

**REGULATIONS RELATING TO  
DESIGN AND OUTFITTING OF FACILITIES, ETC. IN THE PETROLEUM  
ACTIVITIES  
(THE FACILITIES REGULATIONS)**

**(Last amended 26 April 2019)**

**Petroleum Safety Authority Norway  
Norwegian Environment Agency  
Norwegian Directorate of Health  
Norwegian Food Safety Authority  
Norwegian Radiation and Nuclear Safety Authority**



**PETROLEUM SAFETY AUTHORITY  
NORWAY**

# Regulations relating to design and outfitting of facilities, etc. in the petroleum activities (the facilities regulations)

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## **Regulations relating to design and outfitting of facilities, etc. in the petroleum activities (the Facilities Regulations).**

**Stipulated by the Petroleum Safety Authority Norway on 29 April 2010 in pursuance of Section 10-18 of the Act of 29 November 1996 No. 72 relating to petroleum activities, Sections 1-3 and 4-4 of the Act of 17 June 2005 No. 62 relating to working environment, working hours and job protection, etc., and Section 68, first subsection, litera b of the Regulations of 12 February 2010 No. 158 relating to health, safety and the environment in the petroleum activities, etc. Stipulated by the Norwegian Environment Agency on 29 April 2010 in pursuance of Sections 9 and 40 of the Act of 13 March 1981 No. 6 relating to protection against pollution and relating to waste, and Section 68, first subsection, litera b of the Regulations of 12 February 2010 No. 158 relating to health, safety and the environment in the petroleum activities, etc. Stipulated by the Norwegian Directorate of Health on 29 April 2010 in pursuance of Sections 16, second subsection and 76, final subsection of the Act of 2 July 1999 No. 64 relating to health personnel (the Health Personnel Act), Sections 1-2, third subsection and 8-4 of the Act of 5 August 1994 No. 55 relating to protection against contagious illnesses and Section 68, first subsection, litera b of the Regulations of 12 February 2010 No. 158 relating to health, safety and the environment in the petroleum activities, etc. Stipulated by the Norwegian Food Safety Authority on 29 April 2010 in pursuance of Sections 16 and 23 of the Act of 19 December 2003 No. 124 relating to food production and food safety, etc., and Section 68, first subsection, litera b of the Regulations of 12 February 2010 No. 158 relating to health, safety and the environment in the petroleum activities, etc. Amended 20 December 2012. Amended 23 December 2013. Amended 16 December 2014. Amended 18 December 2015. Amended 18 December 2017. Last amended 26 April 2019.**

### **CHAPTER I**

#### **Introductory provisions**

##### **Section 1**

##### **Scope**

These regulations apply to offshore petroleum activities, with exceptions as mentioned in Section 4 of the Framework Regulations.

Requirements for facilities in these regulations also apply to installations and equipment necessary to carry out manned underwater operations from vessels.

Requirements in Sections 13, 56, 62, 69 and 72 of these regulations also apply to those parts of a vessel necessary to ensure that petroleum activities on simpler facilities will be prudent, cf. Section 2 and Section 10 of the Framework Regulations.

As regards mobile facilities registered in a national shipping register, and which adhere to a maritime operational concept, relevant technical requirements in the Norwegian Maritime Authority's regulations for mobile facilities (the Red Book) as they read after the amendments in 2007 and subsequent amendments, form the basis with the following clarifications and limitations, cf. Section 3 of the Framework Regulations:

- a) Section 3 of the Framework Regulations only covers provisions relating to matters of a maritime character that are not directly related to the petroleum function the facility is intended to carry out. The section does not include provisions regarding:
  - drilling and process equipment,
  - universal audio and visual alarms,
  - equipment for personnel transport and requirements for personnel transport on the drill floor,
  - the working environment in general,
- b) the facility shall be used in a manner that makes it possible to use a flag and classification practice that involves a calendar-based recertification, including a five-year main inspection,
- c) which operational assumptions form the basis for engineering, construction and use shall be clear,
- d) any exemptions granted by the flag state authority shall be evaluated and presented to the Petroleum Safety Authority Norway for assessment if they have significance for safety in the petroleum activities,
- e) provisions regarding documentation, supervision, approvals, etc. do not apply, unless otherwise directly evident from the petroleum regulations.

## **Section 2 Responsibilities**

Section 7 of the Framework Regulations applies correspondingly for these regulations.

## **Section 3 Definitions**

Definitions as mentioned in Section 6 of the Framework Regulations, apply correspondingly for these regulations.

The following definitions apply for these regulations:

### *Manned facilities:*

Facilities with living quarters, or facilities that are part of an integrated development concept with gangway connections to a facility with living quarters.

### *Class A fire division:*

A division manufactured in non-flammable materials that satisfies the following criteria:

- a) it is sufficiently reinforced,
- b) it prevents the spread of flames and smoke for at least one hour of the standardised fire test,
- c) it is designed so that the average temperature and the temperature of any single point on the unexposed side do not rise more than 140°C and 180°C, respectively, above the original temperature within the following timeframes:
  - class A-60: 60 minutes,
  - class A-30: 30 minutes,
  - class A-15: 15 minutes,
  - class A- 0: 0 minutes,
- d) any insulation materials are fire-tested at an institution that is internationally or nationally recognised in the specific discipline.

### *Class B fire division:*

A division manufactured in non-flammable materials that satisfies the following criteria:

- a) it prevents the spread of flames for at least half an hour of the standardised fire test,
- b) it is designed so that the average temperature and the temperature of any single point on the unexposed side does not rise more than 140°C and 225°C, respectively, above the original temperature within the following timeframes:
  - class B-30: 30 minutes,
  - class B-15: 15 minutes,
  - class B- 0: 0 minutes.

### *Class H fire division:*

A division manufactured in non-flammable materials that satisfies the following criteria:

- a) it is sufficiently reinforced,
- b) it prevents the spread of flames and smoke for at least two hours of the standardised fire test,
- c) it is designed so that the average temperature and the temperature of any single point on the unexposed side do not rise more than 140°C and 180°C, respectively, above the original temperature within the following timeframes:
  - class H-120: 120 minutes,
  - class H-60: 60 minutes,
  - class H-0: 0 minutes,
- d) any insulation materials are fire-tested at an institution that is internationally or nationally recognised in the specific discipline.

### *Load-bearing structures:*

Those parts of the facility whose primary task is to transfer loads/actions.

### *Dimensioning load/action:*

Characteristic load/action multiplied by load/action coefficients.

*Dimensioning accidental load/action:*

An accidental load/action that a function or a system shall be able to withstand for a given period of time to meet the defined acceptance criteria for risk.

*Design accidental load/action:*

Accidental load/action used as a basis for design.

*Dynamic positioning system (DP system):*

A system in which the power supply, thruster system and control system are incorporated together and can be operated such as to automatically maintain a fixed position.

*Simpler facilities:*

Facilities without living quarters, and which are

- a) unmanned in normal operation,
- b) only manned when personnel can board and leave the facility in a safe manner at all times,
- c) not part of an integrated development concept with bridge connection to manned facilities and placed at a sufficient distance to not pose a danger to other permanently placed facilities.

Simpler facilities can be equipped with emergency quarters.

*Anchoring system:*

An anchoring system of the catenary type or a combination of thruster system and catenary-type anchoring.

*Main area:*

Facility area intended for a specific task or function.

*Functional loads/actions:*

Loads/actions caused by the physical existence, use and treatment of the facility.

*High pressure and high temperature wells (HPHT wells):*

Wells with an expected shut-in pressure greater than 69 MPa (690 bar), or a temperature higher than 150 °C.

*Lifting appliance:*

A composite unit used for hoisting and lowering loads, with or without horizontal movement.

*Lifting gear:*

Components or equipment used between the lifting appliance and the load or to grip the load, and which are not an integrated part of the lifting appliance.

*Environmental loads/actions:*

Loads/actions caused by environmental conditions.

*Emergency quarters:*

Quarters that make it possible for personnel to stay overnight on simpler facilities in an emergency.

*Permanently manned facilities:*

Facilities that are continuously manned, or that are part of an integrated development concept with gangway connections.

*Pipeline systems:*

Subsea pipelines and risers that transport hydrocarbons and other fluids, with associated safety systems, valves, chambers, corrosion protection systems, etc.

*Safety system:*

Technical barrier elements that are realised in a common system.

*Safety functions:*

Technical barrier elements that are intended to reduce the possibility of a concrete fault, hazard and accident situation occurring, or that limit or prevent damage or inconveniences.

*Accidental loads/actions:*

Loads/actions that the facility can be exposed to as a result of incorrect use, technical failure or undesirable external influences.

## **CHAPTER II** **General provisions**

### **Section 4** **Choice of development concept**

When choosing a development concept, the following shall be considered:

- a) major accident risk,
- b) type of operation,
- c) risk of pollution,
- d) geographical location,
- e) location conditions,
- f) reservoir properties,
- g) regularity requirements,
- h) lifetime,
- i) any subsequent removal,
- j) need to develop new technology.

### **Section 5** **Design of facilities**

Facilities shall be based on the most robust and simple solutions as possible, and designed so that

- a) no unacceptable consequences will occur if they are exposed to the loads/actions as mentioned in Section 11,
- b) major accident risk is as low as possible,
- c) a failure in one component, system or a single mistake does not result in unacceptable consequences,
- d) the main safety functions as mentioned Section 7 are maintained,
- e) materials handling and transport can be carried out in an efficient and prudent manner, cf. Section 13,
- f) a safe working environment is facilitated, cf. Chapter IV,
- g) operational assumptions and restrictions are safeguarded in a prudent manner,
- h) barriers are established that can both detect abnormal conditions and reduce the potential for failures and hazard and accident situations developing, and which can restrict possible harm and disadvantages, cf. Section 5 of the Management Regulations,
- i) health-related matters are safeguarded in a prudent manner,
- j) the lowest possible risk of pollution is facilitated,
- k) prudent maintenance is facilitated.

Requirements for the performance of the individual barriers shall be defined, cf. Section 5 of the Management Regulations.

Measures to protect facilities against hazard and accident situations shall be based on a strategy, with reference to Section 5 of the Management Regulations.

The facilities shall be divided into main areas. The main areas shall be separated by fire and explosion divisions or sufficient physical distance to prevent escalation. Alternatively, a combination of physical divisions and sufficient distance may be used. Regardless of whether they are defined as main areas or not, areas shall have siting of equipment and layouts that contribute to good inherent safety characteristics and which reduce the risks associated with hazard and accident situations that may arise.

Areas where an explosive atmosphere may arise, shall be classified.

Areas occupied by personnel, or where safety-related equipment is located, shall not be exposed to waves with an annual likelihood greater than  $1 \times 10^{-2}$ .



The area for storage of flammable and explosive items shall be designed to minimise the risk of and from fires and explosions. Simple provisions shall be in place to handle and remove explosives that may constitute a risk in the event of a hazard and accident situation.

Facilities with surface-completed wells without drilling fluid systems shall have installed or facilitated pumping and fluid capacity capable of controlling the well pressure.

Wells shall be designed so that well control can be regained by means of one (1) relief well. In special cases, wells can be designed for more than one (1) relief well.

## **Section 6**

### **Design of simpler facilities**

Simpler facilities shall be designed to fulfil the requirements for acceptable risk, cf. Section 9 of the Management Regulations. A prudent working environment and satisfactory hygienic conditions shall also be facilitated during stays on the facility.

Where these regulations describe specific solutions for manned facilities, simpler solutions can be chosen for simpler facilities than those prescribed, provided these solutions can be proven satisfactory through special assessments.

Correspondingly, simpler solutions than those recommended in the guidelines for the provisions in these regulations, can be considered.

The facility shall be designed so that the need for crew and number of visits is as low as possible.

## **Section 7**

### **Main safety functions**

The main safety functions shall be defined in a clear manner for each individual facility so that personnel safety is ensured and pollution is limited.

For permanently manned facilities, the following main safety functions shall be maintained in the event of an accident situation:

- a) preventing escalation of accident situations so that personnel outside the immediate accident area are not injured,
- b) the capacity of main load-bearing structures until the facility has been evacuated,
- c) protecting rooms of significance to combatting accidents so that they remain operative until the facility has been evacuated,
- d) protecting the facility's safe areas so that they remain intact until the facility has been evacuated,
- e) at least one escape route from every area where personnel are found until evacuation to the facility's safe areas and rescue of personnel have been completed.

## **Section 8**

### **Safety functions**

Facilities shall be equipped with necessary safety functions that can at all times

- a) detect abnormal conditions,
- b) prevent abnormal conditions from developing into hazard and accident situations,
- c) limit the damage caused by accidents.

Requirements shall be stipulated for the performance of safety functions.

The status of active safety functions shall be available in the central control room.

## **CHAPTER III**

### **Overall joint requirements**

## **Section 9**

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

Where the petroleum activities entail use of new technology or new methods, criteria shall be drawn up for development, testing and use so that the requirements for health, safety and the environment are fulfilled. The criteria shall be representative for the relevant conditions of use, and the technology or methods shall be adapted to already accepted solutions.

The qualification or testing shall demonstrate that applicable requirements can be fulfilled using the relevant new technology or methods.

## **Section 10**

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

Installations, systems and equipment shall be designed in the most robust and simple manner possible and such that

- a) the possibility for human error is limited,
- b) they can be operated, tested and maintained without risk to the personnel and with the lowest possible risk of pollution,
- c) they are suitable for use and able to withstand the loads/actions they can be exposed to during operation.

Installations, systems and equipment shall be marked so as to facilitate safe operation and proper maintenance.

### **Section 10a**

#### **Ignition source control**

In order to prevent and protect against ignition of combustible liquids and explosive gases, a systematic mapping of potential electric and non-electric ignition sources shall be performed. In addition, the necessary technical, operational and organisational measures shall be implemented so as to reduce the risk of ignition as far as possible.

Equipment and safety systems in classified areas shall fulfil requirements for use in explosive areas.

Equipment and safety systems that are meant to be operational in abnormal situations, where an explosive atmosphere can exist outside classified areas, shall fulfil requirements to zone 2, minimum, or be placed in protective rooms. Other non-critical equipment that represents an ignition source, shall deactivate automatically on gas detection, but manual deactivation shall also be possible when it is practical to do so from a central or strategic location, in accordance with the facility specific strategy for fire and explosion safety.

### **Section 11**

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

The design loads/actions that will form the basis for design and operation of installations, systems and equipment, shall be determined. When determining design loads/actions, the requirement to robust solutions, cf. Section 5, and the requirement to risk reduction, cf. the Framework Regulations Section 11, shall form the basis. The design loads/actions shall ensure that installations, systems or equipment will be designed such that relevant accidental loads/actions that can occur, do not result in unacceptable consequences, and shall, as a minimum, always withstand the dimensioning accidental load/action.

When determining design loads/actions, the effects of fire water shall not be considered. This applies to both fire loads/actions and explosive loads/actions.

Installations, systems and equipment that are included as elements in the realisation of main safety functions, cf. Section 7, shall as a minimum be designed such that dimensioning accidental loads/actions or dimensioning environmental loads/actions with an annual likelihood greater than or equal to  $1 \times 10^{-4}$ , shall not result in loss of a main safety function.

When determining loads/actions, the effects of seabed subsidence over, or in connection with the reservoir, shall be considered.

Functional and environmental loads/actions shall be combined in the most unfavourable manner.

Facilities or parts of facilities shall be able to withstand the design loads/actions and probable combinations of these loads/actions at all times.

### **Section 12**

#### **Materials**

Materials to be used in or on facilities shall be selected considering

- a) the load/action requirements mentioned in Section 11,
- b) manufacturing, joining and construction processes,
- c) possible use of materials protection,
- d) fire-resistance properties,
- e) probable changes in operating conditions,
- f) the opportunity to reduce future use of chemicals and pollution,
- g) the opportunity to reduce, reuse and recover waste,
- h) the employees' health and working environment,
- i) potential future removal.

### **Section 13**

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

Facilities and transport routes on and between facilities, and between facilities and vessels, shall be designed so that materials handling and personnel traffic can take place efficiently and safely. Handling of materials shall to the extent possible take place by means of mechanical systems and technical appliances.

There shall be a stairway or ramp where access between different levels is used daily.

Escape routes shall be designed so that all evacuation can take place in a simple, quick and safe manner. There shall be at least two escape routes from areas with regular traffic.

### **Section 14**

#### **Ventilation and indoor climate**

The ventilation in indoor and outdoor areas shall cover the need for air change and provide acceptable air quality. The ventilation shall also be designed so that smoke from fires can be controlled, and so that hazardous and flammable gases cannot penetrate closed non-rated areas.

The indoor climate shall be adapted to the individual room as regards air needs, drafts, humidity and temperature. The indoor air shall be free of hazardous pollution.

### **Section 15**

#### **Chemicals and chemical exposure**

Chemicals and technical solutions shall be chosen that prevent harmful chemical influences on people and the environment, and which reduce the need for use of chemicals.

When choosing, designing and placing installations for storage, use, recovery and destruction of chemicals, the following shall be considered:

- a) health and safety of personnel,
- b) corrosion and other forms of material decomposition,
- c) fire and explosion hazards,
- d) risk of pollution.

### **Section 16**

#### **Flammable and explosive goods**

(Repealed by Regulations 23 December 2013)

### **Section 17**

#### **Instrumentation for monitoring and recording**

Facilities shall be outfitted with instrumentation for monitoring and recording conditions and parameters that can be significant in verifying the results from analyses, as well as parameters of significance to the facility's further use.

Facilities shall also be outfitted with instrumentation for recording environmental data that can be significant to the petroleum activities. Facilities' instrumentation for flight weather service shall fulfil the requirements in Section 31 of the Civil Aviation Authority's Regulations relating to flight over the continental shelf – commercial aviation to and from the helicopter deck on permanent and mobile offshore facilities (in Norwegian only), and in the Civil Aviation Authority's Regulations relating to flight weather service (in Norwegian only).

The first facility of a new type shall be outfitted with instruments to collect data to verify the calculations. Fixed reference electrodes shall be installed on the first facility in areas where the corrosion conditions differ from areas where experience has been gained.

### **Section 18**

#### **Systems for internal and external communication**

Temporarily and permanently manned facilities shall be outfitted with communication systems that enable continuous communication internally on the facility, and between the facility and ships, aircraft and land. Furthermore, these facilities shall be outfitted with alarm systems that can notify the personnel at all times of hazard and accident situations. The following audio and visual alarms shall be possible:

- a) general alarm in the form of interrupted sound signals and yellow flashing lights,
- b) prepare for evacuation in the form of uninterrupted sound signals and yellow flashing lights.

At least two independent chains of notification shall be established to land, preferably using permanent communication connections.

**Section 19**  
**Communications equipment**

Equipment for external communication shall be selected based on operational needs, the type of activity and defined hazard and accident situations, cf. Section 17 of the Management Regulations.

Communication equipment and associated power supplies shall be designed and protected so that their function can be maintained in hazard and accident situations.

**CHAPTER IV**  
**Design of work and common areas**

**Section 20**  
**Ergonomic design**

Work areas and work equipment shall be designed and deployed in such a way that the employees are not subjected to adverse physical or mental strain as a result of manual handling, work position, repetitive movements or work intensity, etc. that can cause injury or illness.

Work sites and equipment shall also be designed and placed in such a way that the risk of mistakes that can have an impact on safety, is reduced.

Workplaces shall facilitate individual work positions.

When carrying out work operations from their normal work station and using a good working position, employees shall have a view that enables them to make sure the work can be carried out safely.

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

Monitor-based equipment and other technical equipment for monitoring, controlling and operating machines, installations or production processes, shall be designed to reduce the risk of mistakes that can have an impact on safety.

Information transmitters and operating devices shall be designed, placed and grouped to allow for simple and quick receipt of necessary information and implementation of necessary actions. The presented information shall be correct and easy to understand.

Information systems shall be dimensioned for both normal and critical situations.

**Section 22**  
**Outdoor work areas**

Outdoor work areas shall have sufficient weather protection so that the risk of health problems and mistakes is reduced.

Weather protection in outdoor areas shall be adapted to the expected periods of stay, the scope and character of the work, representative weather conditions and risk factors.

**Section 23**  
**Noise and acoustics**

Facilities shall be designed so that no employees are exposed to noise that is harmful to hearing. Limit values for hazardous noise are for daily noise exposure  $L_{EX12h} = 83$  dB and for the peak sound pressure level  $L_{pC,peak} = 130$  dB.

Requirements shall be set for noise and acoustics in the individual areas based on planned manning and the functions that shall be safeguarded in the areas. The noise level and acoustics shall not preclude communication of significance to safety. The noise level in cabins, break rooms and recreation rooms shall be reduced as much as possible to contribute to necessary restitution and rest.

**Section 24**  
**Vibrations**

Facilities shall be designed so that vibrations do not harm personnel on the facility, or complicate the personnel's important duties.

## **Section 25**

### **Lighting**

The lighting shall be such that the working environment and safety are ensured during work, travel and restitution.

If possible, daylight and a view shall be provided in work rooms and public rooms.

## **Section 26**

### **Radiation**

Facilities shall be designed such that exposure to radiation is limited.

Primarily, technical solutions shall be facilitated that reduce the need to use radioactive substances.

Where radioactive substances shall be used, safe transport, handling and storage of the substances shall be facilitated.

## **Section 27**

### **Equipment for personnel transport**

Equipment for personnel transport shall be designed to ensure the safety of personnel carrying out activities above normal work height, or who are transported using such equipment.

Personnel winches shall be such that spooling can take place safely and be secured against uncontrolled deployment so that users cannot fall freely.

## **Section 28**

### **Safety signs**

In the event that exposing employees to a risk of accidents or health hazards cannot be avoided using technical measures or other facilitation, safety signs shall be posted.

Safety signs shall be posted at the entrance to rooms and near zones or equipment where employees can be exposed to a risk of accidents or health hazard.

Response, rescue and evacuation equipment, as well as the route to this equipment, shall also be posted with such signs.

## **CHAPTER V**

### **Physical barriers**

## **Section 29**

### **Passive fire protection**

Where passive fire protection is used, this shall be designed such that it provides relevant structures and equipment with sufficient fire resistance as regards load/action capacity, integrity and insulation properties.

When designing passive fire protection, the cooling effect from fire-fighting equipment shall not be considered.

## **Section 30**

### **Fire divisions**

The main areas on facilities shall be separated by fire divisions that, as a minimum, can withstand the dimensioning fire and explosion loads/actions and, as a minimum, satisfy fire rating H-0 if they can be exposed to hydrocarbon fires.

Rooms with important functions and important equipment, as well as rooms with a high risk of fire, shall be separated from their surroundings with fire divisions with a fire rating corresponding to the fire type and the established fire and explosion loads/actions to which they would be exposed.

Penetrations shall not weaken the fire divisions. Doors in fire divisions shall be self-closing.

## **Section 31**

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

The living quarters shall be protected by fire divisions that, as a minimum, satisfy fire rating

- a) H-60 for external walls facing a process or drilling area and which may be exposed to fire from these,
- b) A-60 for other external walls,
- c) A-0 for external walls on the living quarters that are located on a separate facility at a safe distance from production or drilling facilities, and for external walls on the emergency quarters on simpler facilities, if

these quarters are separated from the production or wellhead areas with a main fire division that, as a minimum, satisfies fire rating H-0.

The internal design of the living quarters shall be such that it limits the spread of fire.

### **Section 32**

#### **Fire and gas detection system**

Facilities shall have a fire and gas detection system that ensures quick and reliable detection of near-fires, fires and gas leaks. The system shall be able to perform the intended functions independently of other systems.

In the event of fire or gas detection, automatic actions shall limit the consequences of the fire or gas leak. The placement of detectors shall be based on relevant scenarios and simulations or tests.

### **Section 33**

#### **Emergency shutdown system**

Facilities shall have an emergency shutdown system that can prevent the development of hazard and accident situations and limit the consequences of accidents, cf. Section 7. The system shall be able to perform the intended functions independently of other systems.

The emergency shutdown system shall be designed so that it enters or maintains safe conditions if a fault occurs that can prevent the system from functioning. The emergency shutdown system shall have a simple and clear command structure. The system shall be capable of being activated manually from trigger stations that are in strategic locations on the facility. It shall be possible to manually activate functions from the manned control centre that bring the facility to a safe condition independently of the parts of the system that can be programmed.

Emergency shutdown valves shall be installed that can stop streams of hydrocarbons and chemicals to and from the facility and to and from wells, and which isolate and/or partition the fire areas on the facility.

### **Section 34**

#### **Process safety system**

Facilities outfitted with or attached to process facilities, shall have a process safety system. The system shall be able to perform the intended functions independently of other systems.

The process safety system shall be designed such that it enters or maintains a safe condition if a fault occurs that can prevent the system from functioning.

The process safety system shall be designed with two independent levels of safety to protect equipment.

### **Section 34a**

#### **Control and monitoring system**

Facilities shall have control and monitoring systems which, using associated alarms, warn of incidents, nonconformities or faults that are significant for safety. The alarms shall be issued such that they can be perceived and responded to within the time required for safe use of equipment, plants and processes.

### **Section 35**

#### **Gas release system**

Facilities equipped with or attached to process facilities, shall have a gas release system. The system shall prevent escalation of hazard and accident situations by quickly reducing the pressure in the equipment, and it shall be designed so that the release of gas does not harm personnel or equipment.

It shall be possible to trigger the depressurisation manually from the central control room.

Liquid separators installed in the gas release system shall be secured against overfilling.

### **Section 36**

#### **Firewater supply**

All facilities with accommodation shall have a sufficient supply of firewater to combat fires and suppress gas explosions if this can result in lower explosion pressure, cf. Section 37.

Permanently manned facilities shall have firewater supply from fire pumps or other independent supply to ensure sufficient capacity at all times, regardless of whether parts of the supply are out of service. Simpler facilities with emergency quarters shall have a firewater supply from a fire pump or other equivalently reliable supply. Simpler facilities without emergency quarters shall have an adequate supply of firewater or passive shielding so that the personnel by evacuation can be protected from fires that can occur.

The firewater system shall be designed such that a pressure stroke does not make the system or parts of it inoperative.

On facilities where firewater is supplied from fire pumps, the pumps shall start up automatically in the event of a pressure drop in the fire main and fire and gas detection. Fire pumps shall also be capable of being manually activated from the central control room and at the propulsion unit. Propulsion units for fire pumps shall be equipped with two independent starting arrangements. Automatic disconnection functions shall be as few as possible.

Firewater piping shall be designed and placed such that a sufficient supply of firewater is ensured to any area on the facility.

### **Section 37**

#### **Fixed fire-fighting systems**

Fixed fire-fighting systems shall be installed in explosion-hazard areas and in areas with a major risk of fire. The systems shall also cover equipment containing significant amounts of hydrocarbons. The systems shall be designed such that fire-fighting can be carried out quickly and efficiently at all times.

The systems shall be automatically activated by a signal from the fire detection system. In the event of gas detection, the systems shall be automatically activated if they are used to reduce explosion pressure.

In areas where gas is used as an extinguishing medium, notification systems shall be installed that announce the release of gas.

Manual activation of the fire-fighting systems shall activate the facility's general alarm.

### **Section 38**

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

Facilities shall have a reliable, robust and simple emergency power system that ensures sufficient supply of power to equipment and systems that shall function in the event of a main power failure.

It shall be ensured that interruptions do not entail operating problems for the emergency power users when switching from main power to emergency power.

The emergency power system shall have as few as possible automatic disconnection functions to ensure continuous operation.

Facilities shall be equipped with emergency lighting that ensures necessary lighting on the facility in the event of main lighting failure.

### **Section 39**

#### **Ballast system**

Floating facilities shall be equipped with robust ballast, discharge and drainage systems to maintain necessary draught, stability and hull strength under normal use. Moreover, the ballast system shall be able to bring the facility to a safe condition following an unintended draught, trim or heel. The systems shall be able to empty and fill all tanks and empty watertight spaces in an efficient manner.

### **Section 40**

#### **Open drainage systems**

Facilities shall be equipped with open drainage systems that can collect and divert oil and chemicals so that the risk of fire, harm to personnel and pollution is reduced.

The installation shall be designed such that any discharge of oil and chemicals results in the least possible pollution of the marine environment and such that the requirements in Chapter XI of the Activities Regulations are fulfilled.

## **CHAPTER VI**

### **Emergency preparedness**

#### **Section 41**

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

Facilities shall at all times have available equipment for quick and prudent rescue of personnel who fall into the sea, cf. also Section 77 of the Activities Regulations. This equipment shall not expose the rescue crew or personnel to be rescued to unacceptable risk.

## **Section 41a**

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

Divers at pressure shall be able to be saved and evacuated to a safe area, cf. Section 77, literas c and d of the Activities Regulations.

Diving facilities shall at all times have available equipment such that personnel in chamber complexes, diving bells, subsea chambers and subsea vessels can be rescued in an emergency.

Assessments shall be made of the need for and choice of equipment for hyperbaric evacuation.

Systems for hyperbaric evacuation shall be designed so that the divers can be evacuated from the chamber complex using two independent units. Each unit shall be able to evacuate all the divers at pressure.

Hyperbaric evacuation units shall be designed so that they can be towed and raised or otherwise removed from the water under the weather conditions where such evacuation units are intended to be used.

## **Section 42**

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

Materials for action against acute pollution shall satisfy requirements evident from the analyses mentioned in Section 17 of the Management Regulations.

Facilities shall at all times have access to materials that can efficiently be used against acute pollution, cf. Chapter II of the Framework Regulations.

The materials shall be tested under realistic conditions as regards functional and operative qualities, as well as collection efficiency. The materials shall be adapted to the pollution's physical and chemical properties and operative conditions at sea and along the coast and beaches.

Weather, wind and current-related efficiency figures shall be set for various types of materials, based on documented and relevant capacity figures.

## **Section 43**

### **Emergency preparedness vessels**

The need for emergency preparedness vessels and requirements for the vessels' emergency preparedness functions shall be evident from the analyses mentioned in Section 17 of the Management Regulations.

Emergency preparedness vessels that take part in management and execution of actions against acute pollution shall be designed such that they can perform their functions at sea, along the coast and in the beach zone.

## **Section 44**

### **Means of evacuation**

Personnel on facilities shall be able to evacuate quickly and efficiently to a safe area under all weather conditions, cf. Section 77, litera d of the Activities Regulations.

The choice of means of evacuation, their placement and protection shall be based on the defined hazard and accident situations, cf. Section 73 of the Activities Regulations.

Free-fall lifeboats, supplemented by rescue chutes and associated life rafts shall be used as means of evacuation for evacuation to sea.

## **Section 45**

### **Survival suits and life jackets, etc.**

It shall be possible to store personal survival suits in the cabins. In addition, a number of survival suits and life jackets shall be placed easily accessible on the facility, based on the results from the emergency preparedness analysis mentioned in Section 17 of the Management Regulations.

It shall be possible to store the survival suits and life jackets without compromising their quality.

Life buoys shall be placed so they are easily accessible on the facility.

## **Section 46**

### **Manual fire-fighting and firefighters' equipment**

Facilities shall be equipped with sufficient manual fire-fighting and firefighter equipment to effectively combat incipient fires and prevent escalation.



## **CHAPTER VII**

### **Electrical installations**

#### **Section 47**

##### **Electrical installations**

Electrical installations shall be designed with safeguards and other protection so as to avoid abnormal conditions and faults that can result in danger for the personnel and the facility. Facilities shall be designed with adequate protection against e.g.

- a) electrical shock during normal use and in the event of faults,
- b) thermal effects,
- c) overcurrent,
- d) fault currents,
- e) overvoltage,
- f) undervoltage,
- g) variations in voltage and frequency,
- h) power supply failure,
- i) ignition of explosive gas atmosphere,
- j) electromagnetic interference,
- k) health hazard as a result of electromagnetic fields.

## **CHAPTER VIII**

### **Drilling and well systems**

#### **Section 48**

##### **Well barriers**

Well barriers shall be designed such that well integrity is ensured, and the barrier functions are safeguarded during the well's lifetime.

Well barriers shall be designed such that unintended well influx and outflow to the external environment is prevented, and such that they do not hinder well activities.

When a production well is temporarily abandoned without a completion string, at least two qualified and independent barriers shall be present.

When a well is temporarily or permanently abandoned, the barriers shall be designed such that they consider well integrity for the longest period of time the well is expected to be abandoned.

When plugging wells, it shall be possible to cut the casings without harming the surroundings.

The well barriers shall be designed such that their performance can be verified.

#### **Section 49**

##### **Well control equipment**

Well control equipment shall be designed and capable of activation such that it ensures both barrier integrity and well control. For drilling where drilling mud returns to the facility and no blowout preventer is installed, equipment shall be installed with a capacity to divert gas and formation fluids away from the facility until the personnel have been evacuated. The equipment shall be installed for drilling through risers when the blowout preventer is installed on the seabed.

The pressure control equipment used in well interventions shall have remote-controlled valves with mechanical locking mechanisms in the closed position.

Well intervention equipment shall have a remote-controlled shear/blind ram as close to the christmas tree as possible.

Floating facilities shall have an alternative activation system for activating critical functions on the blowout preventer for use in the event of an evacuation.

Floating facilities shall also have the capacity to disconnect the riser package after the shear ram has cut the work string.

## **Section 50**

### **Compensator and disconnection systems**

Floating facilities shall be equipped with a disconnection system that secures the well and disengages the riser before a critical angle occurs.

When designing the compensator system, robust technical solutions shall be chosen where faults do not result in unacceptable consequences, cf. Section 5 litera c.

## **Section 51**

### **Drilling fluid system**

The drilling fluid system shall be designed such that it mixes, stores, circulates and cleans a sufficient volume of drilling fluid with necessary properties to safeguard the drilling fluid's drilling and barrier functions.

The high pressure section of the drilling fluid system with associated systems shall also have the capacity and working pressure to be able to control the well pressure at all times.

## **Section 52**

### **Cementing unit**

The cementing unit shall be designed such that it mixes, stores and delivers the correct volume of cement with necessary properties to ensure proper anchoring and barrier integrity. The unit shall be designed such that residues of both unmixed chemicals and mixed cement are handled in accordance with the principles of the Pollution Control Act (in Norwegian only).

In the event the cementing unit with associated systems shall function as a replacement unit for the drilling fluid system, it shall have sufficient capacity and working pressure to be able to control the well pressure at all times.

## **Section 53**

### **Equipment for completion and well flow**

Equipment in the well and on the surface shall be designed to safeguard controlled flow during production, injection and well testing, cf. Section 12.

The flow line shall be equipped with necessary downhole safety valve. For permanently placed facilities, except for seabed wells, wells with flows of hydrocarbons in the annulus shall be equipped with an annulus safety valve.

During well testing using the work string, it shall be possible at any time to regulate the well stream through the work string and choke manifold.

## **Section 54**

### **Christmas tree and wellhead**

Christmas trees and wellheads shall be designed such that prudent well control can be performed through recovery, workover and well intervention.

The christmas tree shall have at least two main valves, and at least one of them shall be automatic.

In the case of hydrocarbon flow in the annulus, the closest outer annulus shall be pressure-monitored.

## **CHAPTER IX**

### **Production plants**

## **Section 55**

### **Production plants**

Production plants shall be designed such that chemical and energy consumption is reduced, and with minimum pollution of the external environment.

Production plants shall have a control system that enables stable regulation of the plant.

Treatment systems for produced water shall be designed such that the oil content in each discharge stream is the lowest possible, cf. Section 60 of the Activities Regulations. The discharge point for produced water shall be located such that the discharges result in the least possible damage to the marine environment.

If there is a risk of ignition, the vessels in the system shall be designed to prevent air penetration.

Production plants also include subsea production plants.

## **CHAPTER X**

### **Load-bearing structures and pipeline systems**

#### **Section 56**

##### **Load-bearing structures and maritime systems**

Load-bearing structures shall maintain satisfactory safety in use, failure, fatigue and accident limit states. They shall be able to withstand the loads/actions they are exposed to, including loads/actions with an annual likelihood of  $10^{-2}$  in the failure limit state and the loads/actions that follow from Section 11, in the accident limit state.

Load-bearing structures shall be sufficiently robust to ensure that local damage or failure will not result in unacceptable consequences.

Maritime systems shall be sufficiently robust to ensure that local damage or individual technical or operational faults do not result in unacceptable consequences.

The analyses shall be verified by an organisationally independent party.

#### **Section 57**

##### **Pipeline systems**

The pipeline systems shall be designed such that interior maintenance can be performed.

Chambers for sending and receiving cleaning and inspection tools shall be designed such that they cannot be opened under pressure.

For flexible pipeline systems and pipeline systems of other materials than steel, utilisation factors and any load/action and material factors shall be stipulated so that the safety level for such systems is not lower than for steel pipelines and steel risers.

## **CHAPTER XI**

### **Living quarters**

#### **Section 58**

##### **Living quarters**

The living quarters' furnishings and capacity shall ensure a prudent residential environment and be adapted to the various functions that shall be safeguarded, and the anticipated personnel needs in the various phases of the petroleum activities.

Cabins shall be designed such that personnel cannot be locked in in a situation of hazard and accident and such that rescue personnel can get access to the cabin to search for missing persons.

The living quarters shall be equipped and furnished to maintain an adequate standard of hygiene.

Emergency quarters on simpler facilities shall be adapted to the greatest personnel need. The same safety and hygiene requirements are set for simpler facilities with emergency quarters as for living quarters. A simpler comfort and working environment standard may be permitted in the design of emergency quarters than that which applies to the design of living quarters, if it can be shown by own assessments that this is prudent based on the intended use of the emergency quarters.

#### **Section 59**

##### **Health department**

Permanently manned facilities shall have a health department. The health department shall be such that the health personnel can carry out their tasks in a prudent manner.

There shall be equipment on the facility such that prudent first aid and medical treatment can be provided on the facility and during transport.

It shall be possible to establish telephonic contact between the health department and an onshore physician. Internal communication between the health department and the manned control room shall be facilitated. Communications equipment shall be secured against power outages.

The health department shall have satisfactory work lighting and at least two electrical outlets for emergency power to maintain life support functions, cf. Section 38.

For simpler facilities, there shall be space and equipment available to cover the need for first aid.

**Section 60**  
**Emergency sickbay**

Permanently manned facilities shall have an emergency sickbay in addition to a health department.

The treatment capacity shall be in accordance with the defined hazard and accident situations as mentioned in Section 17 of the Management Regulations.

The emergency sickbay shall be equipped such that it can provide prudent first aid and medical treatment.

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

The provisions in the Drinking Water Regulations (in Norwegian only) apply to drinking water supplies in the petroleum activities.

Facilities, including drinking water supplies, shall be designed such that the requirements mentioned in Section 13 of the Activities Regulations and the Drinking Water Regulations (in Norwegian only) are fulfilled. Facilities shall have the necessary means to ensure the quality of food and drinking water.

**CHAPTER XII**  
**Maritime facilities**

**Section 62**  
**Stability**

Floating facilities and vessels with an offshore gangway to simpler facilities shall have buoyancy and stability in intact and damaged condition.

The facilities shall withstand filling of at least one watertight room against the sea, a room that is wholly or partly below the water line, or rooms that contain piping systems connected to the sea. Moreover, the facility shall withstand collision damage on at least one watertight bulkhead in exposed areas. Semi-submersible facilities shall have reserve buoyancy in the deck.

Piping systems within the collision area shall be regarded as damaged.

There shall be weight control systems on floating facilities, which ensure that the weight, weight distribution and centre of gravity are within the design specifications. Equipment and structure sections shall be secured against displacement that can influence stability.

**Section 63**  
**Anchoring and positioning**

Floating facilities shall have systems designed to hold their position at all times and, if necessary, be able to move from their position in the event of a hazard and accident situation.

Dynamic positioning systems shall be designed so that the position can be maintained during defined failures and damage to the system, as well as during accidents. Components and equipment shall be designed so that the total system satisfies the requirements for a certain equipment class, cf. Section 90 of the Activities Regulations.

**Section 64**  
**Turret**

Turrets shall be designed so that they are in accordance with the requirements in Section 15, Nos. 1 through 4 of the Norwegian Maritime Authority's Regulations relating to mobile offshore facilities with production plants and equipment (in Norwegian only).

**CHAPTER XIII**  
**Diving facilities**

**Section 65**  
**Installations and equipment for manned underwater operations**

Diving bells shall have an internal volume of at least 4.5 m<sup>3</sup>. If the diving bell is designed for more than two divers, there shall, for each extra diver, be an additional internal volume of 1.5 m<sup>3</sup>.

Compression chambers for saturation diving shall have an internal height of at least 200 cm measured from the floor in the centre of the chamber. There shall be an internal volume of at least 4 m<sup>3</sup> for each person.

The umbilical cord to subsea chambers shall allow for controlled disconnection in the event the support vessel loses its position. In addition, it shall be easy to find the umbilical so that necessary supplies to the subsea chamber can be re-established.

## **CHAPTER XIV**

### **Additional provisions**

#### **Section 66**

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

Loading and offloading systems for oil and chemicals shall be designed such that the risk of polluting the external environment is acceptable, cf. Section 9 of the Management Regulations.

#### **Section 67**

##### **Waste**

Facilities shall be designed such that waste can be collected, stored and treated in a prudent manner as regards health and environment, as mentioned in Section 72 of the Activities Regulations.

#### **Section 68**

##### **Exhaust ducts**

Exhaust ducts for combustion products shall be placed and designed such that hot surfaces and sparks cannot ignite potential leaks of flammable liquids and gases, and such that waste gases are not an inconvenience for personnel, or create hazardous situations for helicopter traffic.

Exhaust ducts from atmospheric tanks and vessels shall be placed and designed such that emissions of toxic or flammable gases do not entail increased risk for the personnel or the facility.

#### **Section 69**

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

Lifting appliances and lifting gear on facilities, including launching and recovery appliances for rescue and evacuation means, shall be designed based on the conditions under which the lifting appliances and lifting gear will be used, cf. Section 13. Corresponding requirements apply to the safety of lifting appliances and lifting gear on vessels that participate in the petroleum activities.

When choosing lifting appliances and lifting gear on floating facilities, the facility's movements shall be given special consideration.

Drilling and well areas, including storage areas, shall have equipment for remote operation of pipes and work strings. The requirement for remote operation of pipes and work strings applies from when the pipes have been laid out on the pipe deck and made ready for further transport to the drill floor or work deck.

The requirement for such remote operation of pipes and work strings also applies to lightweight rigs and snubbing units.

#### **Section 70**

##### **Helicopter deck**

The helicopter deck shall be designed and outfitted such that it satisfies the requirements in the Civil Aviation Authority's Regulations relating to flight over the continental shelf – commercial aviation to and from the helicopter deck on permanent and mobile offshore facilities (in Norwegian only).

Equipment for fire-fighting on the helicopter deck shall be designed and placed such that

- a) fires on the helicopter deck, both on and inside helicopters, can be combatted safely and efficiently,
- b) rescue crew and other personnel are protected during evacuation of helicopters,
- c) firefighting foam installations shall deliver foam within 15 seconds of activation.
- d) The helicopter deck shall be equipped with one fire-fighting station at each access point.

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

Facilities shall be marked such that they can quickly be identified and such that other traffic in the area is notified. Marking of facilities shall be in accordance with the Norwegian Coastal Administration's provisions.

Anchor and marking buoys shall be marked in a corresponding manner.

All navigation marks placed in connection with the petroleum activities shall be in accordance with IALA rules and of a type that is accepted by the Norwegian Coastal Administration for such marking. When anchor points are placed outside the safety zone, the Petroleum Safety Authority Norway can require them to be marked with yellow anchor buoys with yellow reflectors, and if applicable, with yellow flashing lights.

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

Cargo and equipment that is transported or used for transport to or from facilities or vessels that participate in the petroleum activities shall be clearly marked with the name of the owner, facility or vessel.

**Section 73**  
**Lifts**

Lifts shall be designed based on the conditions under which they will be used, and such that personnel and materials transport can be carried out in an efficient and prudent manner, cf. Section 13.

**CHAPTER XV**  
**Implementation of eea regulations**

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

(Repealed by Regulations 26 April 2019)

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

Personal protective equipment as defined in the Regulations relating to construction, design and production of personal protective equipment (in Norwegian only) shall be in accordance with the requirements in those regulations, also when such equipment is used in the petroleum activities..

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

Aerosol containers as defined in the Regulations relating to aerosol containers (in Norwegian only) shall be in accordance with the requirements in those regulations, also when such aerosol containers are used in the petroleum activities.

**Section 77**  
**EMC**

Electrical appliances covered by the Regulations relating to electrical equipment (in Norwegian only), and which are used in the petroleum activities, shall be in accordance with the requirements in those regulations as regards electromagnetic compatibility, with the exception of Section 5.

Appliances and fixed installations covered by the Norwegian Communications Authority's Regulations relating to EEA requirements to electromagnetic compatibility (EMC) for equipment for electronic communication (in Norwegian only), shall be in accordance with the requirements in those regulations, also when such equipment is used in the petroleum activities.

**Section 78**  
**ATEX**

(Repealed by Regulations 26 April 2019)

### **Section 79**

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

(Repealed by Regulations 26 April 2019)

### **Section 80**

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

These regulations do not apply to products covered by the Regulations relating to machinery (in Norwegian only).

## **CHAPTER XVI**

### **Concluding provisions**

### **Section 81**

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

Chapter IX of the Framework Regulations applies correspondingly to these regulations.

### **Section 82**

#### **Entry into force**

- 1) The Regulations will enter into force on 1 January 2011. At this time, the Regulations of 3 September 2001 No. 1100 relating to design and outfitting of facilities, etc. in the petroleum activities will be repealed.
- 2) In the areas of health, working environment and safety, technical requirements in regulations in force until these regulations' entry into force, can be used for existing permanently placed facilities.
- 3) In the areas of health, working environment and safety, technical requirements in these regulations, as they sound 1 January 2018, can be used for existing mobile facilities.
- 4) However, in the event of major rebuilding and modifications of existing facilities, these regulations will apply for what is covered by the rebuilding or modification.
- 5) Requirements for helicopter decks as mentioned in Section 70, cf. Chapters IV and V of the Regulations relating to flight over the continental shelf (in Norwegian only) Chapters IV and V, do not apply to facilities built prior to 1 June 1993. The requirement in Section 10 of the mentioned regulations, does not apply to facilities built prior to 1 January 2008.
- 6) The requirement for two independent units for hyperbaric evacuation as mentioned in Section 41, litera a, enters into force on 23 December 2016 and shall apply to existing and new vessels and facilities.