areas. A pump start-up failure does not need to be used as a basis for capacity calculations for the largest fire area plus the largest adjacent area at the same time as a pump is out of operation for a short period (less than 24 hours). On simpler facilities without accommodation, the supply can come from a dedicated water reservoir, from seawater pumps or other available water supply.

In order to fulfil the other requirements as mentioned in this section, the standard [NORSOK S-001](#) Chapter 20 should be used, with the following addition: for hydraulic calculations, a recognised method shall be used.

For mobile facilities that are not production facilities, and that are registered in a national ships' register, [DNV-OS-A301](#) Chapter 2, Paragraphs 3, 6 and 7 can be used as an alternative.

Chemicals added to firewater shall be tested and assessed as mentioned in [Section 62 of the Activities Regulations](#).

### **Re Section 37 Fixed fire-fighting systems**

In order to fulfil the requirement for fixed systems as mentioned in the first subsection, the standards NS-EN ISO 13702 Chapter 11 and Appendix B.8 and [NORSOK S-001](#) Chapter 20 should be used, with the following additions:

- a) the systems should be designed so that capacity and extinguishants, as well as location and selection of nozzles, provide effective fighting of defined fires. The risk represented by other potential fires should be reduced to the greatest extent possible,
- b) the requirement for rapid and efficient fire-fighting as mentioned in the first subsection, makes it difficult to use CO<sub>2</sub> as an extinguishant in rooms where personnel may be located,
- c) in areas where there may be strong winds, this should be taken into account when placing nozzles and in relation to the need for increased capacity,
- d) a water mist system may be installed if realistic tests have been conducted showing that the system fulfils its intended function,
- e) when locating nozzles for the extinguishant in engine rooms for diesel engines, particular consideration should be given to pumps and pipes in the fuel unit, and separate spot protection should be installed, if applicable,
- f) when choosing among equivalent fire solutions, choose the solution that uses the least environmentally harmful extinguishant, cf. Section 3a of the [Product Control Act \(in Norwegian only\)](#).
- g) for chambers in diving facilities, the requirement regarding efficient firefighting entails that it shall be possible to activate internal extinguishing equipment both from the outside and the inside. The firefighting equipment for the diving facility should cover the entire facility, and have capacity to also put out fires that may arise inside the chambers. The firefighting equipment should also have the capability of cooling down the chamber facility and gas storage area, as well as cover other areas that shall be manned in order to evacuate divers.

In order to fulfil the requirement regarding activation of the systems as mentioned in the second subsection, the [NORSOK S-001](#) standard, especially Chapter 20, should be used.

For mobile facilities that are not production facilities and that are registered in a national ships' register, DNV OS-D301 Chapter 2, Paragraphs 3, 4, 7 and 8 may be used as an alternative within the area covered by the standard.

### **Re Section 38**

#### **Emergency power and emergency lighting**

To fulfil the requirement regarding emergency power as mentioned in the first through third subsections, the standards NS-EN ISO 13702 Chapter 9 and Appendix C.1, [NORSOK S-001](#) Chapter 18 and IMO 2009 MODU CODE Chapter 5 should be used, with the following addition: emergency power consumers should be limited to equipment that contributes to maintaining the facility's integrity in an emergency situation. The [NORSOK R-002](#) standard Chapter 5.15 should be used for lifting equipment.

For design of emergency lighting as mentioned in the last subsection, the EN 1838 standard should be used. There should be emergency lighting in those areas where personnel can be located in a hazard and accident situation. The emergency lighting should contribute to ensure evacuation on and from the facility, and indicate the location of manual firefighting equipment and other safety equipment. The emergency lighting should be connected to the emergency power system or have its own battery as a power source.

### **Re Section 39**

#### **Ballast system**

No comments.

### **Re Section 40**

#### **Open drainage systems**

Open drainage systems as mentioned in the first paragraph means systems that collect liquid, but are not pressurised.

The discharge point for drainage water should be located such that potential discharges as mentioned in the second subsection have the least possible impact on the marine environment, and such that discharges are not a nuisance to personnel on vessels near the facilities.

As regards the design of open drainage systems, the following standards should be used in the area of health, working environment and safety: NS-EN ISO 13702 Chapter 8 and Appendix B.4, [NORSOK S-001](#) Chapter 8 and [P-100](#) Chapter 23. In addition, [NORSOK S-001](#) Chapter 23 should be used for mobile facilities.

## **CHAPTER VI EMERGENCY PREPAREDNESS**

### **Re Section 41**

#### **Equipment for rescue of personnel**

In order for the facility to have equipment available at all times as mentioned in the first subsection, there should be two independent man overboard boat systems (MOB boat systems), cf. [Section 5](#) litera c. The boat systems can be located on the facility, on the standby vessel or with one system on each of these.

### **Re Section 41a**

#### **Evacuation and rescue equipment for manned underwater operations**

In order to fulfil the diving facilities requirements referred to in the second subsection, Chapter 9-3 of the [NORSOK U-100N](#) standard should be used.

In order to fulfil the design requirements of hyperbaric evacuation units referred to in the fifth subsection, the [NORSOK U-100N](#) standard should be used, with the following addition: hyperbaric evacuation units should be able to be lifted out of the water using a single attachment point.

In order to achieve the necessary safety level for evacuation at sea using hyperbaric evacuation equipment, it is important to safeguard the following:

- a) the safety of personnel
- b) structural integrity (structural safety)
- c) sufficient propulsive and manoeuvring ability after launch
- d) qualification, trials and testing, with reference to [Section 9](#) of the present regulations and [Section 19 of the Framework Regulations](#).

For the design of flange connections, IMCA D 051 Hyperbaric Evacuation Systems (HES) Interface Recommendations should be used.

## **Section 42**

### **Materials for action against acute pollution**

Materials for action against acute pollution as mentioned in the first, second and third subsections should be functional, robust, flexible and adapted in order to function effectively under prevailing weather, wind and current conditions in the entire area influenced by the pollution.

Realistic conditions as mentioned in the third subsection, means that variable parameters, such as weather, wind and current conditions and changes in the physical and chemical properties of the pollution over time should be selected so they are representative of the conditions that the material will operate under.

It should be possible to store the materials in such a way that they can be mobilised at any given time in accordance with the emergency preparedness plan. It should be possible to incorporate the materials in a system for coordinated action against acute pollution.

## **Re Section 43**

### **Emergency preparedness vessels**

Emergency preparedness vessel means both vessels that have emergency response functions as their primary task and other vessels that will be used, inter alia, for search and rescue, monitoring safety zones or actions against acute pollution.

Emergency response functions can include

- a) monitoring and management of operations,
- b) handling of oil booms and skimmers,
- c) handling of dispersion equipment,
- d) loading and unloading of recovered oil,
- e) operation in areas where there is a risk of explosion and fire.

Aircraft that are to be used in actions against acute pollution, should be designed so that they can be used to carry out dispersion measures and so that they can contribute to monitoring pollution and directing seagoing vessels that take part in the action.

Emergency preparedness vessels that have specific tasks in relation to the facilities should fulfil the technical requirements in the Norwegian Maritime Authority's [Regulations relating to emergency preparedness vessels](#).

## **Re Section 44**

### **Means of evacuation**

To fulfil the requirements for evacuation and means of evacuation as mentioned in the first, second and third subsections, the [NORSOK S-001](#) standard Chapter 21 should be used, with the exception of the reference to SOLAS and national maritime requirements in 21.4.3.

Major modifications or changes in the prerequisites for use for the facility may entail that lifeboats and escape chutes as mentioned in the third subsection, shall be installed.

[DNV-OS-E406](#) should be used in the design of free-fall lifeboats.

Dimensioning of hulls and superstructures on lifeboats should be based on control of the limit states as given in ISO 19900, [DNV-OS-C101](#) or [NORSOK N-001](#).

**Re Section 45**  
**Rescue suits and life jackets, etc.**

No comments.

**Re Section 46**  
**Manual fire-fighting and firefighters' equipment**

In order to fulfil the requirements for manual firefighting and firefighters' equipment, the standards NS-EN ISO 13702 Appendix B.8.12 and [NORSOK S-001](#) Chapter 20.4.7 and 8 should be used. In order to fulfil the requirements for firefighters' equipment, the [NORSOK S-001](#) standard Chapter 22.4.2.6 should be used.

**CHAPTER VII**  
**ELECTRICAL INSTALLATIONS**

**Re Section 47**  
**Electrical installations**

When designing electrical installations, consideration should be given to the output needs, distribution system, earthing system, protection against interruption and adequate selectivity between protections in the event of errors in the installation.

The requirement for protection against electric shock during normal operation as mentioned in litera a, entails that personnel shall not be accidentally exposed to current flow, or the current shall be limited to a non-hazardous level.

The requirement relating to protection against electric shock in the event of errors as mentioned in litera b, entails that quick, automatic disconnection of the power supply shall be provided when a failure arises that can lead to a dangerous flow of current for personnel that unintentionally come into contact with exposed parts of the installation.

The requirement relating to protection against thermal effects as mentioned in litera b, entails that suitable protection shall be used to guard against abnormal heat development, arcing and fire in the installation.

The requirement relating to protection against overcurrent as mentioned in litera c, including protection against overloads and short circuits, entails that provision shall be made for automatic and selective disconnection of consumers that cause such overcurrent before it reaches a dangerous level, or that the overcurrent is limited in some other way so that it does not represent a danger.

The requirement relating to protection against fault currents as mentioned in litera d, entails that other conductors than live conductors and any other part that is intended to lead a fault current resulting from isolation failure or error, shall be able to conduct this fault current without reaching too high a temperature. Particular consideration should be given to the installation's potential earth fault currents and leakage currents.

The requirement relating to protection against overvoltage as mentioned in litera e, means that suitable protection shall be used to safeguard against hazard and accident incidents resulting from surge caused by isolation failure, faults in voltage regulators or faults between electric circuits with varying voltage, changes in load associated with connecting and disconnecting switches, earth faults and atmospheric overvoltage.

The requirement to protection against undervoltage as mentioned in litera f, means that measures shall be implemented against danger or injury resulting from the voltage returning after a full or partial cut. If such reconnection can entail a hazard, the reconnection should not take place automatically.

The requirement relating to protection against variations in voltage and frequency as mentioned in litera g, entails that the power supply shall be of such a dimension that the voltage and frequency under normal conditions lie within the tolerance limits that the installation and connected equipment are intended for.

The requirement relating to protection against power supply failure as mentioned in litera h, entails that measures shall be implemented to ensure satisfactory and reliable power supply, cf. [Section 38](#).

The requirement relating to protection against ignition of explosive gas atmosphere as mentioned in litera i, entails that electrical equipment shall be located in unclassified areas insofar as practicable. For requirements related to area classification and plants, systems and equipment for use in areas with explosion hazard, see [Sections 5](#) and [10](#).

The requirement relating to electromagnetic interference as mentioned in litera j, entails that electrical installations and equipment shall function in a satisfactory manner in their electromagnetic environment without causing unacceptable electromagnetic interference for other equipment in this environment. As regards requirements related to electrical equipment, see [Sections 77 and 78](#).

Protection against health injury as a result of electromagnetic fields as mentioned in litera k, is in particular regulated in the [Section 26 of the Radiation Protection Regulations \(in Norwegian only\)](#).

For the design of electrical installations, the IEC 61892 series, including corrigendum 1 to IEC 61892-2 (2012), should be used. In those cases where the IEC 61892 series is not applicable, relevant parts of the IEC 60092 series and [Regulations relating to electrical power installations \(in Norwegian only\)](#) should be used.

For electrical installations on mobile facilities that are not production facilities and that are registered in a national ships' register, the DNV OS-D201 standard may be used as an alternative.

## **CHAPTER VIII DRILLING AND WELL SYSTEMS**

### **Re Section 48 Well barriers**

The well's life span as mentioned in the first subsection, means time in use and time subsequent to permanent plugging and abandonment.

In order to fulfil the requirement regarding well barriers, the [NORSOK D-010](#) standard Chapters 4, 5, 9 and 15 should be used in the area of health, working environment and safety. See also [Section 5 of the Management Regulations](#) and [Section 8 of these regulations](#).

The requirements in the first subsection also entail that the barriers shall be designed so that unintended outflow of injected material is prevented.

The requirement referred to the second subsection means that it should be assessed whether to insert casings for drilling in zones which may contain hydrocarbons. Robust well design and the potential for regaining well control in the event of an uncontrolled blowout should be given special assessment.

Verification of the performance of well barriers as mentioned in the final subsection, can be based on pressure testing, testing of accessibility, response time and leakage rates, as well as observation of physical properties.

The requirement regarding sufficient independence among the barriers as mentioned in [Section 4 of the Management Regulations](#), entails that well barriers shall be independent, without common well barrier elements, also when the barriers have a common outflow source. One of the barriers may be drilling and well fluids.

With regard to the requirement for dimensioning of binding agents, plugs and seals, particularly in relation to the reduction in strength that can arise over time, see [Section 11](#).

### **Re Section 49 Well control equipment**

In order to fulfil the requirement relating to design of well control equipment as mentioned in the first subsection, the [NORSOK D-001](#) standard Chapters 5 and 6 should be used.

In order to fulfil the requirement relating to equipment as mentioned in the first subsection, second sentence, the [NORSOK D-010](#) standard Chapter 5.7.2 and [NORSOK D-001](#) Chapters 5 and 6 and Appendices A, B and C should be used for diverter lines, with the following addition: for dynamically positioned facilities that drill top hole sections, a straight pipeline can be used, but without valve outlets and with an inner diameter of at least 400 mm (16").

In the event of well interventions as mentioned in the third subsection, including cable, coiled tubing and snubbing activities through the christmas tree, drill pipe or casing that has not been set, the [NORSOK D-002](#) standard should be used.

An alternative system for activation as mentioned in the fourth subsection, means a system that is acoustically operated, ROV-operated or remote-controlled in some other way.

The shear ram should have the capacity to cut the work string, with the exception of collars and bottomhole string components. All outlets for the blowout preventer's circulation lines should be equipped with two closing arrangements as close to the outlet as possible.

For mobile facilities that are registered in a national ships' register, DNV OS-E101 Chapter 2, Paragraph 5, C 100-500 may be used as an alternative to [NORSOK D-001](#).

### **Re Section 50**

#### **Compensator and disconnection systems**

To fulfil the requirement for compensator and disconnection systems as mentioned in the first and second subsections, the [NORSOK D-001](#) standard Chapters 5 and 6 should be used, with the following additions:

- a) it should be possible to move anchored drilling facilities quickly off the drilling location in case of a critical situation,
- b) for interventions on seabed wells with high pressure risers, the valve and disconnection system should consist of
  - a) a remote-operated valve located under the release point, which cuts all objects that penetrate the well barriers and maintains full working pressure after cutting,
  - b) a remote-operated main valve that closes after the cutting is completed,
  - c) a block valve over the release point which prevents blowout from the riser to the sea,
  - d) a vent valve that releases shut-in pressure between the casing ram and the shear ram or block valve prior to release.

For requirements relating to specific analyses to detect accident and hazard situations, reference is made to [Section 17 of the Management Regulations](#). For general requirements related to dimensioning of compensator and disconnection systems as regards loads/actions, see [Section 11](#). The following should be taken into account when stipulating limitations for drilling equipment:

- a) movements of the facility as a result of resonance between the wave frequency and the frequency of the facility itself,
- b) movement of the facility as a result of loss of position because of anchor line breakage or drift,
- c) loads/actions on well and wellhead from pull in riser,
- d) margin due to uncertainty in calculated riser design,
- e) unintended locking of compensator.

For mobile facilities that are registered in a national ships' register, DNV OS-E101 Chapter 2, Paragraph 5, D 100-300 may be used as an alternative.

### **Re Section 51**

#### **Drilling fluid system**

Drilling fluid systems mean complete systems with sufficient capacity to mix, store, pump, recondition and cover the need for a fluid-based well barrier. The drilling fluid system area should be designed to avoid harmful exposure for personnel and the environment. The system should be connected to monitoring systems to ascertain the condition of the fluid, system and well.

The system should be adapted to normal operations and emergency situations.

For general requirements related to design of chemical plants, see [Section 15](#).

In order to fulfil the requirement relating to drilling fluid systems, the [NORSOK D-001](#) standard Chapters 5 and 6 should be used in the area of health, working environment and safety, with the following additions:

- a) return of the drilling fluid from the well should take place in a closed system to avoid evaporation,
- b) the system for monitoring drilling fluid volume should compensate for the facility's movements and should include indicators on the drill floor with audio and visual alarms. When drilling wells with high pressure and high temperature, the need for temperature and pressure sensors in critical locations such as before and after the choke manifold and in the blowout preventer, should be assessed. For general requirements related to drilling fluid parameter monitoring instruments, see [Section 17](#),
- c) gases from the reconditioning unit should be vented through separate pipes to a safe area.

For general requirements related to barriers, see the [Section 5 of the Management Regulations](#) and [Section 8 of these regulations](#).

For mobile facilities that are registered in a national ships' register, DNV OS-E101 Chapter 2, Paragraph 5, G 100-400 may be used as an alternative.

### **Re Section 52 Cementing unit**

For general requirements related to design of chemical plants, see [Section 15](#). In order to fulfil the requirement regarding cementing units, the [NORSOK D-001](#) standard Chapters 5 and 6 and Appendices A, B and C should be used in the area of health, working environment and safety, with the following additions: the cementing unit and the cementing head should be designed for remote operation.

For mobile facilities that are registered in a national ships' register, DNV OS-E101 Chapter 2, Paragraph 5, G 400 may be used as an alternative.

### **Re Section 53 Equipment for completion and well flow**

In order to fulfil requirements relating to equipment for completion and testing of wells, the [NORSOK D-010](#) standard Chapters 6, 7, 8, 14 and 15 and [D-007](#) should be used in the area of health, working environment and safety.

Design to handle controlled well flow as mentioned in the first subsection, means

- a) equipment used for production and injection of gas, fluids and solids,
- b) need for equipment in case of changes in preconditions, for instance, failure of barrier elements,

The equipment should be designed for well intervention, workover and plugging of wells and for collection of well data of significance to safety.

Well testing as mentioned in the third subsection, means flow during formation testing, test production, cleanup and stimulation of the well.

See the [Resource Management Regulations \(in Norwegian only\)](#) on formation strength testing.

For mobile facilities that are registered in a national ships' register, DNV OS-E101 Chapter 2, Paragraph 5, H 100-200 may be used as an alternative.

### **Re Section 54 Christmas tree and wellhead**

The equipment as mentioned in the first subsection, also encompasses casing hangers and annular preventers. To fulfil the requirements in the section, the standards [NORSOK D-010](#) Chapters 8 and 15, [NORSOK U-001](#), ISO 10423 and ISO 13628 should be used, with the following additions:

- a) annulus should have pressure monitoring,
- b) the main valves as mentioned in the second subsection, should be integrated in, or mounted directly on, the christmas tree. It should be possible to close inlets and outlets in the christmas tree that can be subjected to well pressure in at least two independent ways. Injection points should have check valves as close to the injection point as possible,
- c) it should be possible to isolate wellhead christmas trees to avoid unintended closing of valves during well intervention,
- d) the closing time for valves in the main barrel and side outlets of the seabed christmas trees should be assessed in relation to the barrier function of the valves. This evaluation should include necessary closing time in relation to the risk-reducing function and the location of the valve.

For general requirements relating to barriers, see [Section 5 of the Management Regulations](#). See also [Sections 8 and 33 of these regulations](#) and [Section 47 of the Activities Regulations](#).



## CHAPTER IX PRODUCTION PLANTS

### Re Section 55 Production facility

For design of production facilities as mentioned in the first subsection, the standards [NORSOK P-100](#), [L-001](#) and [L-002](#) should be used in the area of health, working environment and safety.

In cases involving subsea production facilities, the standards [NORSOK U-001](#) and ISO 13628 should be used in the area health, working environment and safety.

For subsea production facilities, the pollution requirement as mentioned in the first subsection, means that the responsible party shall evaluate whether hydraulic fluids, well fluids and other chemicals shall be routed back to the surface or to a local storage tank.

The requirement relating to design as mentioned in the first subsection, shall be seen in the context of [Chapter II of the Framework Regulations](#).

For general requirements related to design of chemical plants, see [Section 15](#).

For protection of subsea production facilities against mechanical damage, see [Section 45 of the Framework Regulations](#).

For general requirements related to design, see [Sections 5 and 10](#).

## CHAPTER X LOAD-BEARING STRUCTURES AND PIPELINE SYSTEMS

### Re Section 56 Load-bearing structures and maritime systems

The standard [NORSOK N-001](#) should be used to fulfil the requirements.

For verification of load-bearing structures as mentioned in the first subsection, the [NORSOK N-001](#) standard Chapter 5.2 should be used.

Location-specific analyses of mobile jack-up facilities should be carried out in accordance with [DNV-OS-C104](#).

As regards water breakthrough in floating facilities, see [Sections 39 and 62](#). For general provisions, see [Sections 5 and 7](#).

For design of tension legs the standards [NORSOK N-001](#) and [N-004 Annex N](#) should be used.

It should also be assessed whether firefighting water from the facility's sprinkler system or from a vessel may produce unintended changes to weight or stability.

### Re Section 57 Pipeline systems

It should be possible to take a reading of the pressure in the launchers and receivers as mentioned in the second subsection, both before startup and during operation.

In order to fulfil the requirement for safety level as mentioned in the third subsection, the failure probabilities in the standards [DNV OS-F101](#) and [OS-F201](#), Paragraph 2, Table 2-5, should be used.

For general requirements related to design, see [Sections 5, 10, 12 and 15](#).

## CHAPTER XI LIVING QUARTERS

### Re Section 58 Living quarters

In order to fulfil the requirements relating to living quarters as mentioned in the first subsection, the standards [NORSOK C-001](#), [C-002](#), [S-001](#) and [S-002](#) should be used with the following additions:

- a) the capacity requirement as mentioned in the first subsection, means that the living quarters shall be dimensioned with sufficient margins to avoid bed scarcity during peak manning levels and so that there is no need for two persons to share an individual cabin unless the conditions in [Section 19 of the Activities Regulations](#) concerning accommodation and cabin sharing are fulfilled,
- b) the living quarters should be designed so that personnel can sleep undisturbed and be assured of satisfactory restitution.

For mobile facilities that are registered in a national ships' register, [Sections 6, 7, 8, 12, 13, 14, 15, 17 and 18 of the Norwegian Maritime Authority's Regulations relating to construction and setup of the living quarters on mobile facilities](#) can be used as alternatives to the standards [NORSOK C-001](#) and [C-002](#) in the areas covered by the Norwegian Maritime Authority's regulations, with the following addition:

- a) the additions mentioned in the first paragraph,
- b) bunk beds should be replaced by beds on the floor, cf. [Section 20](#).

The requirements as mentioned in the first subsection, also apply to simpler facilities with accommodation, but consideration can be given to whether

- a) the dining hall should be included in the total recreation area,
- b) adaptation of kitchen and washing-up areas should be in proportion to the need on the facility,
- c) the laundry room can be omitted,
- d) the dedicated health department can be omitted.

If a dedicated health department is omitted, there should be adequate area and equipment on the facility to cover the need for first aid until the helicopter arrives.

The standard of hygiene as mentioned in the second subsection, should particularly be maintained in cabins, day rooms, the health department and areas where food is stored, prepared and served, cf. [Section 61](#) and [Section 14 of the Activities Regulations](#).

For facilities where no permanent manning is planned, consideration should be given to whether living quarters or emergency quarters should be built. These evaluations should at least include

- a) anticipated scope of work and work organisation,
- b) risk related to transport and stay on the facility,
- c) working environment aspects,
- d) need for restitution and rest,
- e) hygienic conditions.

### **Re Section 59 Health department**

If facilities are connected by gangways, the requirement as mentioned in the first subsection, entails that at least one of the facilities shall have a health department.

In order to fulfil the health department requirements as mentioned in the first subsection, the [NORSOK standard C-001](#) Chapter 7.17 should be used with the following addition: the health department should be located with the least possible exposure to noise and vibrations, and such that stretcher transport to the health department of sick or injured personnel can be accomplished in a prudent manner. For mobile facilities that are registered in a national ships' register, [Section 16 of the Norwegian Maritime Authority's regulations relating to construction and outfitting of the living quarters on mobile facilities](#) may be used as an alternative to the [NORSOK standard C-001](#), with the same additions as mentioned in the second subsection.

The health department's equipment should be assessed on the basis of the defined accident and hazard situations as mentioned in [Section 17 of the Management Regulations](#).

Equipment as mentioned in the second subsection, includes medication and first aid equipment, stretchers and medical rescue equipment.

### **Re Section 60 Emergency sickbay**

The emergency unit will normally be a room that has another primary function, but that can quickly be converted into an emergency sickbay if necessary.

In order to fulfil the requirements relating to the emergency sickbay, the [NORSOK standard C-001](#) Chapter 7.17 should be used.

**Re Section 61**  
**Supply of food and drinking water**

The requirement regarding design as mentioned in the second subsection, entails that technical solutions for food and drinking water supply shall satisfy the provisions in the Food Regulations, as well as the [Regulations relating to water supply and drinking water \(in Norwegian only\)](#). In addition, the technical solutions should be based on recognised methods to the extent possible.

Reference is also made to [Section 13 of the Activities Regulations](#).

Furthermore, reference is made to [NORSOK P-100](#) Chapter 22. The Norwegian Institute of Public Health's guideline material for design and operation of drinking water systems details the regulatory requirements for drinking water systems and drinking water supply offshore. The guideline material is available in Norwegian and English at [www.fhi.no/offshore](http://www.fhi.no/offshore).

Following delegation of authority from the Norwegian Food Safety Authority, the County Governor of Rogaland supervises compliance with the provision relating to food, water supply and drinking water in the petroleum activities.

**CHAPTER XII**  
**MARITIME FACILITIES**

**Re Section 62**  
**Stability**

For design of facilities as regards stability, the [NORSOK N-001](#) standard Chapter 7.10 should be used. For requirements regarding the design of ballast systems, see [Section 39](#).

**Re Section 63**  
**Anchoring, mooring and positioning**

Tension legs are load-bearing structures comprised by [Section 56](#).

For design of anchoring systems, the [NORSOK N-001](#) standard Chapters 7.11 and 7.12 should be used.

For general requirements related to loads/actions, load/action effects and resistance, see [Section 11](#).

For design of dynamic positioning systems as mentioned in the last subsection, the technical provisions in the IMO MSC/Circular 645 standard should be used.

For requirements related to disconnection of risers, see [Section 50](#).

**Re Section 64**  
**Turrets**

For design of turrets, the [NORSOK S-001](#) standard Chapter 5.8.2.2 should be used in addition.

**CHAPTER XIII**  
**DIVING FACILITIES**

**Re Section 65**  
**Facilities and equipment for manned underwater operations**

For design of plants and equipment for manned underwater operations on vessels, see [Section 1](#).

For general requirements related to design of plants, systems and equipment for manned underwater operations, see [Section 10](#).

## **CHAPTER XIV ADDITIONAL PROVISIONS**

### **Re Section 66**

#### **Loading and offloading systems**

Hose connections in loading and unloading facilities should be of the quick-release, self-closing type in the event of overloads.

Loading hoses for loading and unloading from supply vessels should be equipped with floats.

In order to fulfil the requirement relating to design of loading and unloading facilities on floating production, storage and offloading facilities (FPSOs) and floating storage units (FSUs), [DNV-OS-E201 Chapter 2 Section 12](#), and [Sections 21 through 28, 30 through 32 and 34 through 36 of the Norwegian Maritime Authority's Regulations relating to mobile offshore facilities with production technical plants and equipment](#) should be used.

The design of the stern on FPSOs and FSUs should conform to the [NORSOK N-001](#) standard.

### **Re Section 67**

#### **Waste**

No comments.

### **Re Section 68**

#### **Exhaust ducts**

In order to fulfil the requirement for exhaust ducts as mentioned in the first subsection, the [NORSOK S-001](#) standard should be used with the following additions:

- a) exhaust ducts should be designed so that the exhaust gases are routed to unclassified areas,
- b) if water-cooled spark catchers are used, a signal should sound in the central control room in the event of a failure in the water supply.

With regard to exhaust ducts from reconditioning plants in drilling fluid systems, see [Section 51](#).

### **Re Section 69**

#### **Lifting appliances and lifting gear**

For the design and selection of lifting appliances and lifting gear for use on permanent positioned and mobile facilities [NORSOK R-002](#) standard should be used.

With regard to evaluation of the technical condition of cranes on mobile facilities built before 2007, reference is made to the Norwegian Shipowners' Association's Guidelines for implementation of EN 13852-1 on existing offshore cranes on mobile offshore units.

In order to fulfil the requirement regarding remote operation as mentioned in the third subsection, the [NORSOK D-001](#) standard Chapters 5 and 6 and [Norwegian Oil and Gas' Guideline No. 081](#) should be used, with the following addition: lifting equipment should have independent safety features and be suspended and stored in such a way that the equipment is secure in the event of heeling, and that the danger of falling objects is limited.

Snubbing units as mentioned in the last subsection, means mobile units that are installed so that forces are transferred directly to the wellhead. For snubbing units, the requirement will be made applicable to the extent that equipment to be used with such units, has been developed and tested.

For lifting appliances and lifting gear on the drill floor, Annex D of the [NORSOK R-002](#) standard should be used.

### **Re Section 70**

#### **Helicopter deck**

In order to fulfil the requirement relating to helicopter decks as mentioned in the first subsection, the [NORSOK C-004](#) standard, with exception of Chapter 14 on the minimum size of helicopter decks, may be used as an addition to the requirements in the regulations of the Civil Aviation Authority.

The standard [NORSOK S-001](#) Chapter 20.4.9 should be used in the design of helicopter decks, with exception of the specified response time for extinguishing agent and with the following addition:

for facilities with particular problems related to take-off and landing, such problems should be taken into account when designing and placing the helicopter deck.

**Re Section 71**  
**Marking of facilities**

In agreement with the Norwegian Coastal Administration, the following provisions shall be used for marking of facilities as mentioned in the first subsection: IALA Recommendation on the marking of man-made offshore structures (IALA Recommendation O-139 December 2008), as long as it serves its purpose.

For requirements relating to marking of mobile facilities that are registered in a national ships' register, reference is made to [Section 1 of the Framework Regulations](#) relating to application of maritime legislation in the offshore petroleum activities.

**Re Section 72**  
**Marking of equipment and cargo**

No comments.

**Re Section 73**  
**Lifts**

In order to fulfil the requirement relating to lifts, the [NORSOK R-002](#) standard Appendix E should be used.

**CHAPTER XV**  
**IMPLEMENTATION OF EEA REGULATIONS**

**Re Section 74**  
**Simple pressure vessels**

This section continues the previous incorporation in the petroleum activities of Council Directive 87/404/EEC relating to simple pressure vessels.

**Re Section 75**  
**Personal protective equipment**

This section continues the previous incorporation in the petroleum activities of Council Directive 89/686/EEC relating to personal protective equipment. In addition, the changes made in Council Directive 93/95/EEC, have been incorporated.

When lifting personnel by means of load carriers, the [NORSOK R-002](#) standard Appendix C 18 should be used.

**Re Section 76**  
**Aerosol containers**

This section continues the previous incorporation in the petroleum activities of Council Directive 75/364/EEC relating to aerosols, as well as the adopted changes in Commission Directive 94/1/EEC.

**Re Section 77**  
**EMC**

This section continues the previous incorporation in the petroleum activities of Council Directive 89/336/EEC and Council Directive 92/31/EEC (electromagnetic compatibility – EMC).

## **Re Section 78**

### **ATEX**

This section continues the previous incorporation in the petroleum activities of Council Directive 94/9/EU relating to equipment and safety systems for use in areas where there is a risk of explosion (ATEX).

## **Re Section 79**

### **Pressure equipment that is not covered by the Facilities Regulations**

The purpose of this section is to clarify the relationship to the [Regulations relating to pressure equipment \(in Norwegian only\)](#) (FTPU).

In those cases where the [FTPU](#) do not apply, relevant parts of the [Facilities Regulations](#) will apply.

## **Re Section 80**

### **Products that are not covered by the Facilities Regulations**

The purpose of this section is to clarify the relationship to the Machinery Regulations.

The [Machinery Regulations \(in Norwegian only\)](#) have limited application in the petroleum activities and do not comprise seagoing vessels and mobile facilities together with machinery on board such vessels or facilities, cf. Section 1, No. 2 litera f of the [Machinery Regulations](#).

Seagoing vessels and mobile offshore facilities such as, for example, mobile drilling facilities, and machinery installed on them are excluded from the scope of the Machinery Directive by Article 1 (2) (f) since they are subject to the Conventions of the International Maritime Organisation.

Some of the equipment concerned by this exclusion may also be subject to the Marine Equipment Directive 96/98/EC18 as amended by Directive 2002/75/EC19.

A mobile offshore facility is an offshore facility that is not intended to be located on the oil field permanently or for the long term, but is designed to be moved from location to location, whether or not it has a means of propulsion or of lowering legs to the seafloor.

However, floating facilities intended for production, such as, for example, FPSOs (Floating Production, Storage and Offloading installations - usually based on tanker designs) and FPPs (Floating Production Platforms - based on semi-submersible vessels) and the machinery installed on such units are not excluded from the scope of the Machinery Directive.

Machinery intended to be installed on fixed offshore facilities such as, for example, oil production facilities, and machinery which may be used on both fixed and mobile offshore facilities, is also subject to the Machinery Directive. Sections 1 and 2 of the [Machinery Regulations](#) stipulate the scope of the regulations and which equipment is covered by the [Machinery Regulations](#). In those cases where the [Machinery Regulations](#) do not apply, relevant parts of the [Facilities Regulations](#) will apply.

## **CHAPTER XVI CONCLUDING PROVISIONS**

### **Re Section 81**

#### **Supervision, decisions, enforcement, etc.**

No comments.

### **Re Section 82**

#### **Entry into force**

See [Section 73, No. 2 of the Framework Regulations](#) for an overview of which regulations are repealed when these regulations enter into force.

Within the scope of the [Pollution Control Act \(in Norwegian only\)](#), the complete [Facilities Regulations](#) enter into force on 1 January 2002. This also applies to existing facilities. This entails that an assessment has to be made of existing facilities to determine whether the facility fulfils the requirements of the regulations. This applies in particular to the requirements in [Sections 15, 40, 48, 51, 52, 66 and 69 of the regulations](#). If the facility does not fulfil the requirements of the regulations, changes shall be made to the facility. If particular reasons so warrant, the Norwegian Environment Agency can grant exemptions from requirements

in the regulations. This could, for example, be instances where the costs of making changes substantially exceed the environmental gain. It is not anticipated that the regulations' requirements regarding taking into account the external environment, will entail major or costly changes to existing facilities. In many of the requirements, provision is made for making a cost-benefit assessment in relation to deciding whether the regulatory requirements are fulfilled or not. This applies to e.g. [Section 40](#).

[Sections 4, 5, 6, 10 and 12](#) state that consideration shall be given to the risk of pollution or environmental risk when selecting materials and when choosing and designing facilities and plants. These provisions will be of significance in the planning and design phase, and when modifying plants and facilities. These sections do not require, however, that changes are made to existing plants and facilities.

This Section No. 2, viewed in context with [Section 73 of the Framework Regulations](#), entails that, in the area of health, working environment and safety, it is the technical requirements in the regulations that applied up to the date when these regulations entered into force, that can still be used as a basis.

Major modifications as mentioned in this Section No. 3, may be the installation of a new module, major interventions in hydrocarbon-carrying systems or major changes in physical barriers. With regard to the use of new standards in such contexts, see the [Framework Regulations Section 23](#).

Existing facilities as mentioned in this Section No. 3, means facilities where the plan for development and operation of petroleum deposits (PDO) has been approved in accordance with [Section 4-2 of the Petroleum Act](#), or where special permission has been given on the basis of plans for installation and operation of facilities for transport and exploitation of petroleum (PIO) in accordance with the [Petroleum Act Section 4-3](#), or facilities that have been granted consent to carry out petroleum activities before these regulations entered into force.

New vessels, as referred to in subsection 5, means units contracted for (build contract signed) after 23 December 2016.

For mobile facilities that are registered in a national ships' register, the requirements in the new regulations will apply when a new consent is applied for, see [Section 73 of the Framework Regulations](#). It follows from [Section 26 of the Management Regulations](#) that the operator shall provide an overview of previously granted exemptions for mobile facilities in applications for consent. Previously granted exemptions follow the mobile facility. New operators shall, however, evaluate whether it is prudent to operate with the exemptions granted, and whether changed conditions exist that make it necessary to apply for a new exemption, see [Section 70 of the Framework Regulations](#).

## LIST OF REFERENCES

### 1. Regulations and guidelines issued by the authorities

#### The Ministry of Labour

(In Norwegian only)

[Forskrift 6. desember 2011 nr. 1355 om organisering, ledelse og medvirkning](#)

[Forskrift 6. desember 2011 nr. 1356 om utforming og innretning av arbeidsplasser og arbeidslokaler](#)

(arbeidsplassforskriften),

[Forskrift 6. desember 2011 nr. 1360 om administrative ordninger på arbeidsmiljølovens område](#) (forskrift om administrative ordninger)

[Forskrift 6. desember 2011 nr. 1358 om tiltaksverdier og grenseverdier for fysiske og kjemiske faktorer i arbeidsmiljøet samt smitterisikogrupper for biologiske faktorer](#) (forskrift om tiltaks- og grenseverdier),

[Forskrift 6. desember 2011 nr. 1357 om utførelse av arbeid, bruk av arbeidsutstyr og tilhørende tekniske krav](#) (forskrift om utførelse av arbeid),

[Forskrift 6. desember 2011 nr. 1359 om konstruksjon, utforming og fremstilling av arbeidsutstyr, samt rutiner for samsvar for arbeidsutstyr og kjemikalier](#) (produsentforskriften),

[Forskrift 20. mai 2009 nr. 544 om maskiner](#) (forskrift om maskiner). (Dette er en fellesforskrift fastsatt av Arbeidsdepartementet, Justisdepartementet og Miljøverndepartementet. Bestillingsnr. 522.)

#### The Norwegian Labour Inspection Authority

Guidelines relating to climate and air quality in the workplace (Ordering No. 0444),

Guidelines relating to work at computer monitors (Ordering No. 540).

### **The Directorate for Civil Protection and Emergency Planning**

Regulations of 7 July 1994 No. 735 relating to simple pressure vessels (in Norwegian only) (the SPV regulations),

Regulations of 19 August 1994 No. 819 relating to construction, design and production of personal protective equipment (in Norwegian only) (the PPE regulations),

Regulations of 1 March 1996 No. 229 relating to aerosols (in Norwegian only) (the Aerosol Regulations),

Regulations of 9 December 1996 No. 1242 relating to equipment and safety systems for use in areas where there is a hazard of explosion (in Norwegian only) (the ATEX Regulations),

Regulations of 9 June 1999 No. 721 relating to pressure equipment (in Norwegian only) (RPE), (The RPE are joint regulations for the Directorate for Civil Protection and Emergency Planning and the Petroleum Safety Authority Norway),

Regulations of 26 June 2002 No. 922 relating to handling of explosive substances (in Norwegian only),

Regulations of 20 December 2005 No. 1626 relating to electrical power installations (in Norwegian only),

Regulations of 14 January 2011 No. 36 relating to electrical equipment (in Norwegian only) (the EE regulations),

Regulations of 8 June 2009 no. 602 relating to handling of flammable, reactive and pressurised substances as well as equipment and systems used during handling of such (in Norwegian only).

### **The Civil Aviation Authority**

Regulations of 26 October 2007 No. 1181 relating to continental shelf aviation – commercial air transport to and from helidecks on facilities and vessels at sea (in Norwegian only),

Regulations of 28 January 2008 No. 81 relating to meteorological services for aviation (in Norwegian only).

### **The Norwegian Petroleum Directorate**

Regulations of 18 June 2001 No. 749 for resource management in the petroleum activities (in Norwegian only).

### **The Petroleum Safety Authority**

Publication YA-710 Principles for design of alarm systems, February 2001.

### **The Norwegian Maritime Authority**

Regulations of 17 December 1986 No. 2318 relating to the construction and outfitting of living quarters on mobile facilities,

Regulations of 4 September 1987, No. 856 relating to the construction of mobile facilities,

Regulations of 4 September 1987 No. 860 relating to drinking water systems and drinking water supply on mobile facilities,

Regulations of 16 October 1991 No. 853 relating to emergency preparedness vessels,

Regulations of 20 December 1991 No. 878 relating to stability, watertight subdivision and watertight/weathertight closing means on mobile facilities,

Regulations of 20 December 1991 No. 879 concerning ballast systems on mobile facilities,

Regulations 10 February 1994 No. 123 relating to mobile facilities with production plants and equipment,

Regulations of 10 July 2009 No. 998 relating to positioning and anchoring systems on mobile facilities (the anchoring regulations 09).

### **The Ministry of Health and Care Services**

Regulations of 4 December 2001 No. 1372 relating to water supply and drinking water (in Norwegian only).

Regulations of 17 June 1991 No. 386 relating to hygienic factors, etc. for facilities involved in the petroleum activities (in Norwegian only), Ch. III,

Detailed regulations 23 October 1978 No. 9938 relating to requirements to drinking water units on facilities for production, etc. of subsea petroleum deposits, with guidelines for disinfection (in Norwegian only),

Regulations of 21 November 2003 No. 1362 relating to radiation protection and use of radiation (in Norwegian only).

### **The Norwegian Institute of Public Health**

The Norwegian Institute of Public Health's guideline material for drinking water units,



The Norwegian Institute of Public Health's guideline materials for design and operation of drinking water systems,  
Recommended standards for indoor climate, November 1998.

### **The Norwegian Post and Telecommunications Authority**

[Regulations of 22 January 2007 No. 89 relating to electromagnetic compatibility \(EMC\) for electronic communication \(in Norwegian only\).](#)

## **2. Standards and guidelines**

### **American Petroleum Institute (API)**

API Spec 17J, Specification for Unbonded Flexible Pipe, Third Edition (ISO 13628-2:3006, Identical), Includes Errata (2009 and 2010), 1 July 2008,

### **Det Norske Veritas (DNV)**

[DNV-OS-A101](#), Safety Principles and Arrangement, April 2011,  
[DNV-OS-B101](#), Metallic Materials, April 2009,  
[DNV-OS-C102](#), Structural Design of Offshore Ships, October 2011,  
[DNV-OS-C103](#), Structural Design of Column Stabilised Units (LRFD-method), April 2012,  
[DNV-OS-C104](#), Structural Design of Self Elevating Units (LRFD-method), April 2012,  
[DNV-OS-D101](#), Marine & Machinery Systems & Equipment, 2001,  
[DNV-OS-D201](#), Electrical Installations, April 2011,  
[DNV-OS-D202](#), Automation, Safety and Telecommunication Systems, October 2008,  
[DNV-OS-D301](#), Fire Protection, October 2009,  
[DNV-OS-E101](#), Drilling Plant, October 2009,  
[DNV-OS-E201](#), Oil and Gas Processing Systems, October 2010,  
[DNV RP-A203](#), Qualification of New Technology, July 2011,  
[DNV-OS-E406](#) Design of Free Fall Lifeboats, April 2010,  
[DNV-OS-F101](#), Submarine Pipeline System, August 2012,  
[DNV-OS-F201](#), Dynamic Risers, October 2010.

### **The Danish Energy Agency**

Guidelines for the design of fixed offshore installations (revision 1, July 2008) Chapter 2 on design of unmanned production platforms (UP).

### **European Standard (EN)**

NS-EN 894-1:1997+A1:2008, Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 1: General principles for human interactions with displays and control actuators, edition 1,1997,  
NS-EN 894-2:1997+A1:2008, Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 2: Displays, edition 1,1997,  
NS-EN 894-3:2000+A1:2008, Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 3: Control actuators, edition 1, 2000,  
NS-EN 1838:1999, Lighting applications – Emergency lighting, edition 1, 1999,  
NS-EN 13852-1:2004, Cranes - Offshore cranes - Part 1: General - purpose offshore cranes, 2004, with later amendments.

### **International Electrotechnical Commission (IEC)**

NEK IEC 60092 Electrical installations in ships (relevant parts),  
NEK IEC 60331 Tests for electric cables under fire conditions - Circuit integrity, Part 11, 21, 23 and 25, 1999-2009,  
NEK IEC 60332 Tests on electric and optical fibre cables under fire conditions - Part 1 (2004), 2 (2004), 3-10 (2009) and 3-21 through 3-25 (2000-2009),  
NEK IEC 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems, first edition, Part 1-7, edition 2, 2010,  
Part 1: General requirements,  
Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems,

Part 3: Software requirements,  
Part 4: Definitions and abbreviations,  
Part 5: Examples of methods for the determination of safety integrity levels,  
Part 6: Guidelines on the application of IEC 61508-2 and 61508-3,  
Part 7: Overview of techniques and measures,  
NEK IEC 61892 Fixed and mobile offshore units - Electrical Installations, Part 1, 2, 3, 5, 6 and 7, 2007-2012.

#### **The International Marine Contractors Association (IMCA)**

IMCA D 045, R 015 Code of practice for the safe use of electricity under water, October 2010.

#### **International Maritime Organization (IMO)**

Code for the construction and equipment of mobile offshore drilling units (2009 MODU Code), 2010 edition,  
MSC/Circ. 645, Guidelines for vessels with dynamic positioning systems, 6 June 1994,  
Resolution A.471 (XII) Recommendation on test method for determining the resistance to flame of vertically supported textiles and films, 19 November 1981, with amendments,  
Resolution A.653 (16) Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials, 19 October 1989, with amendments,  
Resolution A.754 (18) Recommendation on fire resistance tests for “A”, “B” and “F” class divisions, 4 November 1993, with amendments.

#### **International Organization for Standardization (ISO)**

ISO 22899-1 Determination of the resistance to jet fires of passive fire protection materials – Part 1: General requirements,  
ISO 834 Fire-resistance tests – Elements of building construction, Part 1 (1999), 3 (2012) and 4 through 7 (2000),  
ISO 1182:2010 Reaction to Fire Tests for Products – Non-Combustibility Test, edition 5, 2010,  
ISO 1716:2010 Reaction to Fire Tests for Products – Determination of the gross heat of combustion (Calorific value), edition 1, 2010,  
ISO 3008:2007 Fire-Resistance Tests - Door and Shutter Assemblies, edition 3, 2007,  
ISO 3009:2003 Fire-Resistance Tests – Elements of building construction - Glazed Elements, edition 2, 1997,  
ISO 5657:1997 Reaction to fire tests – Ignitability of building products using a radiant heat source, edition 2, 1997,  
ISO 5660-1:2002 Reaction to Fire tests – Heat release, smoke production and mass loss rate - Part 1: Heat release rate (Cone Calorimeter method), edition 2, 2002,  
ISO 6385:2004 Ergonomic principles in the design of work systems, edition 2, 2004,  
ISO 9705:1993 Fire Tests – Full-Scale Room Test for Surface Products, first edition, 1993, with corrections in 1996,  
ISO 10418:2003 Petroleum and natural gas industries - Offshore production platforms - Analysis, design, installation and testing of basic surface process safety systems, edition 2, 2003,  
ISO 10423:2009 Petroleum and natural gas industries - Drilling and production equipment - Wellhead and christmas tree equipment, edition 1, 2010,  
NS-EN ISO 13623:2009 Petroleum and natural gas industries - Pipeline transportation systems, edition 2, 2009,  
NS-EN ISO 13628 Petroleum and natural gas industries – Design and operation of subsea production systems, part 1-9, 2000-2011,  
NS-EN ISO 13702 Petroleum and natural gas industries – Control and mitigation of fires and explosions on offshore production installations – Requirements and guidelines, edition 1, 1999,  
NS-ISO 4126 Safety devices for protection against excessive pressure, Part 1-7, 2004-2010,  
ISO 23251:2006 Petroleum, petrochemical and natural gas industries - Pressure-relieving and depressuring systems, edition 1, 2006, with later corrections.

#### **Norwegian Standard (NS)**

NS-EN 1992 Eurocode 2: Prosjektering av betongkonstruksjoner, (består av i alt fire deler),  
NS 3907 Technical fire testing of doors, ports and hatches – fire resistance, 1977,  
NS 3908 Technical fire testing of glass sections – fire resistance, 1977,

NS 4931 Guidelines for assessing human reactions to low-frequency horizontal movements (0.063 to 1 Hz) in permanent structures, particularly buildings and offshore installations, 1985,  
NS 6033 Sea engineering – Signs – with fixed text, 1977 with addition 1981,  
NS-EN 614-1:2006+A1:2009, Safety of machinery – Ergonomic design principles part 1: Terminology and general principles, edition 1, June 2009,  
NS-EN 614-2:2000+A1:2008, Safety of machinery – Ergonomic design principles part 2: Interactions between the design of machinery and work tasks, edition 1 January 2009,  
NS-EN ISO 11064 Ergonomic design of control centres, Part 1-4, 1999-2004,  
NS-EN ISO 15138 Petroleum and natural gas industries – Offshore production installation – Heating, ventilation and air conditioning, 2008.  
NS-EN ISO 13849-1 Safety of machinery - Safety-related parts of control systems Part 1: General principles for design.

### **NORSOK standards**

[NORSOK C-001](#) Living quarters area, revision 3, May 2006,  
[NORSOK C-002](#) Architectural components and equipment, revision 3, June 2006,  
[NORSOK C-004](#) Helicopter deck on offshore installations, revision 2, May 2013,  
[NORSOK D-001](#) Drilling facilities, revision 3, December 2012,  
[NORSOK D-002](#) System requirements well intervention equipment, revision 1, October 2000,  
[NORSOK D-007](#) Well testing system, revision 2, September 2013,  
[NORSOK D-010](#) Well integrity in drilling and well operations, revision 4, June 2013,  
[NORSOK H-003](#) Heating, ventilation and air conditioning (HVAC) and sanitary systems, revision 1, May 2010,  
[NORSOK I-002](#) Safety and automation systems (SAS), revision 2, May 2001,  
[NORSOK L-001](#) Piping and Valves, revision 3, September 1999,  
[NORSOK L-002](#) Piping design, layout and stress analysis, revision 3, July 2009,  
[NORSOK L-004](#) Piping fabrication, installation, flushing and testing, revision 2, September 2010,  
[NORSOK M-001](#) Material selection, revision 4, August 2004,  
[NORSOK M-101](#) Structural steel fabrication, revision 5, October 2011,  
[NORSOK M-501](#) Surface preparation and protective coating, edition 6, February 2012,  
[NORSOK M-503](#) Cathodic protection, revision 3, May 2007,  
[NORSOK M-601](#) Welding and inspection of piping, revision 5, April 2008,  
[NORSOK N-001](#) Integrity of offshore structures revision 8, September 2012,  
[NORSOK N-002](#) Collection of metocean data, revision 2, October 2010,  
[NORSOK N-003](#) Actions and action effects, revision 2, September 2007,  
[NORSOK N-004](#) Design of steel structures, revision 2, October 2004,  
[NORSOK P-001](#) Process Design, revision 5, September 2006,  
[NORSOK P-100](#) Process Systems, revision 3, February 2010,  
[NORSOK R-001](#) Mechanical Equipment, revision 3, November 1997,  
[NORSOK R-002](#) Lifting equipment, edition 2, September 2012,  
[NORSOK R-004](#) Piping and equipment insulation, edition 1, February 2009,  
[NORSOK S-001](#) Technical Safety, revision 4, February 2008,  
[NORSOK S-002](#) Working environment, revision 4, August 2004,  
[NORSOK S-005](#) Machinery-working environment analyses and documentation, revision 1, March 1999,  
[NORSOK T-001](#) Telecommunication systems, revision 4, February 2010,  
[NORSOK T-100](#) Telecom subsystems, revision 4, February 2010,  
[NORSOK U-001](#) Subsea production systems, revision 3, October 2002,  
[NORSOK U-100](#) Manned underwater operations, revision 3, April 2009,  
[NORSOK U-101](#) Diving respiratory equipment, revision 1, August 1999,  
[NORSOK Z-DP-002](#) Coding System, revision 3, October 1996,  
[NORSOK Z-013](#) Risk and emergency preparedness assessment, revision 3, October 2010,  
[NORSOK Z-015](#) Midlertidig utstyr, revisjon 3, juni 2004,

### **Nordtest (NT)**

NT Fire 021 Insulation of Steel Structures: Fire protection, February 1985,  
NT Fire 036 Pipe insulation: Fire spread and smoke production – Full scale test, February 1998.

**Norwegian Oil and Gas Association**

070 – Norwegian Oil and Gas' Guidelines for the application of IEC 61508 and IEC 61511 in the Norwegian petroleum industry, revision 02, 29 October 2004,

081 – Norwegian Oil and Gas' Recommended guidelines for remote pipe handling operations, revision 4, 11 June 2012.

**The Norwegian Shipowners' Association (NR)**

Norm for physical-chemical working environment on mobile facilities built before 1 August 1995 and operating on the Norwegian shelf (in Norwegian only), revision 03, 1 February 2005.