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Temporary equipment

Midlertidig utstyr

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Foreword

NORSOK Z-015:2019 was adopted as NORSOK Standard 2019-10-24.

NORSOK Z-015:2019 supersedes NORSOK Z-015 Rev. 4, September 2012.

NORSOK is an acronym for the competitive position of the Norwegian continental shelf and comprise petroleum industry standards in Norway. The collaboration initiative in 1993 between the authorities and the petroleum industry initiated the development of NORSOK standards.

Reducing the project execution time and developing and operating cost for petroleum installations on the Norwegian shelf was the target.

The intention for the Petroleum industry is to develop and use standards providing good technical and cost-effective solutions to ensure that the petroleum resources are exploited and managed in the best possible way by the industry and the authorities. The industry will actively contribute to the development and use of international standards in the global market.

The NORSOK standards shall:

- bridge the gap based on experiences from the Norwegian continental shelf where the international standards are unsatisfactorily;
- replace oil company specifications where possible;
- be available as references for the authorities' regulations;
- be cost effective; and
- promote the Norwegian sector as an attractive area for investments and activities.

Developing new NORSOK standards and regular maintenance of existing standards shall contribute to maintain the competitiveness both nationally and internationally for the Norwegian petroleum industry.

The NORSOK standards are developed by experts from the Norwegian petroleum industry and approved according to the consensus principles as laid down by the guidelines given in NORSOK A-001 N directive.

The NORSOK standards are owned by the Norwegian Oil and Gas Association, the Federation of Norwegian Industries and the Norwegian Shipowners' Association. They are managed and published by Standards Norway.

Annex A, B, C, D, E, F, G, H, I, J and K are normative. None informative Annexes.

Revision notes.

This revision main changes related to Rev 4, September 2012.

- 5.4.10 "Mechanical" is added
- Annex J – "List of all Ex approved equipment on the unit" is a new documentation list
- Annex K – "Marking of manned module" is added.
- Some requirements have been adapting to requirements in DNV GL 2.7-2.
- All requirements/guidelines regarding the use of the temporary equipment on board the unit, are described as "Notes - Guidelines for use on board".

NOTE It is supposed that the Company has routines and work processes that also include the use of temporary equipment in its management system. It is these work processes that govern the business, and these notes may then be taken into consideration in these work processes.

Introduction

This document specifies requirements for temporary equipment to be used by operators and their suppliers or other external partners involved in offshore oil and gas activities including design, development, production, storage, distribution and any other activity related to temporary equipment.

The reference in the regulations to other standards or to classification societies (e.g. DNVGL or other accepted classification society) only applies to the technical content. Any requirements in these regulations in terms of classification, certification or third-party verification do not form part of this document and can therefore be considered as a separate service.

The operators and their suppliers and other external partners interpret and acknowledge the use of applicable regulatory requirements, identify its roles under the regulatory regime and incorporate these requirements into its own management and compliance systems.

The use of recognized standards is described in The Framework Regulations, Section 24 [8] and accompanying guideline [9] and section 25 with accompanying guideline for including company guidelines covering the use of offshore mobile facilities.

In the bibliography [10]-[21] describes other important regulations applicable to this document.

NORSOK requirements takes precedence over an international normatively referenced standard if in conflict.

The bibliography lists of acts, regulations, standards, norms and other literature that may be relevant to the use of this document.

Temporary Equipment

1 Scope

This document defines the minimum technical and safety-related requirements for temporary equipment used on installations (fixed and mobile) on the Norwegian continental shelf. This includes verification of design, testing, certification and maintenance of the temporary equipment.

2 Normative references

The following referenced documents contain text which fully or in part is part of the requirements in the document. For dated references, only the edition cited applies. For undated references, the latest edition of the cited document applies (including amendments).

NORSOK C-001:2015, *Living quarter area*

NORSOK C-002:2015, *Architectural components and equipment*

NORSOK D-002:2013, *Well intervention equipment*

NORSOK E-001:2016, *Electrical systems*

NORSOK R-001:2017, *Mechanical equipment*

NORSOK R-002:2017, *Lifting equipment*

NORSOK R-003:2017, *Safe use of lifting equipment*

NORSOK S-001:2018, *Technical safety*

NORSOK S-002:2018, *Working environment*

NORSOK T-101:2019, *Telecom systems*

NS 3910: 2015, *Firefighting equipment — Maintenance of portable fire extinguishers (Norwegian language)*

NS-EN 3-7, *Portable fire extinguishers — Part 7: Characteristics, performance requirements and test methods*

NS-EN 3-8, *Portable fire extinguishers — Part 8: Additional requirements to NS-EN 3-7 for the construction, resistance to pressure and mechanical tests for extinguishers with a maximum allowable pressure equal to or lower than 30 bar*

NS-EN 3-9, *Portable fire extinguishers — Part 9: Additional requirements to NS-EN 3-7 for pressure resistance of CO₂ extinguishers*

NS-EN 3-10, *Portable fire extinguishers — Part 10: Provisions for evaluating the conformity of a portable fire extinguisher to EN 3-7*

NS-EN 1834-1:2000, *Reciprocating internal combustion engines — Safety requirements for design and construction of engines for use in potentially explosive atmospheres — Part 1: Group II engines for use in flammable gas and vapour atmospheres*

NS-EN 1838:2013, *Lighting applications — Emergency lighting*

NS-ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

NS-EN ISO 7010:2011, *Graphical symbols — Safety colours and safety signs — Registered safety sign*

NS-EN ISO 10855-1:2018, *Offshore containers and associated lifting sets — Part 1: Offshore container — Design, manufacture and marking of offshore containers*

NS-EN ISO 10855-2:2018, *Offshore containers and associated lifting sets — Part 2: Design, manufacture and marking of lifting set*

NS-EN ISO 10855-3:2018, *Offshore containers and associated lifting sets — Part 3: Periodic inspection, examination and testing*

NS-EN ISO 16852: 2016, *Flame arresters — Performance requirements, test methods and limits for use*

NS-EN ISO 13850: 2015, *Safety of machinery — Emergency stop function — Principles for design*

NS-EN ISO 28300: 2008, *Petroleum, petrochemical and natural gas industries — Venting of atmospheric and low-pressure storage tanks*

NS-EN ISO 80079 36:2016, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements title*

NEK 606:2016, *Cables for offshore installations — Halogen-free low smoke and flame-retardant / fire-resistant (HFFR-LS)*

NEK IEC 60079-13:2017, *Explosive atmospheres — Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"*

NEK IEC 60079-28:2015, *Explosive atmospheres — Part 28: Protection of equipment and transmission systems using optical radiation*

NEK IEC/TS 60079-32-1:2013+AMD1:2017, *Explosive atmospheres — Part 32-1: Electrostatic hazards, guidance*

NEK IEC 60533:2015, *Electrical and electronic installations in ships — Electromagnetic compatibility (EMC) - Ships with a metallic hull*

NEK IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards - Immunity standard for industrial environments*

NEK IEC 61000-6-3:2006, *Electromagnetic compatibility (EMC) — Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments*

NEK IEC 61000-6-4:2018, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards - Emission standard for industrial environments*

NEK IEC 61892-1:2015, *Mobile and fixed offshore units — Electrical installations — Part 1: general requirements and conditions*

NEK IEC 61892-2:2012, *Mobile and fixed offshore units — Electrical installations — Part 2: System design*

NEK IEC 61892-3:2012, *Mobile and fixed offshore units — Electrical installations — Part 3: Equipment*

NEK IEC 61892-4:2007, *Mobile and fixed offshore units — Electrical installations — Part 4: Cables*

NEK IEC 61892-6:2013, *Mobile and fixed offshore units — Electrical installations — Part 6: Installation*

NEK IEC 61892-7:2014, *Mobile and fixed offshore units — Electrical installations — Part 7: Hazardous areas*

NEK IEC 61936-1:2010+AMD1:2014, *Power installations exceeding 1 kV a.c — Part 1: Common rules*

DNVGL-ST-0378, *Standard for offshore and platform lifting appliances*

DNVGL-ST-E271 2.7-1: 2017, *Offshore containers*

DNVGL-ST-E273, 2.7-3: 2016, *Portable offshore units*

IMDG Code 2016 Edition, *International Maritime Dangerous Goods Code — Part 1: General provisions, definitions, training*

IMDG Code 2016 Edition, *International Maritime Dangerous Goods Code — Part 2: Classification*

IMDG Code 2016 Edition, *International Maritime Dangerous Goods Code — Part 3: Dangerous Goods List and provisions on limited quantities*

IMDG Code 2016 Edition, *International Maritime Dangerous Goods Code — Part 4: Packing and tank provisions*

IMDG Code 2016 Edition, *International Maritime Dangerous Goods Code — Part 5: Consignment provisions and procedures*

IMDG Code 2016 Edition, *International Maritime Dangerous Goods Code — Part 6: Construction and testing of packaging, IBC's, large packing, portable tanks and road tank vehicles*

IMDG Code 2016 Edition, *International Maritime Dangerous Goods Code — Part 7: Provision on transport operations*

Norwegian oil and gas:2018, 070 — *NORWEGIAN OIL AND GAS APPLICATION OF IEC 61508 AND IEC 61511 IN THE NORWEGIAN PETROLEUM INDUSTRY (Recommended SIL requirements)*

SfS Samarbeid for sikkerhet, *Working Together for Safety Recommendation 036E/2015 — Part Use of habitats*

3 Terms and definitions

In this document, the following terms and definitions apply.

3.1

shall (requirement)

expression in the content of a document conveying objectively verifiable criteria to be fulfilled and from which no deviation is permitted if compliance with the document is to be claimed

Note 1 to entry: Requirements are expressed using the verbal forms specified in ISO/IEC Directives, Part 2 clause 7.2 Table 3.

3.2

should (recommendation)

expression in the content of a document conveying a suggested possible choice or course of action deemed to be particularly suitable without necessarily mentioning or excluding others

Note 1 to entry: Recommendations are expressed using the verbal forms specified in ISO/IEC Directives, Part 2 clause 7.3 Table 4.

Note 2 to entry: In the negative form, a recommendation is the expression that a suggested possible choice or course of action is not preferred but it is not prohibited.

3.3

may (permission)

expression in the content of a document conveying consent or liberty (or opportunity) to do something

Note 1 to entry: Permissions are expressed using the verbal forms specified in ISO/IEC Directives Part 2 clause 7.4 Table 5.

3.4

can (possibility and capability)

1: expression in the content of a document conveying expected or conceivable material, physical or causal outcome.

2: expression in the content of a document conveying the ability, fitness, or quality necessary to do or achieve a specified thing

Note 1 to entry: Possibility and capability is expressed using the verbal forms specified in in ISO/IEC Directives, Part 2 clause 7.5 Table 6.

3.5

temporary equipment

equipment for time-limited use onboard platform and requires connection hook-up and/or constitutes a possible ignition source

Note 1 to entry: This could be any type of service container or equipment mounted on a frame

Note 2 to entry: This do not include equipment such as tools and extension cables, see Annex D

3.6

hot work

work operations which make use of or create sources of ignition

Note 1 to entry: These sources are normally divided into groups A and B, whereby group B sources are easier to control. Examples of type A sources of ignition include welding, hot tapping of pipe and tanks, use of open flame for heat shrinking, preheating, annealing, use of cutting torch and grinding Examples of type B sources of ignition heat shrinking by means of electric heat gun, sandblasting, electrical hand tools, insulation resistance testing, soldering, use of flash camera, non-Ex-proof electrical equipment and use of chisel or needle gun.

3.7

permanently manned

intended to be manned for more than 8 hr. pr. day

Note 1 to entry: Only related to enclosed space (room)

3.8

periodically manned

intended to be manned for more than 2 hr. pr. day and less than 8 hrs. pr. day

Note 1 to entry: Only related to enclosed space (room)

3.9

normally unmanned

neither permanently nor periodically manned

3.10

the Company

main company on the installation considered to be the operator

Note 1 to entry: See "Frame regulations", section 6,f.

3.11

harmonised standard

a European standard developed by a recognised European standardisation organisation to support a directive

Note 1 to entry: A harmonised standard is created following a request from the European Commission to one of these organisations which are developed based on the EU-directives, CEN, CENELEC, or ETSI

3.12

responsible person in the company

the person who approve shipment and use of temporary equipment which require special measures or routines to ensure safe hook-up and use

Note 1 to entry: This can be platform manger, offshore installation manager or another assigned person.

Note 2 to entry: Temporary equipment which are handled according to this procedure are normally in compliance with the requirements and therefore do not require special deviation for use, this concern typically items 1-8 in Table 10 in subclause 5.8.3.

4 Abbreviations

ABC	fire extinguishers approved for the following fires; wood, cloth, paper, flammable liquids, gasoline, grease and electrical equipment up to 1000 V
AC	alternating current
API	American Petroleum Institute
ATEX	Equipment and protective systems intended for use in potentially explosive atmospheres
CCR	central control room
CE	Communauté Européenne (European Community)
DSB	Directorate for Civil Protection and Emergency Planning
DC	direct current
EMC	electromagnetic compatibility
EN	European Norm
ESD	emergency shutdown system
EEA	European Economic Area
FSE	Regulations relating to safety in connection with work in and operation of electrical systems
HVAC	heat, ventilation and air conditioning
IE	instrument and telecommunications earth
IEC	International Electrotechnical Commission
IMDG	International Maritime Dangerous Goods
IP	Ingress Protection
ISO	International Organization for Standardisation
IS	intrinsically safe
LEL	lower explosion limit
MER	main earthing reference
NEK	Norwegian Electrotechnical Committee
NS	Norwegian Standard

PAGA	public address system and alarm system
PE	protective earth
PED	Pressure equipment directive
PRV	pressure relief valve (pressure safety valve - PSV)
ROV	remotely operated vehicle or equipment
SINTEF	Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology
UPS	uninterruptible power supply

5 Technical requirements

5.1 Introduction

5.1.1 Technical requirements and checklists

5.1.1.1 Technical requirements in this document.

Clause 5 contains the detailed technical requirements for temporary equipment.

Subclause 5.2 describes various types of container that are defined and also includes special requirements that can apply to various types of container.

Subclause 5.3 describes various types of equipment and includes special requirements for this equipment. The equipment can be installed on a skid or in a container.

Subclause 5.4 is divided into further subclauses for different disciplines and contains general discipline requirements.

The technical requirements for a temporary equipment are the sum of the requirements for the relevant container in 5.2, the equipment in 5.3 and discipline area stated in 5.4.

In addition, the general requirements for Ex-protection (see 5.5), marking and tagging/labelling (see 5.6), interface with the installation (see 5.7) and documentation (see 5.8) also apply.

5.1.1.2 Other technical requirements

In addition to the requirements in this document, authorities' requirements (regulations) and other recognised standards relating to the relevant equipment also apply. Where appropriate, this document refers to other standards for more detailed descriptions of the requirements.

NOTE See also first and last paragraph of the guidelines to the "Frame regulations", § 24 [9].

5.1.1.3 Checklists

In connection with the dispatch and receiving inspection of temporary equipment, checklists as shown in Annex C shall be used. A description of the requirements in connection with the items on the checklist, and the extent to which these requirements apply to a specified piece of equipment is provided in this document. The reference stated in the checklist indicates where the requirement is described in this document.

NOTE 1 Only some of the most relevant requirements are included on the checklist for verification.

By filling in the checklists, all contents shall be answered. The answer alternatives are: OK, NA or D.

OK means compliance with the requirement, NA means not relevant for this equipment (Not Applicable). D means non-compliance with the requirement (Defect). When the supplier/ owner of the equipment uses NA in the checklist, it should be explained why the checkpoint is not relevant.

Any Company agreed alternatives shall be detailed on the checklist.

Copies of checklists shall always follow the equipment, see 5.8.2.

NOTE 2 Guideline for use of checklist by Company: During the receiving inspection done by Company, the checklist status NC (Not Checked) might also be used.

5.1.2 Overview of equipment and requirements with references

Types of containers which are described in this document, are listed in Table 1.

Table 1 – Overview types of containers

Type	Description	Subclause
A	Accommodation container	5.2.1
B	Office, coffee bar, laboratories, control- rooms, container etc.	5.2.2
C	Workshop for hot work	5.2.3
D	(Vacant)	5.2.4
E	Workshop for cold work	5.2.5
F	(Vacant)	5.2.6
G	Container for diesel engine	5.2.7
H	(Vacant)	5.2.8
I	Stores for flammable material	5.2.9
J	Stores for non-flammable material	5.2.10
K	(Vacant)	5.2.11
L	Painters' workshop	5.2.12
M	Refrigeration and freezer container	5.2.13
N	Radio and communications room	5.2.14
O	Toilet container	5.2.15
P	Motor control centre	5.2.16
X	Other container with ignition source	5.2.17
Y	Other container with over pressure	5.2.18
Z	Other container without ignition sources	5.2.17

Types of equipment which are described in this document, are listed in Table 2.

Table 2 – Overview types of equipment

Type	Description	Subclause
U01	Diesel engine	5.3.1
U02	Air compressor	5.3.2
U03	Tanks	5.3.3
U04	High pressure cleaning equipment	5.3.4
U05	Steam boiler / generator	5.3.5
U06	Mobile crane	5.3.6
U07	Well service equipment	5.3.7
U08	Habitat for hot work Class A	5.3.8
U09	Equipment for waste handling	5.3.9
U10	Pneumatic / hydraulic pump equipment etc.	5.3.10
U98	Non-Ex-proof equipment on frame	5.3.11
U99	Ex-proof equipment on frame	5.3.12

Disciplines with special requirements which are described in this document, are listed in Table 3.

Table 3 – Overview of discipline requirements

Topic	Subclause
Structure	5.4.1
Fire protection and alarms	5.4.2
Gas and explosion protection	5.4.3
Signals to/from central control room and local alarms	5.4.4
Telecommunication	5.4.5
Electrical systems	5.4.6
HVAC	5.4.7
Health, safety and the environment	5.4.8

5.1.3 Temporary equipment used on mobile installations

Requirements for temporary equipment onboard mobile installations, the requirements of this document and those of International Maritime Organisation shall be applied.

NOTE See chapter XV of the "Facilities regulations" [12] for the integration of the EEA regulations, as directives may not apply should these be utilised on a mobile offshore unit or vessel.

5.2 Container types and requirements

5.2.1 Type A – Accommodation containers

Description of accommodation containers:

- a) cabins and corridors;
- b) mess and recreation rooms;
- c) sanitary rooms, changing rooms and laundries;
- d) galley, bakery and kitchen;
- e) offices for administrative tasks;
- f) other rooms used for accommodation purposes.

Special requirements for accommodation containers:

- a) accommodation containers shall be designed in accordance with NORSOK C-001 and NORSOK C-002;
- b) for fire class requirements in accommodation containers NORSOK S-001 subclause 20.4.6 shall apply;
- c) accommodation containers used as cabin shall follow 5.4.1.2
- d) accommodation containers used as cabin, shall be fitted with firewater, fire hoses and automatic sprinkler system.

NOTE 1 Guideline for use on board: Accommodation containers should be located in non-hazardous area. No doors, windows or openings should be in the direction of hazardous area.

NOTE 2 Guideline for use on board: Office for administrative tasks may be combined with containers for other purposes which are required to be within a hazardous area.

5.2.2 Type B: Offices, coffee bar, laboratory, control room container for ROV, well service etc.

Examples of manned containers having potential sources of ignition container:

- a) laboratories;
- b) offices;
- c) well service containers;
- d) ROV control room containers;
- e) test/calibration container;
- f) container for calibrating PRVs;
- g) coffee bar.

Special requirements to type B containers:

- a) offices, laboratories and coffee bars shall be designed in accordance with NORSOK C-001 and NORSOK C-002.

NOTE Guideline for use on board: Coffee bars should be located in non-hazardous areas.

5.2.3 Type C – Workshop for hot work

Description of workshop:

Workshops for different types of work operations, including hot work.

Special requirements for workshop for hot work containers:

- a) spot extractors shall be installed if the work causes air pollution.

NOTE Guideline for use on board: Type A hot work (see definition 3.6) should not be carried out in containers located in hazardous areas.

5.2.4 Type D: Vacant

5.2.5 Type E: Workshop for cold work

Description of container:

- a) container for different types of work operations without the use of ignition sources or ignition potential (independent of manning);
- b) manned (periodic or permanent) tool shop container for non-flammable material or tools.

5.2.6 Type F: Vacant

5.2.7 Type G: Container for diesel engine

Description of container:

Container with diesel engine, driven equipment (generator, pump, compressor etc.) and auxiliary equipment.

Special requirements for diesel engine containers:

- a) requirements for diesel engines, see 5.3.1;
- b) requirements for air inlets, see 5.4.7;
- c) diesel engines shall have an emergency stop on the outside of the container, see 5.4.8;
- d) machinery designed for unmanned operation shall be fitted with a warning signal for condition monitoring, see 5.4.4.1;
- e) for containers with diesel engines that do not meet zone 2 requirements (see paragraph below), see 5.3.1.4.2 for the conditions that shall be fulfilled before these can be used on board;
- f) a permanent fire extinguishing system with automatic release shall be installed in addition to a manual release located on the outside, see 5.4.2.3 (room extinguishing system).

Additional requirements for containers with built-in diesel engine approved for zone 2:

- a) general requirements for Ex-rating, see 5.5;
- b) alternative 1 or 2 below shall be fulfilled:

Alternative 1:

- all equipment in the container shall as a minimum be approved for use in zone 2;
- special requirements for the diesel engine, see 5.3.1.4.

Alternative 2:

- the container shall have pressurised mechanical ventilation and gas warning system;
- the ventilation shall be designed for adequate cooling of the container;
- the diesel engine shall have a separate air inlet for combustion air;

- ignition sources shall be disconnected, and the diesel engine shall be stopped when gas is detected or pressurisation in the container is lost;
- engine exhaust temperature shall not exceed 300 °C. The engine or exhaust pipe surface temperature shall not exceed 200 °C (T3). The test journal that documents this shall form part of the documentation.

5.2.8 Type H: Vacant

5.2.9 Type I: Stores for flammable material

Description of container:

- a) container for storing flammable material, paint and hazardous products;
- b) container for storing products in sealed, original wrapping and other products that cannot emit solvent vapours.

NOTE Guideline for use on board: All opening of paint product wrapping or storage of products that can emit solvent vapours should be carried out in container type "L", see 5.2.1.

5.2.10 Type J: Stores for non-flammable materials

Description of container:

- a) container for storing non-flammable material;
- b) unmanned tool container or equipped for work operations.

NOTE If there inside the container is a small bench with vice, this do not have to cause the container type to be changed to type E.

5.2.11 Type K: Vacant

5.2.12 Type L: Painters' workshop

Description of container:

Container where open contact with paint and solvents is possible.

Special requirements for painter's workshop containers:

- a) inside the container is classified as a hazardous area. Zone category shall be determined based on the product's emissions of flammable and explosive gases, and the exposure time if emissions occur;
- b) electrical equipment shall be rated relative to the materials stored with a minimum of gas group IIB and temperature rating T3 (200 °C);
- c) requisitioner shall specify HVAC requirements. The area surrounding a possible ventilation outlet shall be classified as a hazardous area, see NEK IEC 61892-7, subclause 5.7.4 c);
- d) containers shall have lockable doors with signs warning of toxic and flammable gases.

NOTE Guideline for use on board: Container should be located in a non-hazardous area (due to risk for self-ignition).

5.2.13 Type M: Refrigeration and freezer containers

Special requirements for refrigeration and freezer containers:

- a) refrigeration and freezer containers shall always be located in a non-hazardous area;
- b) it shall be possible to open the door from inside;
- c) a manual alarm shall be provided for personnel who may get trapped inside, see 5.4.4.1.

5.2.14 Type N: Radio and communications

No special description or requirements.

NOTE Guideline for use on board: Container should be located in a non-hazardous area.

5.2.15 Type O: Toilet container

No special description or requirements.

5.2.16 Type P: Containers for electrical equipment

Description of container:

Container for electrical panels, switchboards and/or other major electrical equipment.

Special requirements for electrical equipment containers:

- a) doors shall be lockable, preferably with a padlock.

5.2.17 Type X: Other containers with ignition sources

Description of container:

Other containers that are fitted with systems or equipment, which are not Ex-proof (potential ignition sources).

Special requirements for other containers with ignition sources:

- a) containers which are not approved for placement in hazardous area, are not according to general regulations for temporary equipment. Therefore, it requires special management in such cases. This requires as a minimum to include the elements which are described in 5.5.1.

5.2.18 Type Y: Other container with over pressure

Description of container:

Other containers that contains systems or equipment which are not Ex-proof (potential ignition sources)

Special requirements for other containers with over pressure:

- a) if the container contains flammable substances, the requirements for container type I apply;
- b) the container shall be fitted with over pressure (see 5.4.7) and gas detection, see 5.4.3.1.

5.2.19 Type Z: Other containers without ignition sources

Description of container:

Other containers in which all systems and all equipment are Ex-approved (no ignition sources) and where it is not relevant to use tools and equipment that are potential sources of ignition.

Special requirements for other containers without ignition sources:

- a) if the container contains flammable substances, the requirements for container type I apply.

NOTE Guideline for use on board: If the container is classified inside as hazardous area (due to potential leakage emissions of hydrocarbons or explosive gases) the container should be placed in an area classified as hazardous, minimum three metres from non-hazardous area (not applicable for container containing paint).

5.3 Other types of temporary equipment

5.3.1 Type U01: Diesel engines

5.3.1.1 General requirements

For diesel engines the following general requirements applies:

- a) electrical equipment, see 5.4.6;
- b) frames and lifting equipment, see 5.4.1.1;
- c) satisfactory vibration reducing measures shall be implemented;
- d) the exhaust pipe on the engine shall have an approved spark arrester;
- e) use of threaded or welded connections on the exhaust pipe is preferred. Flanged connections shall be fitted with fireproof gaskets;
- f) in the event of electric start, the battery shall be fitted with a circuit breaker connected to the installation's system for disconnection of ignition source, see 5.4.3. Requirements for batteries, battery circuit breaker and placement, see 5.4.6.4;
- g) that excess diesel shall be routed back to the diesel tank, not to the pump feed chamber. The return area in the tank shall be separated and ventilated to avoid continuous agitation of diesel and pressure build-up in the tank;
- h) that any oil or diesel leaks shall be collected by a drip tray positioned under the engine. To prevent leakage of diesel outside the container a bunded area encompassing the fuel system shall be provided. This shall be sized for 100 % of the worst-case leakage from internal tank(s) or provided with a leakage alarm;
- i) that all oil and diesel lines shall be made of hydrocarbon-resistant material;
- j) that the cap and dipstick for lube oil shall be secured against coming loose when the engine is running;
- k) that diesel tanks that are located such that the diesel is gravity-fed to the engine shall be fitted with a manual shut-off valve. When diesel engine is located inside a container this shut-off valve shall be operable from outside the container. Any indirect operation shall be designed to be fail safe;
- l) that diesel tanks shall be designed, built, maintained and tagged in accordance with the IMDG code. If shipped with fuel tank empty it is assumed that no more than 5 litres of fuel are in the system this is exempt from the IMDG requirements. The container shall be clearly marked externally to highlight that it shall be empty prior to transportation, when not in accordance with IMDG code.

5.3.1.2 General stop and safety functions

The automatic shut-off mechanisms shall as a minimum satisfy the requirements below, unless there are requirements for emergency shutdown level 'C' in accordance with 5.4.3.2, see 5.3.1.3.

The following safety functions shall be available:

- a) gas detector in the air inlet (for alternative to gas detector in combustion air inlet, see 5.3.1.5. For critical operations, see 5.3.1.3);
- b) local emergency stop, see 5.4.8;
- c) remote-controlled stop (e.g. the installation's ESD see 5.4.4.2 "a) Emergency stop from control room, 230 V signal". All ignition sources (electrical and non-electrical) shall be isolated by the remote-controlled stop;
- d) over speed protection;
engine protection devices shall cover surveillance as a minimum:
 - o lube oil pressure;
 - o cooling water temperature;
 - o exhaust temperature (only applicable for Ex-proof diesel engines);
- f) fire detector (requirements for diesel engine located in room or container). For critical operations, see 5.3.1.3.

This approval shall be added to the checklist from the supplier. See Table 4 for general stop and safety functions

Table 4 – General stop and safety functions for diesel engine

	Gas detection in air inlet	Local emergency stop	ESD from control room	Over speed protection	Engine protection devices ^a	Fire protection
Stop engine	X	X	X	X	X	X
Close dampers in combustion air inlet	X		X	X		X
Close diesel supply valve	X		X	X		X
Disconnect el. Power supply	X		X			X
Isolate ignition sources	X		X			X
a On continually manned units an alarm can replace the automatic stop. If this is the case, it shall be cleared and approved by the responsible person in the company in connection with the requisition. This approval shall be added to the supplier's checklist.						

5.3.1.3 Critical equipment and operations when using diesel engines

Automatic equipment shutdown can increase risk for certain well operations. Emergency shutdown level 'C' (see 5.4.3.2) can apply in such circumstances.

Compensating measures shall be covered by the procedure for manual shutdown in the event of an alarm or gas leakage signal. This procedure shall be attached to the documentation that accompanies the equipment, see 5.8.2.

For Ex-proof requirements, see Table 5 in 5.3.1.5.

Use of critical equipment with manual shutdown shall be cleared and approved by the responsible person in the company in connection with the requisition. This approval shall be added to the checklist from the supplier.

NOTE Examples of equipment and operations that can be defined as critical are as follows:

- Power pack for wire line units;
- Power pack for coiled tubing
- Power pack for coiled tubing power pack for pressure pipe;
- Pump units for special pumping operations (fracturing, well stimulation, sand control, cementing, "kill" pumps);
- Firefighting pumps

This applies where it is essential to establish a safe well condition before the machine is shut down. This critical equipment classification should not be applied due to business/ production related requirements

5.3.1.4 Ex-proof requirements for diesel engines

5.3.1.4.1 Additional requirements for zone 2-approved diesel engines

For detailed requirements for zone 2-approved diesel engines, see NS-EN 1834-1.

The following requirements also apply:

- a) for diesel engines located in containers special requirements in 5.2.7 apply;
- b) electrical systems for diesel engines shall be Ex-proof, see 5.5.1;
- c) for hot surfaces refer to NS-EN ISO 80079-36 clause 6.2. The engine's exhaust temperature shall not exceed 300 °C. The engine's surface temperature and the exhaust pipe temperature shall not exceed 200 °C. Maximum operational temperature and load shall be considered. The test journal that documents this shall form part of the documentation. Documentation shall include thermographic image of the engine taken with calibrated thermographic camera with 100 % load on engine;
- d) requirement for flame arresters, see NS-EN ISO 16852. Protection methods which provide alternative to flame arrestors can be utilised providing they are documented to provide equivalent safety level as described in referenced standard;
- e) supplier shall provide documentation for maximum temperature for rapid shut-down, see data sheet H. Before using diesel engines, the risk potential from instant shut down shall be evaluated (high temperatures).

Alternative to the NS-EN 1834-1 solution of Ex-proof, which is approved /certified by a technical inspection unit (Notified Body), can be accepted.

NOTE Guideline for use on board: See NS-EN 1834-1, 5.6, 5.7 and Figure 1.
The engine's air inlet and exhaust outlet should be located in an unclassified area.

5.3.1.4.2 Non-Ex-proof diesel engines

Non- Ex-proof diesel engines with associated equipment shall only be used at an adequate distance from hazardous areas and shall always be connected to the installation's emergency shutdown system for ignition sources.

An "adequate distance" means that any gas leakage shall be detected by the installation's gas detection system before explosive gas can reach the diesel engine.

This assessment shall be carried out and approved by the responsible person in the company in connection with the requisition.

This approval shall be added to the checklist from the supplier.

NOTE Guideline for use on board:
The assessment should comprise if there can be any remaining ignition sources in the equipment after shutdown by the platform's shutdown system, this includes any residual hot surfaces. Dispensations can be made for "cold" installations free from hydrocarbons (e.g. building or removing the installation) as described in Table 5 in 5.3.1.5.

5.3.1.5 Alternative to gas detector in the combustion air inlet

Application of this subclause requires prior approval by company. This approval shall be added to the checklist from the supplier.

Diesel engines not equipped with a gas detector and associated shutdown functions can be used when the requirements below are met, Table 5:

Table 5 – Requirements for gas detector, using key words.

	A) Cold installation (e.g. building or removing the installation)	B) Located at an adequate distance from classified areas	C) Located in or near zone 2 classified area
Diesel engine for non-critical equipment	a) No gas detector on the equipment. b) No ignition source shutdown.	a) Gas detectors in adjacent area(s), no gas detector on equipment. b) Automatic ignition source shutdown. c) Automatic closure of air inlet (overspeed protection). d) Location and use approved by responsible person of the company.	a) Gas detectors in adjacent area(s), no gas detector on equipment. b) Automatic ignition source shutdown. c) Automatic closure of air inlet (overspeed protection). d) Ex-approved equipment (approved for zone 2 as a minimum).
Diesel engine for critical equipment	a) No gas detector on the equipment. b) No ignition source shutdown.	a) Gas detectors in adjacent area(s), no gas detector on equipment. b) Automatic ignition source shutdown. Procedure for manual shutdown in the event of detected gas. c) Automatic closure of air inlet (overspeed protection). d) Ex-approved equipment (approved for zone 2 as a minimum).	a) Gas detectors in adjacent area(s), no gas detector on equipment. b) Automatic ignition source shutdown. Procedure for manual shutdown in the event of detected gas. c) Automatic closure of air inlet (overspeed protection). d) Ex-approved equipment (approved for zone 2 as a minimum).

Explanation of terminology used in the table with reference to the letter used

- a Gas detectors: "Gas detectors in adjacent area(s)" means that the installation is fitted with gas detection equipment in areas where there are potential sources of leakage and/or where gas from these potential sources of leakage will disperse. Any gas leakage shall be detectable before reaching the diesel engine.
- b Ignition source shutdown: "Ignition source shutdown" means that the diesel engine is connected to an ignition source control or shutdown system that shuts down the engine automatically when a low level of gas is detected (usually 10 % LEL) anywhere on the installation. This requirement applies to diesel engines that are used in non-critical activities.
- For critical equipment and activities with diesel engines, see 5.3.1.3
- c Automatic closure of air inlet. Diesel engines shall be fitted with the following safety devices:
- overspeed protection;
 - automatic rapid closing valve in combustion air;
 - rapid closing valve in fuel inlet.
- This arrangement ensures a rapid shutdown of the engine, in case gas reach the combustion air inlet without being detected.
- d Ex-approved equipment: It is recommended that diesel engines are located in non-hazardous areas. If diesel engines are located close to or in zone 2, the engine and all equipment on the machinery shall be approved for installation in zone 2, see 5.3.1.4.

5.3.2 Type U02: Air compressors

Description of equipment:

Diesel- or electrically operated compressor unit for the supply of compressed air.

Equipment requirements (air compressor):

- a) requirements for diesel engines, see 5.3.1;
- b) requirements for electric motors, see 5.4.6.1;
- c) general requirements for Ex-rating, see 5.5.1;
- d) requirements for frames and lifting equipment, see 5.4.1.1;
- e) for requirements to PRV, see 5.3.3;
- f) supply air duct shall be secured against leaks (e.g. all-welded or flanged with seals).

NOTE Guideline for use on board: Supply air should be taken from non-hazardous areas.

- g) drip tray for collecting oil or diesel leaks shall be installed;
- h) the compressor shall be fitted with various stop and safety functions (Table 6), including
 - o gas detector in air inlet, see paragraph below Table 6,
 - o local emergency stop, see 5.4.8;
 - o remotely controlled emergency shutdown from control room;
 - o various protection devices for the compressor. These shall as a minimum protect against low oil pressure and excessive cooling fluid temperature.

Table 6 – Minimum shut down requirements for air compressor

	Gas detection in air inlet (automatic)	Local emergency stop (manual)	Remote-controlled ESD from control room	Engine protection (automatic)
Compressor shutdown	X	X	X	X
Power disconnection	X		X	
Isolation of ignition sources	X		X	

Gas detector requirements for compressor

If the compressor air inlet is located in a container or other room with mechanical ventilation with a gas detector in the ventilation air inlet, there is no requirement for a gas detector in the compressor air inlet. The compressor shall be shut down when gas is detected on the installation (ignition source shutdown). For compressors with air inlet located in naturally ventilated areas, gas detector is required. Dispensations from this requirement can be handled in accordance with the same criteria as described for diesel engines in 5.3.1.5. Air compressors that are part of the start-up system for temporary diesel engines are exempt from the gas detector requirement.

Other references:

If specified by the requisitioner, the requirements in NORSOK R-001, 2.3, 5.3 and 5.11, shall be met for larger units.

5.3.3 Type U03: Vessels/tanks**Equipment description:**

Tanks which do not have other hook-up than the earthing (bonding) are not considered as temporary equipment according to this document. Only tanks which require hook-up for electric power, instrumentation or plant air, will be considered as temporary equipment.

NOTE 1 Guideline for use on board: Tanks that are not defined as temporary equipment, but are equipped with Ex approved components, for example valves, should be treated as other equipment not registered as temporary equipment. This is related to maintenance, inspection and marking, see Annex D.

Equipment requirements:

- a) vessels/tanks shall be approved, maintained and tagged/labelled in accordance with the IMDG code;
- b) requirements for frames and lifting equipment, see 5.4.1.1;
- c) vessels/tanks shall have earthing boss;
- d) if liquid or tank content is not electrically conductive, hoses shall be conductive or semiconductor, see requirements in NEK IEC/TS 60079-32-1 chapter 7.7.3;
- e) the hook-up interface shall comply with the requisition.

NOTE 2 Guideline for use on board: Bonding of tanks should be in accordance with NEK IEC/TS 60079-32-1. In zone 2 areas where the risk of electrostatic generation is sufficiently low, bonding of metal components solely for the control of static electricity may not be necessary. Dissipative and conductive materials should then be used in hoses etc. to avoid the retention of static electricity, see the mentioned standard for details.

Requirement for pressure relief valves, PRV:

- a) pressurised tanks/systems shall have protection against excess pressure;
- b) if abnormal conditions may occur inside or outside an atmospheric tank, the need for a PRV shall be considered (over pressure safety valve protection) in addition to normal ventilation systems, reference is made to NS-EN ISO 28300;
- c) if the normal venting system can become blocked, e.g. by a flame trap, then an additional vent system or PRV shall be used;
- d) pressure relief valves shall be certified and shall be maintained. For more information see Annex I.

NOTE 3 For information of alternative ways to perform ventilation of storage tanks, see NS-EN ISO 28300.

5.3.4 Type U04: High pressure cleaning equipment**Equipment description:**

Equipment with fluid, fluid and steam or fluid and abrasive/polishing medium under pressure is released into the atmosphere as a jet spray through a pipe or nozzle.

Equipment requirements:

- a) requirements for frames and lifting equipment, see 5.4.1.1;
- b) requirements for Ex-rating, see 5.5;

- c) for requirement of PRV, see 5.3.3;
- d) heated equipment shall be fitted with two safety devices to prevent overheating;
- e) heating of fluid or steam by electric power is preferred.

5.3.5 Type U05: Steam generator

Description of equipment:

- a) boiler for the supply of superheated water or steam (above 100 °C) normally heated by electrical heater or diesel burner;
- b) boiler will normally be placed in a container (type X or Y).

General requirements:

- a) requirements for frames and lifting equipment, see 5.4.1.1;
- b) boilers shall be designed and built to comply with the regulations for pressurized equipment [12];
- c) for requirement of PRV see 5.3.3;
- d) the unit shall be fitted with an alarm for low water level. In special hot pipe/coiled tube boilers this can be replaced with a dry-out alarm (excess temperature). Any feed tank installed shall have an alarm for low water level;
- e) general requirements for Ex-rating, see 5.5.1.

Requirements for boilers with diesel burner:

- a) diesel burner requirements follow the general requirements for diesel engines, see 5.3.1.1;
- b) use of boilers with diesel burners shall be considered a hot work Class A (due to open flame);
- c) use of boiler with diesel burner without Ex-proof, shall be cleared and approved by the responsible person in the company in connection with the requisition. This approval shall be added to the checklist from the supplier;
- d) a permanent fire extinguisher system with automatic release and external manual release shall be installed, see 5.4.2.3. In addition, there shall be at least one fire extinguisher type ABC, minimum 12 kg provided;
- e) the diesel burner shall have a gas detector in the air inlet. When placed in a container mechanical ventilation is required (reference 5.4.7) and the gas detector shall then be placed in the container's air inlet. For the gas detector system, see the requirements in 5.4.3.1.
As an alternative to gas detector, requirements as described in 5.3.1.5 can be applied for equipment located well away from Ex-hazardous area, see 5.5.1. This shall be approved by the responsible company representative;
- f) the diesel burner shall have a flame guard that automatically closes the diesel supply in case of loss of flame;
- g) the supplier shall provide documentation for maximum temperature for rapid shut-down, see data sheet H. Before using steam boiler/steam generator, the risk potential in the event of instant shut down shall be evaluated (high temperatures). This is also valid for Ex-proof boiler;
- h) condensate and steam returning to a boiler after being used in direct or indirect (potential) exposure to hydrocarbons (eg. In a heat exchanger) shall have gas-detection to screen for the presence of hydrocarbon gas or liquid, before it is returned to any feed water tank in the same container or housing as the boiler.

Requirements for stop and safety functions:

The automatic shutdown mechanisms shall as a minimum fulfil the requirements below and in Table 7:

- a) requirements for gas detector in the air inlet, see paragraph above e);
- b) requirements for local emergency stop device, see 5.4.8;
- c) requirements for remote-controlled stop device (e.g. the installation's ESD, see 5.4.4.2);