

Temporary equipment

This NORSOK standard is developed with broad petroleum industry participation by interested parties in the Norwegian petroleum industry and is owned by the Norwegian petroleum industry represented by The Norwegian Oil Industry Association and The Federation of Norwegian Industries. Please note that whilst every effort has been made to ensure the accuracy of this NORSOK standard, neither The Norwegian Oil Industry Association nor The Federation of Norwegian Industry or any of their members will assume liability for any use thereof. Standards Norway is responsible for the administration and publication of this NORSOK standard.

Standards Norway
Strandveien 18, P.O. Box 242
N-1326 Lysaker
NORWAY

Telephone: + 47 67 83 86 00
Fax: + 47 67 83 86 01
Email: petroleum@standard.no
Website: www.standard.no/petroleum

Copyrights reserved

Foreword	2
Introduction	2
1 Scope	3
2 Normative and informative references	3
2.1 Normative references	3
2.2 Informative references	5
3 Terms, definitions and abbreviations	5
3.1 Terms and definitions	5
3.2 Abbreviations	6
4 Technical requirements	7
4.1 Introduction	7
4.2 Containers	9
4.3 Other types of temporary equipment	12
4.4 Special technical requirements for temporary equipment	23
4.5 Ex-rating requirements for equipment in terms of location (zone division)	33
4.6 Marking and tagging	35
4.7 Hook-up interface	37
4.8 Documentation	37
Annex A (Normative and informative) Administrative guidelines	40
Annex B (Normative) Z-015 Data Sheet for installation	44
Annex C (Normative) Checklist matrices	46
Annex D (Informative) Equipment not registered as temporary equipment	50
Annex E (Normative) Qualification requirements for supplier personnel who operate, maintain and repair electrical equipment	52
Annex F (Normative) Mono cable	54
Annex G (Normative) Z-015 Declaration of conformity	61
Annex H (Normative) Z-015 Data sheet for temporary equipment	62
Annex I (Normative) Maintenance	65

Foreword

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

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

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

The NORSOK standards are prepared and published with support by The Norwegian Oil Industry Association and Federation of Norwegian Industry, Norwegian Ship owners' Association and the Petroleum Safety Authority Norway.

NORSOK standards are administered and published by Standards Norway.

Annexes B, C, E, F, G, H and I are normative, while Annexes A and D are informative.

Introduction

This revision is a minor adjustment related to Rev 3, June 2004. .

Container type D is deleted (compactor and waste storage)

Container type X (Container with ignition sources) is added

Further U08 (habitat) U09 (waste handling) and U010 (pneumatic hydraulic) are new.

Certain requirements are specified, in particular the requirements for ex-class (chapter 4.5) r "U05-Steam generator" and "U06-Mobile crane".

Norwegian and English edition

This standard is issued both in English and in Norwegian. With any conflicting text or content of these editions, it is the Norwegian version which will apply.

1 Scope

This NORSOK standard defines the minimum technical and safety-related requirements for temporary equipment used on installations on the Norwegian continental shelf.

2 Normative and informative references

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

NOTE – The reference to regulations from classification societies 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 NORSOK standard and can therefore be considered as a separate service.

2.1 Normative references

References to chapter /section in other documents are based on year of revision as listed below. It is however the last revision of respective standard which is valid.

Document references	Year	Title
Regulations:		
Frame regulations	2010	<i>Regulations relating to health, safety and the environment in the petroleum activities, issued by the Norwegian Petroleum Directorate. By royal decree 12th February 2010</i>
Management regulations	2011	<i>Regulations relating to management in the petroleum activities, issued by the Norwegian Petroleum Directorate.</i>
Facilities regulations	2011	<i>Regulations relating to design and outfitting of facilities etc. in the petroleum activities, issued by the Petroleum Safety Authority Norway .</i>
Activities regulations	2011	<i>Regulations relating to conducting petroleum activities issued by the Norwegian Petroleum Directorate.</i>
High Pressure Regulations (Forskrift for høytrykkspyling)	2003	<i>Regulations relating to the Working Environment Act, High Pressure Cleaning (no. 515), issued by the Directorate for Labour Inspection. FOR 1992-02-13 no 1263</i>
Regulations on Pressure Equipment (Forskrift om trykkpåkjent utstyr)	1999	<i>FOR Regulations relating to the Working Environment Act, Regulations for pressurized equipment (no. 192), issued by the Directorate for Labour Inspection. 1999-06-09 no 721</i>
Regulations on Fire Prevention - Measures and Prevention (Forskrift om brannforebyggende tiltak og tilsyn)	2002	<i>Regulations on Fire Prevention and Control, established by the DSB on 2002-06-26 nr 847.</i>
Machinery Regulations (Maskinforskriften)		<i>Regulations to the work environment, equipment (best No. 544) issued by the Directorate of Labour Inspection</i>
FUSEX 1996 (ATEX)	2003	<i>Regulations concerning equipment and protective systems in potentially explosive areas</i>
Fire Protection Act (Lov om brannvern)	2002	<i>Law on protection against fire, explosion and accidents involving hazardous substances and the fire service (fire and explosion protection law. Act 2002-06-14 no.20</i>
EMC	2007	<i>Directive on electromagnetic compatibility (emc) for electronic communications. Act 2007-01-22 no.89</i>
NORSOK		
NORSOK A-001N, rev.5	2008	<i>Utvikling av NORSOK-standarder</i>
NORSOK C-001, rev.3	2006	<i>Living quarters area</i>

Document references	Year	Title
NORSOK C-002, rev 3	2006	<i>Architectural components and equipment</i>
NORSOK D-002, rev 1	1998	<i>System requirements well intervention equipment</i>
NORSOK E-001, rev 5	2007	<i>Electrical systems</i>
NORSOK H-003, rev 1	2010	<i>Heating, ventilation and air conditioning (HVAC) and sanitary systems</i>
NORSOK R-001, rev 3	1997	<i>Mechanical equipment</i>
NORSOK R-002, rev 2	2012	<i>Lifting Equipment</i>
NORSOK R-003, rev 2	2004	<i>Safe use of lifting equipment</i>
NORSOK S-001, rev 4	2008	<i>Technical Safety</i>
NORSOK S-002, rev 4	2004	<i>Working environment</i>
NORSOK S-003, rev 3	2004	<i>Environmental</i>
NORSOK T-001, rev 4	2010	<i>Telecom systems</i>
NORSOK T-100, rev 4	2010	<i>Telecom subsystems</i>
NORSOK Z-DP-002, rev 2	1996	<i>Coding system</i>
IEC/NEK		
IEC 60079 (all parts)		<i>Equipment and Equipment Standards for Explosive Atmospheres</i>
IEC 60092-350	2008	<i>Electrical installations in ships – Part 350: Shipboard power cables – General construction and test requirements</i>
NEK IEC 60533	1999	<i>Electrical and electronic installations in ships with Electromagnetic compatibility</i>
IEC 61508 (all parts)		<i>Functional safety of electrical/electronic/programmable electronic safety-related systems</i>
IEC 61511 (all parts)		<i>Functional safety - Safety instrumented systems for the process industry sector</i>
IEC 61892-2	2005	<i>Mobile and fixed offshore units – Electrical installations – Part 2: System design</i>
IEC 61892-4	2007	<i>Mobile and fixed offshore units – Electrical installations – Part 4: Cables</i>
IEC 61892-6	2007	<i>Mobile and fixed offshore units – Electrical installations – Part 6: Installations</i>
IEC 61892-7	2007	<i>Mobile and fixed offshore units – Electrical installations – Part 7: Hazardous area</i>
NEK EN50272-1	2010	<i>Safety requirements for secondary batteries and battery installations -Part 1: General safety information</i>
NEK EN50272-2	2001	<i>Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries</i>
NEK TR 50404	2003	<i>Electrostatics - Code of practice for the avoidance of hazards due to static electricity</i>
NS/EN/ISO		
NS-EN 792 (all parts)		<i>Hand-held Non-electric Power Tools</i>
NS-EN 1834-1	2000	<i>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</i>
NS-EN 1838	1999	<i>Lighting applications – Emergency lighting</i>
NS-EN 12079-1	2006	<i>Offshore containers and associated lifting sets - Part 1: Offshore container - Design, manufacture and marking</i>
NS-EN 12079-2	2006	<i>Offshore containers and associated lifting sets - Part 2: Lifting sets - Design, manufacture and marking</i>
NS-EN 12079-3	2006	<i>Offshore containers and associated lifting sets - Part 3: Periodic inspection, examination and testing</i>
NS-EN 13463 (all parts)		<i>Non-electrical equipment for use in potentially explosive atmospheres</i>
NS-EN ISO 16852	2010	<i>Flame arresters - Performance requirements, test methods and limits for use</i>

Document references	Year	Title
NS-EN ISO 13850	2006	<i>Safety of machinery – Emergency stop equipment, functional aspects – Principles for design</i>
NS-EN ISO 28300 6 th edition	2008	<i>Petroleum, petrochemical and natural gas industries - Venting of atmospheric and low-pressure storage tanks</i>
EN 50381	2004	<i>Transportable ventilated rooms with or without an internal source of release (TVR)</i>
NS-EN 3 (all parts)		<i>Fire Material - Portable fire extinguishers</i>
NS 3910	2006	<i>Fire fighting equipment - Maintenance of portable fire extinguishers</i>
NS 4210	1983	<i>Colours used in warnings and warning signs</i>
Other references		
IMDG-code		<i>International Maritime Dangerous Goods Code (IMO)</i>
DNV 2.22	2011	<i>Lifting Appliances</i>
DNV 2.7-1	2006	<i>Offshore containers</i>
DNV 2.7.3	2011	<i>Portable offshore units</i>
SINTEF report No. TR A4596		<i>(Use of single core cable during well intervention operations, available only in Norwegian)</i>
SINTEF report No. TR F4975		<i>Use of electric high power equipment during well intervention with DC current</i>
Electricity authority (Elektrisitetstilsynet)	1993	<i>DBE-9039: Guidelines for grounding in maritime construction</i>
OLF 070, rev 02	2001	<i>APPLICATION OF IEC 61508 AND IEC 61511</i>
OLF 088, rev.3	2011	<i>OLF Guidelines for common models for work permits</i>

2.2 Informative references

None

3 Terms, definitions and abbreviations

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

3.1 Terms and definitions

3.1.1

temporary equipment

equipment intended for use on installations for a limited time and which requires hook-up and/or is a potential source of ignition

3.1.2

shall

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

3.1.3

should

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

3.1.4

can

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

3.1.5

could

verbal form used to indicate an allowable course of action within the limits in this NORSOK standard

3.1.6**hot work**

all work operations which make use of or create sources of ignition

NOTE – These sources are normally divided into groups A and B, whereby group B sources of ignition are easier to control.

- Examples of type A sources of ignition include welding, hot tapping of pipes and tanks, use of open flame for heat shrinking, preheating, annealing, use of cutting torch and grinding.
- Examples of type B sources of ignition include heat shrinking by means of electric heat gun, sandblasting, electrical hand tools, megger testing, soldering, use of flash camera, non-Ex-proof electrical equipment and use of chisel or needle gun.

3.1.7**permanently manned**

manned at least 8 h every day for at least 50 % of the unit's (equipment's) time on board on the installation.

NOTE – For containers this is relative to the time on board.

3.1.8**periodically manned**

manned during inspections, maintenance or other work with a planned duration of at least 2 h per day for at least 50 % of the installation or unit's operating time.

3.1.9**normally unmanned**

neither permanently nor periodically manned

3.1.10**the company**

main company on the installation

NOTE – See "Frame regulations", section 44.

3.1.11**Harmonised standard**

Standards which are developed based on EU-directives are named harmonised standards. This procedure of harmonisation is often named the "new method".

3.2 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	Regulations relating to equipment and safety systems for use in hazardous areas
BOP	blowout preventer
CCR	central control room
CE	Communauté Européenne (European Community mark)
DNV	Det Norske Veritas
DVD	Digital videodisc
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
FKE	Regulations relating to qualifications for electricians
FSH	Regulations relating to safety in connection with work in and operation of high voltage systems
FSL	Regulations relating to safety in connection with work in and operation of low voltage 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
NC	normally closed
NS	Standards Norway
PAGA	public address system and alarm system
PE	protective earth
PSV	pressure safety valve
ROV	remotely operated vehicle or equipment
SHE	Safety, Health, Environment
SJA	safety job analysis
SINTEF	Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology
TN-S	3-phase system with earthed neutral point
TPU	Regulations relating to pressurised equipment
UPS	uninterruptible power supply

4 Technical requirements

4.1 Introduction

4.1.1 Technical requirements and checklists

Technical requirements in this NORSOK standard

Clause 4 contains the detailed technical requirements for temporary equipment.

Subclause 4.2 describes various types of container that are defined and also includes special requirements that can apply to various types of container.

Subclause 4.3 describes various types of equipment and includes special requirements for this equipment. The equipment can be installed on a skid or in a container. Sub clause 4.4 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 4.2, the equipment in 4.3 and discipline area stated in 4.4.

In addition, the general requirements for Ex-protection (see 4.5), marking and tagging/labelling (see 4.6), interface with the installation (see 4.7) and documentation (see 4.8) also apply.

Other technical requirements

In addition to the requirements in this NORSOK standard, authorities' requirements (regulations) and other recognised standards relating to the relevant equipment also apply. Where appropriate, this NORSOK standard therefore refers to other documents for more detailed descriptions of the requirements. See also first and last paragraph of the guidelines to the "Frame regulations", § 24.

Checklists

In connection with the dispatch and receiving control 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 NORSOK standard. The reference stated in the checklist indicates where the requirement is described.

Note that only some of the most relevant requirements are included on the checklist for verification.

By filling in the checklists, all contents have to be answered. The answer alternatives as: OK, NC, NA or D. OK means compliance with the requirement, NC means not checked. 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.

Copies of checklists shall always follow the equipment.

4.1.2 Overview of equipment and requirements with references**Types of container described in this NORSOK standard - References (4.2):**

Type	Description	Subclause
A	Accommodation container	4.2.1
B	Office, coffee bar, laboratories, control-rooms, container etc.	4.2.2
C	Workshop for hot work	4.2.3
D	(Vacant)	4.2.4
E	Workshop for cold work	4.2.5
F	(Vacant)	4.2.6
G	Container for diesel engine	4.2.7
H	(Vacant)	4.2.8
I	Stores for flammable material	4.2.9
J	Stores for non-flammable material	4.2.10
K	(Vacant)	4.2.11
L	Painters' workshop	4.2.12
M	Refrigeration and freezer container	4.2.13
N	Radio and communications room	4.2.14
O	Toilet container	4.2.15
P	Motor control centre	4.2.16
X	Other container with ignition source	4.2.17
Y	Other container with ignition sources pressure regulated	4.2.18
Z	Other container without ignition sources	4.2.19

Types of equipment described in this NORSOK standard - References (4.3):

Type	Description	Subclause
U01	Diesel engine	4.3.1
U02	Aircompressor	4.3.2
U03	Tanks	4.3.3
U04	High pressure cleaning equipment	4.3.4
U05	Steam boiler / generator	4.3.5
U06	Mobile crane	4.3.6
U07	Well service equipment	4.3.7
U08	Habitat for hot work Class A	4.3.8
U09	Equipment for waste handling	4.3.9
U10	Pneumatic / hydraulic pump equipment etc.	4.3.10
U98	Non-Ex-proof equipment on frame	4.3.11
U99	Ex-proof equipment on frame	4.3.12

Discipline requirements described in this NORSOK standard - references (4.4):

Topic	Subclause
Structure	4.4.1
Fire protection and alarms	4.4.2
Gas and explosion protection	4.4.3
Signals to/from central control room and local alarms	4.4.4
Telecommunication	4.4.5
Electrical systems	4.4.6
HVAC	4.4.7
Health, safety and the environment	4.4.8

4.1.3 Temporary equipment used on mobile installations

See chapter XV of the "Facilities regulations" for the integration of the EEA regulations, which states that certain directives do not apply to mobile installations.

For mobile installations, see also section 3 of the "Frame regulations".

4.2 Containers

4.2.1 Type A: Accommodation containers

Description of container:

- a) Cabins and corridors;
- b) Mess and recreation rooms;
- c) Sanitary rooms, changing rooms and laundries;
- d) Galley, bakery and kitchen;
- e) Other rooms used for accommodation purposes.

Special requirements:

- a) Accommodation containers shall be designed in accordance with NORSOK C-001 and NORSOK C-002.
- b) Accommodation containers shall be located in a non-hazardous area. No doors, windows or openings shall face a hazardous area.
- c) For fire class requirements in accommodation containers, see the fire class specification in the regulations (see section 30 of the "Facilities regulations").
- d) Accommodation containers used as cabin (see description of container a) above) shall have fire dampers. Duct penetrations in fire class A building components and which are minimum 750 cm² in cross-section shall be fitted with an approved automatic fire damper.
A fire damper is not necessary if the duct penetration has a cross-section of less than 750 cm², in which case the duct penetration shall be no less than 3 mm gauge steel for a continuous length of 900 mm. This length shall be insulated to the same fire resistance as the adjoining building component.
- e) Accommodation containers shall be fitted with firewater, fire hoses and automatic sprinkler system.
- f) Accommodation container where high pressure cleaning (laundries, galleys etc.) requires higher IP for electric equipment, see IEC61892-2 clause 13.

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

Examples of manned containers having potential sources of ignition:

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

Special requirements:

- a) Offices, laboratories and coffee bars shall be designed in accordance with NORSOK C-001 and NORSOK C-002.
- b) Coffee bars shall always be located in non-hazardous areas.

4.2.3 Type C: Workshop for hot work

Description of container:

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

Special requirements:

- a) Spot extractors shall be installed if the work causes air pollution.
- b) Type A hot work (see 3.1.6) shall not be carried out in containers located in hazardous areas.

4.2.4 Type D: Vacant

4.2.5 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.

4.2.6 Type F: Vacant**4.2.7 Type G: Container for diesel engine****Description of container:**

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

Special requirements:

- a) Requirements for diesel engines, see 4.3.1.
- b) Requirements for air inlets, see 4.4.7.
- c) Diesel engines shall have an emergency stop on the outside of the container, see 4.4.8.
- d) Machinery designed for unmanned operation shall be fitted with an alarm for condition monitoring in a permanently manned control room, see 4.4.4 a).
- e) For containers with diesel engines that do not meet zone 2 requirements (see paragraph below), see 4.3.1.4 for the conditions that shall be satisfied in order for these to 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 4.4.2 (room extinguishing system).

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

- a) General requirements for Ex-rating, see 4.5.
- 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 4.3.1.4.
 - 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.
- c) 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.

4.2.8 Type H: Vacant**4.2.9 Type I: Stores for flammable materials****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. All opening of paint product wrapping or storage of products that can emit solvent vapours shall be carried out in container type "L", see 4.2.12.

4.2.10 Type J: Stores for non-flammable materials**Description of container:**

- a) Container for storing non-flammable material.
- b) Tool container not manned or equipped for work operations.

4.2.11 Type K: Vacant**4.2.12 Type L: Painters' workshop****Description of container:**

Container where open contact with paint and solvents is possible.

Special requirements:

- a) Container shall always be located in a non-hazardous area (due to risk for self-ignition).
- b) 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.
- c) Electrical equipment shall be approved for group II B and temperature rating T3 (200 °C).
- d) Requisitioner shall specify HVAC requirements. The area surrounding a possible ventilation outlet shall be classified as a hazardous area, see IEC 61892-7, Clause 4.
- e) Containers shall have lockable doors with signs warning of toxic and flammable gases.

4.2.13 Type M: Refrigeration and freezer containers**Special requirements:**

Refrigeration and freezer containers shall always be located in a non-hazardous area.

It shall be possible to open the door from inside.

An alarm shall be provided for personnel who may get trapped inside, see 4.4.4.

4.2.14 Type N: Radio and communications**Special requirements:**

Container shall be located in a non-hazardous area

4.2.15 Type O: Toilet container

No special description or requirements.

4.2.16 Type P: Containers for electrical equipment**Description of container:**

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

Special requirements:

Doors shall be lockable, preferably with a padlock.

4.2.17 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:

- a) Containers which are not approved for placement in Ex-hazard area, are not according to general regulations for temporary equipment. Therefore it requires special care for such events. This requires as a minimum to include the elements which are described in clause 5.5.1 e)

4.2.18 Type Y: Other container with ignition sources excess pressure ventilated**Description of container:**

Other containers in which all systems and all equipment which are not Ex-proof (potential ignition sources)

Special requirements:

- a) If the container contains flammable substances, the requirements for container type I apply.
- b) The container shall be fitted with ventilation (see 4.4.7) and gas detection, see 4.4.2. See 4.5.2 for details.

4.2.19 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 possible to use tools and equipment that are potential sources of ignition.

Special requirements:

- b) If the container contains flammable substances, the requirements for container type I apply.
- c) If the container is classified inside as hazardous explosive area (due to potential leakage emissions of hydrocarbons or explosive gases) the container should be placed in an explosive hazard area, minimum three metres from non-explosive area (not applicable for container containing paint).

4.3 Other types of temporary equipment

4.3.1 Type U01: Diesel engines

4.3.1.1 General requirements

- a) Requirements for electrical equipment, see 4.4.6.
- b) Requirements for frames and lifting equipment, see 4.4.1.
- c) Noise suppression shall be in accordance with NORSOK S-002, 5.5.
- d) Satisfactory vibration reducing measures shall be implemented.
- e) The exhaust pipe on the engine shall have an approved spark arrester.
- f) Use of threaded or welded connections on the exhaust pipe is preferred. Flanged connections shall be fitted with fireproof gaskets.
- g) 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 4.4.3. Requirements for batteries, battery circuit breaker and placement, see 4.4.6.4.
- h) 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.
- i) A drip tray for collecting any oil or diesel leaks shall be placed under the engine.
- j) All oil and diesel lines shall be made of hydrocarbon-resistant material (reinforced hose or piping).
- k) The cap and dipstick for lube oil shall be secured against coming loose when the engine is running.
- l) Diesel tanks that are located such that the diesel is gravity-fed to the engine shall be fitted with a manual shut-off valve.
- m) Diesel tanks shall be designed, built, maintained and tagged in accordance with the IMDG code.

4.3.1.2 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 4.4.3, see 4.3.1.3.

The following are obligatory:

- a) Gas detector in the air inlet (For alternative to gas detector in combustion air inlet, see 4.3.1.5. For critical operations, see 4.3.1.3.
- b) Local emergency stop, see 4.4.8.
- c) Remote-controlled stop(e.g. the installation's ESD see Clause 4.4.4 b) Emergency stop signals from CCR
- d) Over speed protection.
- e) Engine protection devices shall cover as a minimum
 - lube oil pressure,
 - cooling water temperature,
 - 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 4.3.1.3.

*Use of diesel engines with an alarm and manual shut off instead of the automatic stop, 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.*

	a) Gas detection in air inlet	b) Local emergency stop	c) ESD from control room	d) Over speed protection	e) Engine protection devices (see NOTE)	f) Fire protection
1) Stop engine	X	X	X	X	X	X
2) Close dampers in combustion air inlet	X		X	X		X
3) Close diesel supply valve	X		X	X		X
4) Disconnect el. power supply	X		X			X
5) Isolate ignition sources	X		X			X

NOTE – 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 checklist from the supplier.

4.3.1.3 Critical equipment and operations when using diesel engines

When carrying out certain operations with temporary well operations equipment, automatic shutdown can lead to increased risk. Emergency shutdown level 'c' (see 4.4.3) can apply in such circumstances.

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

- power pack for cable units;
- power pack for coiled tubing;
- power pack for pressure pipe;
- Pump units for special pumping operations (fracturing, well stimulation, sand control, cementing).

Before the machine is shut down a safe well condition is wanted. 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 4.7.2.

For Ex-proof requirements, see table in 4.3.1.4.

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.

4.3.1.4 Ex-proof requirements for diesel engines

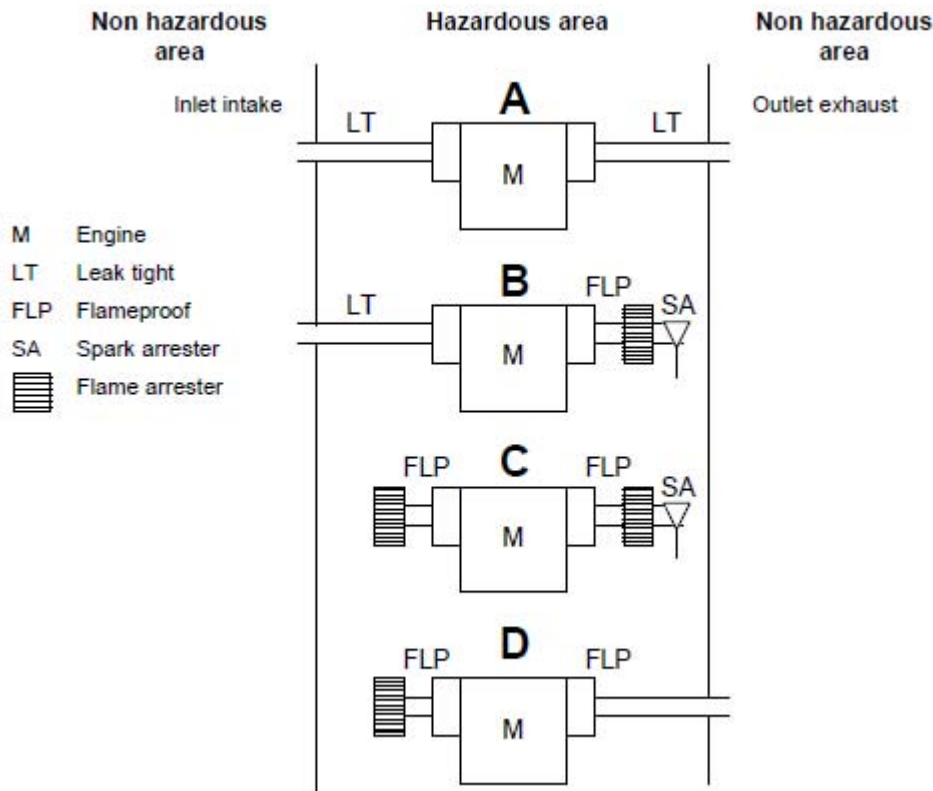
a) Additional requirements for zone 2-approved diesel engines

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

The following requirements also apply:

- For diesel engines located in containers special requirements in 4.2.7 apply.
- Electrical systems for diesel engines shall be Ex-proof, see 4.5.1.
- Refer to EN 1834-1, 5.3. 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. The test journal that documents this shall form part of the documentation.
- Requirement for flame arresters, see EN 1834-1, 5.6, 5.7 and Figure1. The engine's air inlet and exhaust outlet should be located in an unclassified area.
- 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)

Figure: 1 Principle layout for location of engine's air inlet and exhaust outlet



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

b) Non-Ex-proof diesel engines

Diesel engines with associated equipment not Ex-proof 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.

Dispensations can be made for "cold" installations free from hydrocarbons (e.g. building or removing the installation) as described in the table under 4.3.1.5.

4.3.1.5 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 if the requirements below are met.

The table shows these requirements 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) No 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) No 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 4.3.1.3.

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 inlet;
- rapid closing valve in fuel inlet.

Should gas reach the combustion air inlet without being detected this arrangement will ensure a rapid shutdown of the engine.

d. Ex-approved equipment

It is recommended that diesel engines are located in non-hazardous areas. If diesel engines are located closed to or in zone 2, the engine and all equipment on the machinery shall be approved for installation in zone 2, see 4.3.1.4.

4.3.2 Type U02: Air compressors

Description of equipment:

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

Equipment requirements:

- a) Requirements for diesel engines, see 4.3.1.
- b) Requirements for electric motors, see 4.4.6.1.
- c) General requirements for Ex-rating, see 4.5.1
- d) Requirements for frames and lifting equipment, see 4.4.1.
- e) For requirements to PSV, see 4.3.3
- f) Noise suppression shall comply with NORSOK S-002, 5.5.
- g) Supply air shall be taken from non-hazardous areas. Supply air duct shall be secured against leaks (all-welded or flanged with seals).
- h) Fan belts shall be antistatic.
- i) Drip tray for collecting oil or diesel leaks shall be installed.
- j) The compressor shall be fitted with various stop and safety functions, including
 - gas detector in air inlet, see paragraph below the table,
 - local emergency stop, see 4.4.8,
 - remotely controlled emergency shutdown from control room,
 - various protection devices for the compressor. These shall as a minimum protect against low oil pressure and excessive cooling fluid temperature.

The functions shall as a minimum meet the requirements in the table below.

	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 requirement. Dispensations from this requirement can be handled in accordance with the same criteria as described for diesel engines in 4.3.1.5. 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.

4.3.3 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 standard. Only tanks which require hook-up for electric power or instrumentation, will be considered as temporary equipment.

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 4.4.1.
- c) Vessels/tanks shall have earthing boss.
- d) The hook-up interface for shall comply with the requisition.

Requirement to safety valves, PSV:

Pressurised tanks/systems shall have protection for excess pressure.

If abnormal conditions may occur inside or outside an atmospheric tank, the need for a PSV is to be considered (over pressure safety valve protection) in addition to normal ventilation systems.

It is referred to EN ISO28300. If the normal venting system can become blocked, such as a flame trap, and then a vent system or Pressure Safety Valve shall be used.

Safety valves shall be certified and shall be maintained,

4.3.4 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 4.4.1.
- b) General requirements for Ex-rating, see 4.5.
- c) For requirement of PSV, see 4.3.3
- d) Heated equipment shall be fitted with two safety devices to prevent overheating.
- e) Heating of fluid or steam by electric power is preferred.

The "Regulations for high pressure cleaning" also apply.

4.3.5 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 4.4.1.
- b) Boilers shall be designed and built to comply with the regulations for pressurized equipment
- c) For requirement of PSV see 4.3.3
- d) The unit shall be fitted with an alarm for low water level. In special hot pipe boilers this can be replaced with a dry-out alarm (excess temperature). Any feed tank if installed shall have an alarm for low water level.
- e) General requirements for Ex-rating, see 4.5.1.

Requirements for boilers with diesel burner:

- a) Use of boilers with diesel burners shall be considered a hot work Class A (due to open flame).
- b) 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.
- c) Exhaust pipes shall have flameproof seals between flanged joints. Threaded or welded joints are preferred.
- d) The exhaust temperature (by the outlet) shall not exceed 300 °C. Surface temperature shall not exceed 200 °C. Test readings shall form part of the required documentation. If this requirement cannot be fulfilled, the conditions for dispensation in 4.5.1 shall be fulfilled.
- e) An approved spark arrester shall be fitted in the exhaust pipe. The spark arrester shall satisfy the requirements in EN 1834-1, 5.10 (technical requirements) and 6.4 (test requirements)
- f) 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.
- g) Drip tray shall be installed below burner unit to collect any diesel leaks.
- h) All oil and diesel lines/hoses shall be made of hydrocarbon-resistant material (armoured/reinforced hose or pipe).
- i) A permanent fire extinguisher system with automatic release and external manual release shall be installed, see 4.4.2. In addition there shall be at least one fire extinguisher type ABC, minimum 12 kg provided.
- j) The diesel burner shall have a gas detector in the air inlet. When placed in a container it is required mechanical ventilation (reference 4.4.7) and gas detector shall then be placed in the container's air inlet.

For the gas detector system, see the requirements in 4.4.3. As an alternative to gas detector, requirements as described in Clause 4.3.1.5 can be applied for equipment located well away from Ex-hazardous area, see clause 4.5.1. This must be approved by the responsible company representative.

- k) The diesel burner shall have flame guard who automatically closes the diesel supply in case of loss of flame.
- l) 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 by instant shut down shall be evaluated (high temperatures). This is also valid for Ex-proof boiler.

Requirements for stop and safety functions:

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

- a) Requirements for gas detector in the air inlet, see paragraph above j).
- b) Requirements for local emergency stop device, see 4.4.8.
- c) Requirements for remote-controlled stop device (e.g. the installation's ESD, see 4.4.3).
- d) Equipment protection devices shall as a minimum include those described in applicable regulations relating to boilers, issued by DSB. Annex 1 clause 2.
- e) Fire detector (requirements for diesel burner located in room or container) see 4.4.2.

	a) Gas detection in air inlet	b) Local emergency stop	c) Remote- controlled ESD from control room	d) Equipment protection	e) Fire detector
Stop diesel burner	X	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		X
Pressure relief of unit	X	X	X		X

4.3.6 Type U06: Mobile cranes

Equipment requirements:

Requirements for diesel engines, see 4.3.1.

Mobile crane are not built according to Z-015, therefore non-compliances have to be identified and compensated.

Below are lists with some requirements and other issues which are recommended to be considered in this context.

Requisitor (operator):

1. The requisitor must specify the equipment outriggers, lifting workload in tonnes and positioning on the platform, see Annex A 2.1

Supplier /at supplier:

1. If the crane is separated with an upper. Lifting section and lower carrier, the lower section has to be de-energized before the crane is used.
2. A local control cabinet must be fitted on the crane to handle alarm and shut –down functions. (See requirements in clause 4.4.2)
3. The crane shall be equipped with portable gas detectors, one of which the crane operator shall have in the operator cabin, connected to the local control cabinet. If power plugs/sockets are used for connections, individually, they shall not be interchangeable with other plugs or sockets.
4. A shut down valve shall be controlled by the gas detector equipment and give automatic shutdown of the combustion air for the engine with measurements of gas over 10% LEL:

5. The crane shall be delivered with rubber cable and plug (single phase. -230V, 50/60Hz) suitable for the sockets on the installation. At loss of external power, the mobile crane shall be shut down (see 4.4.4 b. Signal from CCR to container or equipment).
6. The crane is manned under operation. Therefore crane condition alarms do not need to be relayed to the CCR. See 4.4.4 a).
7. Local emergency stops shall be fitted on the crane (see 4.4.8).
8. The mobile cranes shall be checked and tested at the supplier's facility. In particular the shutdown functions have to be tested. All limit switches have to be function tested. The crane operator has to be familiar with the shutdown procedures and the alarms for the crane. As long as the crane is in operation, it will be manned by a crane operator, and this should be taken into consideration when shut downs are tested. E.g. high oil pressure and high cooling water temperature, the crane operator will shut down the crane.
9. Normally the crane will not have drip tray (see 4.3.1.1 i)). Therefore leakage checks must be carried out at the supplier's facility prior to delivery.
10. Crane cabins normally do not comply with the offshore HSE requirements.
 - a) The cabin heater with diesel burner is not acceptable.
 - b) Ventilation and fresh air may be achieved by opening a window.

At coastal base:

1. The mobile cranes are in general not certified with lifting arrangement for offshore operation. Therefore mobile crane has to be considered as cargo / load. The lift may vary from a single 25 ton lift in an approved lifting basket, to 100 tons made up of several lifts in several approved lifting baskets or frames. In such events, it should be referred to an approved SJA (Save job Analysis) under point 1.3 mechanical condition in the checklist, see Annex C. The SJA must be carried out and the user instructions must be available before the crane is lifted onto the platform.
2. The diesel tanks shall be empty during transport to the unit.

On board the unit:

1. Lack of space in the engine bay means that a spark arrestor will not have been fitted to the diesel engine. This is compensated for by positioning the crane in safe zone or by taking the exhaust to a safe area, see 4.3.1.4.
2. The shutdown system of the crane shall always be tested prior to usage on the installation.
3. The lack of a full alarm system (PA) on the crane, has to be compensated by the crane operator using "headset" in direct contact with the CCR.
4. The crane operator should be equipped with an Ex-flashlight and should wear it as long as he is working at and in the crane. This may be borrowed on the installation.
5. To ensure that the crane is de-energised when the crane operator leaves the crane, the emergency stop shall be activated.
6. Loads in the crane hook when the shut-down system is activated shall be lowered or left to hang on the brakes according the agreed procedure. This shall be clarified in the risk analysis.
7. The crane shall close down on the platform's lowest level of ignition source disconnection (see 4.4.3 and 4.4.4). This is carried out by supplying the crane with single phase – 230V, 50/60 Hz plug (Rubber cable) which connects to the socket on the platform and guided by the platform's shut down system. At loss of power, the mobile crane is shutdown.
8. The crane operator shall have the necessary familiarity with the crane including the documentation which accompanies the crane.
9. The diesel tank shall be empty during return transport from the platform.

4.3.7 Type U07: Well service equipment

Description of equipment:

All equipment used in connection with preparations for and performance of well interventions (wireline, coiled tubing, snubbing, well testing etc.).

These types of operation require a system that usually comprises several units, such as those shown in the table below (first column).

For the different units (first column), the special requirements for container or equipment listed in column two apply.

Unit	Checklist, special requirements
Wireline winch w/operator cabin (see NOTE)	Equipment type U07
Wireline logging unit/data collection container	Container type B
Wireline mast	Equipment type U07
Coiled tubing spooler (reel unit)	Equipment type U07
Coiled tubing injector	Equipment type U07
Control cabin	Container type B
Remotely-operated BOP control panel	Equipment type U07
Power pack, diesel	Container type G, Equipment type U01
Power pack, electrical	Container type Z, Equipment type U07
Workover control container for subsea operations	Container type B
Down holes operations	- Down holes equipment e.g. Tractor) not considered as temporary equipment; - Control cabin: Container type B; - Well equipment / boxes placed in the control cabin are included in the same type B container; - Well equipment / boxes placed in own container: Container type P; - Well equipment placed in own boxed: Equipment type U07, in Ex-approved version

NOTE – A typical wireline winch w/operator cabin is a winch with a simple cabin where all internal and external equipment is Ex-proof (no ignition sources). The cabin is ventilated for periodic or permanent manning, see 4.4.7.

In relation to shipment of equipment for tractor operation from supplier, the documentation of control/check of all equipment which are part of the setup, may be included in a common checklist, (see Annex C). The checklist for container type B (office) is recommended.

It shall be agreed upon by the responsible person in the company.

All individual temporary equipment units that are included, shall be listed in the remark field in the checklist.

Each separate equipment/container that are included in this checklist, and considered as temporary equipment according to the table above, shall have a separate declaration of conformity (Annex G).

Special requirements:

- Requirements for frames and lifting equipment, see 4.4.1.
- Detailed requirements for different types of wellservice equipment, see NORSOK D-002.

4.3.8 Type U08: Habitat for hot work Class A

Description of equipment:

- Welding habitat is primarily used for carrying out hot work in Ex-risk areas, and when such work cannot be carried out without substantial operational shut downs.
- Habitat is also used to provide good working conditions in order to carry out surface treatment where it is difficult to maintain suitable temperature, such as during painting work.

Special requirements:

- a) A welding habitat shall be built with fire-resistant material.
- b) The habitat covers (which should have a standardised size) are put together in order to achieve the desired size and shape of the habitat. It should be put together with zips and sealed by Velcro™ (hook and loop fasteners).
- c) The habitat should be prepared for fitting an air-lock.
- d) One of the walls in the habitat shall work as an emergency exit route and be equipped with a big zip in fluorescent colour which reaches from floor to roof. When using large habitats, more walls can be equipped with emergency exits.
- e) Habitats shall have a built in window for the fireguard who can observe the status in the habitat from outside.
- f) The air is supplied by using fans, for requirements related to ventilation, air inlet, overpressure etc. see 4.4.7. There are no requirements for air outlet fans. The air may be guided out through leakages and openings in the habitat cover.
- g) For requirements related to gas detection, see 4.4.3.
 - If propane gas is used inside the habitat, minimum one gas detector (calibrated for propane) shall be installed at the lowest point of the habitat.
 - During hot work class A, the use of several extra gas detectors should be considered. If the habitat is sited in an Ex-hazard area, a minimum of two portable detectors shall be placed outside the habitat cover, one of which shall always be on the windward side.
- h) Requirement for shutdown:
 - Power supply shall be disconnected at the lowest level, see 4.4.3, i.e. emergency shutdown level together with central ignition source disconnection (the common ignition source of the platform)
 - The fan shall be shut down by the detection of gas (low level) in the air inlet (not the common ignition source of the platform). The air valve shall be closed automatically when the fan stops.
- i) Powersupply:
 - The unit may have two power supply sources, one for utility power supply (socket which disconnects on lowest level) and one for the fan control system (which for example disconnects at ESD2). The utility power supply shall disconnect at a signal from control system (loss of excess pressure/ventilation and gas detection).
 - Alternatively the unit may have one power supply (which for example disconnects for ESD2). The part of the powersupply which is used for utility power, shall in addition to disconnection from CCR, also be disconnected separately by a signal from the platform (see 4.4.4 Signal to/ from, CCR and local alarms)
 - Pneumatically driven fans may be used, provided that shutdown during gas detection as described above, is fulfilled. Then the utility power supply and power supply to the control system should be two separate power supply sources from the platform as indicated in the first point above.
- j) For general requirement for Ex-class, see 4.5.1.
- k) Measures to avoid static electricity, shall be carried out for the parts of the equipment which are electrically isolated from the equipment's structure/frame, see requirement for bonding NEK TR 50404
- l) Hoses and air ducts shall be conductive or semi conductive, see requirement in NEK TR 50404 clause 5.5.5.

On board the platform:

- a) Habitats shall always be assembled together by personnel who have special competence and experience with operation of habitats.
- b) Habitats should be built in such a way that HC containing equipment or pipes are not inside the habitat. Alternatively, such parts shall be marked and covered with a welding blanket.
- c) Potential leakage points near the habitat shall be identified and the risk evaluated. The entrance to the habitat shall be situated on the "safer" side.
- d) The window in the habitat must be screened from the platform flame detectors during welding, use of open flames, etc.

4.3.9 Type U09: Equipment for Waste handling**Description of equipment, this may be:**

- Compactor for waste handling with electric and/or air connection.
- Grinder / Shredder for waste handling with electric and/or air connection

Special requirements:

- a) The equipment shall in general be placed in a non Ex-hazard area. Equipment that is Ex-approved and where use of the equipment does not cause ignition source risk, may be placed in Zone 2.
- b) The equipment shall be fitted with "dead man's control".
- c) The equipment shall have a drip tray for oil spill.

Pneumatic equipment for waste handling (without electric connection) with "dead man's control" and placed at a good distance from Ex-hazard areas, is not considered as temporary equipment.

4.3.10 Type U10: Pneumatic/hydraulic pump equipment**Description of equipment**

- a) Pneumatic or hydraulic equipment, normally skid mounted, normally used, situated in one position on board over a period of several days. Equipment which is moved about all the time, such as pneumatic barrel pumps or similar, is not considered to be temporary equipment, but to be portable handtools or similar (see Annex D 3).

Special requirements for the equipment:

- a) Compressors shall be equipped with "dead man's control".
- b) Hydraulic equipment shall have a drip tray for oil spill.
- c) For general requirements for Ex-class, see 4.5.1.
- d) The equipment shall have a bonding boss on the structure/frame for bonding to the structure /or earth rail on the platform.
- e) Measures to avoid static electricity shall be carried out on parts of the equipment that are electrically isolated from the equipment's structure/frame, see requirements for bonding in NEK TR 50404.
- f) Hoses shall be conductive or semi-conductive, see requirement in NEK TR 50404

Special requirements for use of the equipment:

- a) The appropriate type of hose, dimension and pressure rating
- b) Air pressure at the intake for pneumatic tool shall not exceed 7 bar. If the tool is rated for a lower pressure, this pressure shall not be exceeded.
- c) Only approved hose couplings and hose clamps shall be used (U-bolts are not permitted)
- d) Crow's foot shall be secured by splints
- e) Supply hoses shall be secured in addition with "Chinese fingers" or equivalent.

Emergency shutdown by gas

- a) Requirements for shut down at gas detection, see 4.4.3
- b) Shutdown of the equipment may be carried out by use of an electric closure valve, connected to socket to the unit. See 4.4.4 clause "Emergency stop from CCR". The closure valve shall automatically close at loss of power.

4.3.11 Type U98: Other non Ex-proof equipment in frame

Description of equipment:

Various equipment installed in a frame in which some parts of the equipment are not Ex-proof (ignition sources).

Special requirements:

Equipment that is not approved for operation in Ex-zone area, is not in compliance with general requirement for temporary equipment. Therefore special evaluation is required in such cases. This evaluation shall at least include the elements described in 4.5.1 e). The company has to decide in each case whether such equipment may be used,

4.3.12 Type U99: Other Ex-proof equipment in frame

Description of equipment:

Various equipment units installed on a frame where all parts of the equipment are Ex-proof (no ignition sources).

4.4 Special technical requirements for temporary equipment

4.4.1 Structural

Lifting devices

References for more information / detail requirement:

Facilities regulations § 3 (Definitions of Lifting devices and Lifting tools)
DNV 2.7.1 (offshore containers)
DNV 2.7.3 (portable offshore units)
NS-EN 12079-1 (Offshore container; Design, manufacture and marking)
NS-EN 12079-2 (Lifting sets; Design, manufacture and marking)
NS-EN 12079-3 (Periodic inspection, examination and testing)

Lifting devices which are used for lifting from the vessel to the platform, shall be certified according to one of the following standards; DNV 2.7-1, DNV 2.7-3 or NS-EN 12079-series. This ~~is also valid by~~ requirement applies also to internal lifts on floating installations, ref NORSOK R-002. Internal lifting on installations fixed to the seabed, the equipment shall either be certified according to one of the three standards above, the Machinery regulations or DNV 2.22.

There is no drop-test requirement for devices that are not used for the transport of dangerous goods. Such devices can be tested and approved by an authorised company. A definition of what constitutes dangerous goods is provided in the IMDG code.

The requirement for periodic inspection and maintenance, is found in the above listed standards.

Fire classification

References for more information/detail requirements:

Facilities regulations § 3 (definitions of fire classification)
Facilities regulations § 30
NORSOK S-001 chapter. 19.4.1

- For containers that normally are unmanned and do not contain flammable material, there is no requirement for fire classification provided that the container is of steel or aluminium construction.
- Other containers shall satisfy the general requirement for fire classification A0.
- Containers where equipment is in operation during emergency situations shall satisfy the requirement for fire classification A-60 (unless the company has specified otherwise), such as diesel operated emergency generators (type F) and emergency MCC room (type P). For accommodation containers, see 4.2.1.

There is no requirement for fire dampers in containers fire with class rating A0 or lower. However, there is a requirement for fire dampers for accommodation containers. For other containers, any requirements for fire dampers are to be specified by requisitioner.

For description of fire dampers, see 4.2.1

Emergency exit

References for more information/detail requirements:
NORSOK C-002 clause 7.25

Containers that are permanently or periodically manned, and either have an internal area exceeding 20 m² or the distance to the exit door exceeds 5 m (if there are several rooms or air locks this means the furthest distance to the outer door), shall have a separate emergency exit. The emergency exit shall have a minimum size of 800 mm x 800 mm and be possible to open from both sides.

Doors

References for more information/detail requirements:
NORSOK C-002 clause 7

Containers that are permanently or periodically manned, shall have an access door for personnel. All personnel access doors shall be self-closing. This requirement does not apply to transport doors or emergency exits.

In general, doors shall open outwards (away from the container).

For containers with pressurisation ventilation, doors shall open inwards (into the container). Alternatively the door can open outwards if the container is fitted with an overpressure protection device (not a flow switch).

Air locks

References for more information/detail requirements:
IEC 61892-7 clause 8

Containers approved for use in zone 1, and contain ignition sources (non-Ex-proof equipment), shall have pressurisation ventilation and air lock.

In an air lock the inner door should open into the container and the outer door outwards.

Attached lifting slings

References for more information/detail requirements:
NORSOK R-003 clause 7.11 and Annex D.3
NORSOK R-002 Annex C

Containers and frames shall have lifting slings fitted. For prolonged stays offshore the lifting slings may be removed for storage in a dry place.

Mechanical protection of components on units

References for more information/detail requirements:
NORSOK E-001 clause 4.13

External location of components (junction boxes, control panels, pipe connections, fans, etc.) should be avoided. Components that have to be located externally shall be installed within the equipment's outer frame.

4.4.2 Fire protection and alarms**Fire detection**

References for more information/detail requirements:
NORSOK S-001 clause 13

A fire detection and alarm system shall quickly, safely and unambiguously detect and warn of fire or potential outbreak of fire. Fire detection and alarm is required in cases where there is a real possibility that a fire can arise or be sustained.

Automatic fire alarm systems shall satisfy the requirements in NORSOK S-001, Clause 13.

The system shall be complete with its own control cabinet (preferably combined with the systems for monitoring gas and pressurisation in ventilated containers) and detectors. The detectors shall be located according to the most probable causes of fire.

If fire is detected the local alarm in the container shall be activated. .See 4.4.4 c) for details. The system in the container shall also be provided for safe and controlled shutdown of the equipment. The control panel shall have an output signal for alarm to CCR, see 4.4.4.

Portable extinguishers

References for more information/detail requirements:

Forskrift om brannforebyggende tiltak og tilsyn § 1-3 (definition)

NS 3910 Firefighting equipment - Maintenance of portable fire extinguishers

Portable extinguishers are required in cases where there is a real possibility that a fire can arise or be sustained, as well as in all normally manned containers. Portable fire extinguishers of adequate size and quantity suitable for the anticipated development of the fire shall accompany the equipment. Permanent brackets for such appliances shall be provided.

The following standards shall be met:

- For portable fire extinguishers: See DSB: Fire Protection Act with regulations and guidelines, § 1-3. Portable fire extinguishers which are tested and certified in accordance with the requirement in the *Regulations for pressurized equipment*(no. 721) and which is additionally type approved by a recognized notified body according to NS-EN-3 or other equal standards regards to functionality and efficiency.
- For location and quantity: DSB: Fire Protection Act with regulations and guidelines, section 4-3 relating to manual fire extinguishers.
- For inspection and maintenance: NS 3910.

Permanently installed fire extinguishing systems

References for more information/detail requirements:

NORSOK S-001 clause 20.4.5 (sprinkler)

NORSOK S-001 clause 20.4.10 (fire extinguishing systems for rooms)

Containers in which equipment has a particularly high risk of fire (flammable material, flammable liquids and hot surfaces) or where a fire can arise and will have a particularly high safety risk for personnel, shall be fitted with a permanently installed fire extinguishing system. This applies for example for accommodation and diesel engine containers.

When this requirement applies to permanently and periodically manned containers, the fire extinguishing system shall be an automatic release sprinkler system. The sprinkler system shall be protected against frost. In other containers (for example equipment with diesel operation), other systems can be used, e.g. room fire extinguishing systems of "water mist" type or inert gas approved for this purpose.

Requirements for room fire extinguishing systems also apply in cases where equipment with an extra high risk of fire is installed on a skid and enclosed as a 'closed room' due to noise emission, fire requirements and environmental requirements.

4.4.3 Gas and explosion protection

Gas detector

References for more information/detail requirements:

Facilities regulations; § 32

NORSOK S-001 clause 12

The gas detection and alarm system shall provide a quick and reliable alarm of explosive gases. The system shall be complete with its own control cabinet (preferably combined with the systems for monitoring fire and pressurisation in ventilated containers) and detectors, and shall be capable of shutting down the equipment locally. This system and the system for ventilation shall always be Ex-proof approved for zone 1.

Automatic gas alarm systems shall meet the requirements in NORSOK S-001, clause 12.

Gas detectors shall be installed in all air inlets to mechanically ventilated containers, in all air inlets on combustion engines and compressors, and in all ventilation outlets from classified areas. If the air inlet goes to several containers it is only necessary to monitor the common inlet. In general, it is acceptable to have a detector in the air inlet without voting system.

In containers where all installation is Ex-proof and where the use of tools or equipment will not create any ignition potential, gas detectors are not necessary in any air inlets.

For alternatives to gas detectors and further details, see s 4.3.1.5 (combustion engines), 4.3.2 (air compressor) and 4.5.2 (air inlet, general).

If gas is detected the local alarm in the container shall be activated. See 4.4.4 c) for details. . The control panel shall have an output signal for alarm to CCR, see 4.4.4.

The alarm to the CCR shall always be given at 10 % LEL.

Local ignition source disconnection

References for more information/detail requirements:

IEC 61892-7 clause 5.5

NORSOK S-001 clause 14

In containers where gas detectors are installed, a local ESD shall provide a safe and controlled shutdown of the equipment (disconnection of all sources of ignition).

Emergency shutdown level (disconnection of ignition sources):

- a) If the container does not contain important equipment, disconnection shall occur at 10 % LEL.
- b) If the container contains important equipment, disconnection shall occur at 30 % LEL (if two or more detectors, when the first reaches 30 % LEL). Emergency shutdown level "B" shall be agreed between the supplier and the company.
- c) If automatic shutdown of the equipment increases the risk to personnel, the emergency shutdown system shall warn the operator in a permanently manned control station. For such alerts the operator shall immediately commence shutdown of the equipment in accordance with approved procedures. For emergency shutdown level "c", the procedure for shutdown of the equipment shall form part of the documentation that accompanies the equipment, see 4.8.2. This shall include the procedure for manual shutdown in the event of gas. The implementation of manual shutdown shall be clarified with and approved by the responsible person in the company in connection with the requisition. The approval shall be added to the checklist from the supplier. This requirement applies for equipment, which contain power sources, e.g. diesel engine or battery. The requirement does not apply for minor battery systems which are Ex-proof (for example emergency light) or other power systems, e.g. accumulator with compressed gas.

Central ignition source disconnection

References for more information/detail requirements:

IEC 61892-7 clause 5.5

NORSOK S-001 clause 14.4.11

Most installations also have a system for shutting down the power supply to temporary equipment.

Especially for equipment mentioned in b) and c) above, checks shall be carried out to ensure that the power supply from the installation is not shut down at lower levels.

There is also a general requirement that containers or equipment that are not approved for zone 1 shall have a power supply from the installation that is connected to the ignition source disconnection system, e.g. the installation's electrical sockets. See 4.5 for details.

Shutdown of UPS and battery systems

For battery systems which can be disconnected when main power is lost, the installation main power voltage is used as the disconnect signal, see description of emergency stop in 4.4.4. See also 4.4.6.4, Batteries.

4.4.4 Signals to/from central control room

a) Signal from container or equipment to CCR

References for more information/detail requirements:

NORSOK S-001 clause 14.4.11 (fire- and gas alarm to CCR)

IEC 61892-7 clause 8.5 (loss of over pressure)

NORSOK S-001 clause 16.4.4 (loss of over pressure)

Depending on the configuration of the container or equipment, the following signals shall be transmittable:

- Gas alarm (always for equipment fitted with a gas detector).
- Fire alarm (always for equipment fitted with a fire detector).
- Manual alarm.
- Loss of pressurisation (always for equipment fitted with a device for monitoring air supply or pressurisation, see 4.4.7).
- Condition monitoring alarms (can be connected to a common alarm to the CCR).

Signals from containers to the CCR shall be voltage-free contacts, where the activated signal (alarm) shall be a closed contact. These signals shall be available individually inside a local panel or in a junction box inside the container or on the equipment.

The connection interface will vary on different installations. In many cases there is a requirement for ohm resistors in parallel and in series with signal contact for circuit monitoring. "Z-015 Data Sheets for installation" shall therefore be checked in every case, see Annex B.

Output alarms shall not be activated due to loss of power to the temporary equipment control panel.

Manual alarm

Temporary equipment that cannot be left unattended and where operator may need to call for assistance shall be fitted with a manual alarm for attracting attention if other arrangements have not been made for calling for assistance in work operations.

Condition monitoring alarms

This means alarms from monitoring systems for machinery, processes and similar. Temporary equipment, which has this local monitoring system, shall have a condition monitoring signal output to the control room if the equipment can be operated unmanned.

b) Signals from CCR to container or equipment

References for more information/detail requirements:

- IEC 61892-7 clause 5.5 (requirements for shutdown)
- NORSOK S-001 14.4.11 (requirements for shutdown)
- Facilities regulations § 18 (alarm signals from CCR)
- NORSOK S-001 clause 17.4.2 (PA-alarm signals)

Depending on the configuration of the container or equipment, the following signals shall be transmittable:

- Emergency stop from control room (e.g. rotating machinery).
- Shutdown, e.g. battery systems.
- Information via the installation's alarm system (PA system).

Signals from CCR to container shall be as follows:

Emergency stop from control room

230 V AC-signal, emergency stop activated through loss of voltage (e.g. diesel engine shutdown). This 230 V AC signal will normally come from a socket on the installation, whereby the socket is connected to the lowest level ignition source disconnection system.

Shutdown

Voltage-free contact, activated signal (disconnection) is normal open circuit (check the datasheet of the unit for more specified information, (used e.g. for battery system, see 4.4.3).

Information via installation's alarm system

The PA system, telephones and flashing lights can be used. The alarm system shall satisfy the requirements in 4.4.5.

c) Alarms on temporary equipment

References for more information/detail requirements:

NORSOK S-001 clause 17.4.1 (requirement for light signal in addition to sound signal)

In noisy containers (over 85 dbA) there shall be a yellow flashing light in addition to the local alarm in the container.

4.4.5 Telecommunications

References for more information/detail requirements:

Facilities regulations § 18

NORSOK S-001 clause 17 (PA)

NORSOK T-001 (datasheet Annex B for telephone PA, alarm lamps)

NORSOK T-100 clause 5 (PA)

Telephone

Containers that are permanently manned shall be fitted with a telephone for connection to the telephone network on the installation.

PAGA loudspeaker

Containers that are permanently or periodically manned shall be fitted with PAGA loudspeakers that can be connected to the installation's loudspeaker system. PAGA loudspeakers shall be adapted to the system on the installation such as the installation's status alarms, including fire, gas and evacuation alarms as well as PA announcements, are communicated inside the containers.

Container shall have two systems for PAGA (A and B) with each of them independent connection to the platform system.

Loudspeakers and loud range shall be in accordance to NORSOK T-000 Clause 5.

Loudspeakers and telephones shall not share the same cable.

Alarm lamps

In particularly noisy rooms (with noise level above 85 dBA) light signals shall be installed in accordance with NORSOK T-000 Clause 5 and NORSOK S-001 Clause 17.4. The lamp shall be controlled on/off by a built-in control system operated by the installation's PAGA system. A separate interface (connections) to the lamp will therefore be avoided (i.e. same interface as PAGA).

Data network

Containers which require data network connection, have to be equipped with a fibre cable for fibreoptic connection. Fibre cables, connectors and network equipment have to be suitable for the actual installation. It has to be clarified which parts the operator on the installation have to provide. The connection shall be in accordance with IEC 60079-28 «Explosive atmospheres Part 28: Protection of equipment and transmission systems for optical radiation».

4.4.6 Electrical systems

References for more information/detail requirements:

Facilities regulations § 47

IEC 61892

Norsok E-001

4.4.6.1 Detailed requirements for electrical systems

For detailed requirements for electrical systems and electrical installation see the references to NORSOK standards in the table below.

Requirements for electrical systems

Topic	Description	NORSOK E-001 rev.5
Earthing	System earth, earth reference PE, IE, bonding, earth clamp	5.2 9.1
Lighting system	Lighting equipment	5.4.3, 5.7.6, 5.8
Sockets		5.4.4, 5.4.5, 9.13.3
Heating cable		5.7.6, 6.8. 9.8
Ignition source disconnect		5.13
Generators	Generators	6.2
Motors	IP, Ex-rating	5.7.2
Motor protection	Protection	5.7.4
Circuits in distribution boards	Protection of various circuits	5.7.6
Ex-proof rating	Applications for various Ex-ratings	10.2.2
IP rating		5.10
EMC	Electromagnetic compatibility	5.6.8, 6.6.2
Cabling	Type, segregation, installation, fastening, nipples, termination	7.9.2
Mono cable	See Annex F	
Fastening arrangements	Cable trays, equipment	9.2.5, 9.2.10, 9.13.4, 9.13.8
Marking	Cable trays, equipment, cables, wires, colour coding, earth	9.12

Note: For cables without NEK TS 606 declaration of conformity, the supplier shall obtain documentation from the manufacturer (or his representative) which shows that the cables and the use of the cable are in accordance with the technical requirements in IEC 61892-4.

4.4.6.2 Electro additional requirements

Emergency lighting

References for more information/detail requirements:

- Facilities regulations § 38
- IEC 61892-2 clause 11.4
- NORSOK E-001 clause 5.8.3
- NORSOK S-001 clause 18.4.4
- NS-EN 1838

Containers that are permanently or periodically manned shall be fitted with emergency lighting. The emergency light shall be zone 1 Ex-approved. A light fitting with integral battery and battery capacity for at least 30 min shall be used.

Short circuit level

References for more information/detail requirements:

- IEC 61892-2 clause 7.5.4 (protection for short circuit)
- IEC 61892-2 clause 9.4 (short circuit measurements)
- IEC 61892-2 clause 10.2 (requirements for short circuit protection)
- NORSOK E-001 clause 5.6.2 and 5.6.6

Maximum allowable short circuit level for the temporary equipment shall be stated on the data sheet, see Annex H. This short circuit level shall not be lower than the maximum short circuit level at the connection point on the installation (see the installation's data sheet).

If any special considerations are to be taken due to high or low short circuit level on electrical systems, this shall be stated on the requisition.

High voltage equipment and installations

References for more information/detail requirements:

- NORSOK E-001 clause 4.18, 6.1, 9.1.3, 9.2.2

High voltage equipment and installations shall be marked with signs as shown in NS 4210, sign no. C.6. The signs shall have the following text: "Høyspenning - livsfare" (or for example in English "High voltage – danger").

Rooms that contain high voltage equipment shall be fitted with lockable doors and shall not be accessible to unauthorised personnel.

Switchgear for high voltage or high voltage equipment shall be fitted with lockable circuit breakers.

This also applies to equipment which is supplied from low voltage plant.

High voltage windings on transformers, switchboards bus bars etc. shall be fitted with connector for portable earthing equipment. Alternatively the high voltage equipment can be equipped with earthing switch.

Circuit Breaker for all poles:

All electric components/equipment shall have a switch for circuit breaker at the board or distributor. Such a switch shall disconnect all poles and also include neutral conductor.

4.4.6.3 Earthing

References for more information/detail requirements:

- IEC 61892-6 clause 4
- NORSOK E-001 kapittel 9.1
- NEK TR 50404 (bonding)
- Elektrisitetstilsynet Guidelines for earthing for maritime installations

Earthing shall be carried out as stated in the NORSOK standards referred to in the table in 4.4.6.1. The following also apply:

Main earth reference (MER):

The installation's main structure is used to establish different earthing systems. In a container, the container's structure can be used (see paragraph below).

Instrumentation and telecommunication earth (IE):

IE earth is the earth reference for IS, non-IS and telecommunications circuits etc. For local instrument earthing systems in a container, the container's structure can be used as the MER. For instrument systems in the container which are integrated with the installation systems, the associated earth system on the installation shall be used. Interface points can include a junction box with dedicated, separated, isolated and tagged terminals for the earth system(s) used.

Protective earth (PE):

The PE connection to the container shall be a part of the power cable (or cables) from the junction box or socket on the installation. The cross section for PE-conductor shall satisfy the requirements in IEC 61892-4 table 2. The PE earth connection can be the cable armour or a separate wire in the cable. (NB: The cable reinforcement shall be in copper). If the cross-section of the cable does not satisfy the requirements for capacity of bringing forward the PE, an extra connector in the cable shall be used.

Bonding:

Where the PE wire from the installation terminates in a terminal of a junction box, cabinet or other equipment in the container, a bonding connection shall be established from the terminal in the equipment to an earthing point on the container structure. This will ensure that the container with electrical equipment has an equalising connection to the installation. If there are several power supplies from the installation, bonding shall be performed for each power supply. In cases where the installation has special bonding requirements, this shall be stated on the requisition.

All temporary equipment shall have external earthing boss for local bonding to platform structure. The cross section for Bonding-conductor shall satisfy the requirements in IEC 61892-4 table 1. The bonding connector without protection shall have a cross section of at least 6 mm².

4.4.6.4 Battery system

References for more information/detail requirements:

- IEC 61892-3 clause 9 (battery)
- IEC 61892-6 clause 10 (battery placement, capsule)
- IEC 61892-7 clause 8.6 (ventilation of battery system)
- NORSOK E-001 clause 6.1
- NEK EN50272-1 (safety-information for battery systems)
- NEK EN50272-2 (safety requirements for battery systems)

Non-Ex-proof battery system should be avoided. "Battery system" means all circuits that can be powered by a battery.

Non-Ex-proof battery circuit breaker can be used if the battery system is located inside a ventilated container and with shutdown level a) and the battery system shuts down with loss of AC power supply and with loss of ventilation.

Non-Ex-proof battery circuit breaker (not zone 1 approved) shall be controlled by a shutdown system, see 4.4.3 and 4.4.4.

After shut down only Ex-proof circuits and equipment are allowed to be energised (except terminals on battery and breaker).

Non Ex-proof battery systems that do not shut down with loss of AC power supply, shall have terminals for external shutdown signal from the platform ESD system. The signal from platform will normally be voltage free NC contact (contacts open on activated ESD).

Use of non Ex-proof battery systems 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.

For requirements for placement of the battery (in cabinet together with other equipment, own battery boxes, separate ventilated cabinet or room) refer to IEC 61892-6.

4.4.6.5 EMC

References for more information/detail requirements:

- Facilities regulations § 77
- IEC 60533 Annex C.2.3 (electromagnetic compability, grounding)

In general the installation shall be made in accordance with the recommendations in IEC 60533 Annex C, "Measures to achieve EMC".

EMC earthing of equipment and cabinets shall be carried out in accordance with the recommendations in IEC 60533 Annex C.2.3.

4.4.7 HVAC

References for more information/detail requirements:

- Facilities regulations § 14
- IEC 61892-7 clause 8 (ventilation in Ex-hazard areas)
- NORSOK S-001 clause 16.4 (HVAC function requirements)
- NORSOK H-003, clause 4 (HVAC-systems).

Mechanical ventilation

The following containers require mechanical ventilation:

- a) Containers in which ignition sources are present (in order to secure ignition source disconnection in the event of gas).
- b) Containers that are permanently or periodically manned (requirements for fresh air, see NORSOK S-002 clause 5.7).
- c) Containers in which equipment emits large amounts of heat (cooling requirement).
- d) Containers in which equipment emits gases or other pollution.
- e) Habitat for hot work.

There shall be at least six air changes per hour.

In general all containers in which ignition sources are present shall have mechanical ventilation. Exceptions will only be allowed for containers that fulfil the requirements in the table in 4.5.2. item 8, NOTE. Natural ventilation can be used if it results in a satisfactory indoor climate for situations b), c) and d) above (e.g. for container type E).

Air inlet

References for more information/detail requirements:

NORSOK S-001 chapter 16.4.6 (air inlet and outlet)

All air inlets shall be fitted with a gas detector, see 4.4.3. In containers where all installation is Ex-proof and where the use of tools or equipment will not create any ignition potential, a gas detector is not required.

For combustion air to diesel engines, see 4.3.1.4 a), item d).

All other combustion air inlets (e.g. for boilers and all air inlets for pressurised rooms) shall be located in non-hazardous areas and at least 3 m from each boundary with zone 2 areas. Air inlet ducts where leakages can occur shall have an over pressure system.

Pressurisation

References for more information/detail requirements:

IEC 61892-7 clause 8.3, 8.4 and 8.5

NORSOK S-001 clause 16.4.4

For containers with mechanical ventilation that are located in non-hazardous areas, there is no requirement for minimum pressurisation with monitoring system. However, the ventilation system shall be in operation to ensure that non-Ex proof equipment can be energized (electrical interlock). See 4.5 regarding requirements for Ex-proof containers in terms of location (zone) and approval prior to shipment.

Containers with mechanical ventilation containing ignition sources shall have self-closing doors. All other hatches and doors shall be closed when the container is energised.

Containers having ignition sources (for example non-Ex proof equipment) located in hazardous area, shall have overpressure with monitoring.

There shall always be an over pressure of 5 mmVS (50 Pa) inside the container. Level for alarm and cut off should be set to 2,5 mmVS (25 Pa).

The pressurisation monitoring system shall be complete and fitted in its own control cabinet (preferably combined with the fire and gas monitoring systems).

In the event of pressurisation loss (air flow), all ignition sources shall be disconnected (time delay, for example 30 s). The control panel shall have an output signal for alarm to CCR (see 4.4.4.), activated when disconnection takes place. The system should also have a local audible alarm that is activated immediately upon loss of pressurisation.

Requirements for air locks, see 4.4.1.

Zone 1 approved container with emergency closure level c)

References for more information/detail requirements:

EN 50381

Critical containers with **emergency closure level c)** (see clause 4.4.3) and that are zone 1 approved, shall satisfy requirements in EN 50381

4.4.8 Health, safety and the environment

References for more information/detail requirements:

Facilities regulations clause IV (§20 - § 28, design of work - and living areas))

Activities regulations clause VIII (§ 33 - § 44, working environment)

NORSOK S-001 clause 4 (management of technical safety)

NORSOK S-002 clause 5 (working environment)

Prior to choosing, usage and location of temporary equipment, an assessment shall be carried out taking into account the results of risk analyses and how the equipment might affect this result. This applies in particular to containers which are intended for accommodation or workplace purposes, or in which ignition sources and/or flammable materials are present. For permanently manned containers, the assessment shall be summarised and transferred to the data sheet for temporary equipment, part 5, based on the "Working environment area chart" (WEAC) form.

Containers or equipment that are required to have an emergency stop shall be fitted with a stop pushbutton designed and functioning according to NS-EN ISO13850.

Health, safety and environment

Function	Description	NORSOK S-002
Layout	Dimensions (l x b x h), access, lighting, planning of workplace	5.1
Workplace, design and outfitting	Organisation, design, furnishings, choice of equipment, work order processing	5.2
Hot and cold surfaces	Protection against hot and cold surfaces	5.3.2
Chemicals	Handling, storage, use of personal protective equipment	5.4
Noise, vibrations	Requirements for noise and vibrations in different areas	5.5 and Annex A
Lighting	Requirements for quality of lighting and light level for different work tasks	5.6 and Annex A
Internal climate	Requirement to air quality	5.7 and Annex A
Operation	Planning and use	
Drains	Connection to drain (open drain)	NORSOK S-003 clause 6

4.4.9 Safety related system and equipment

References for more information/detail requirements:

Facilities regulations clause II (§ 8, Safety functions)

IEC61508 (all parts)

IEC61511 (all parts)

OLF guidelines 070 application of IEC 61508 and IEC 61511

Safety related systems and equipment, which are a part of temporary equipment or are used with temporary equipment, shall maintain high safety integrity. This kind of equipment should, when relevant, be based on recognized industry standards such as IEC61508 / IEC61511, together with OLF's guideline 070.

Specific safety technical issues are addressed in previous chapters with requirements for each discipline (4.4.2) Fire protection and 4.4.3 Gas and Explosion protection).

SIL-requirements to these safety systems shall be in conformity with OLF guideline 070, clause 7.6.

4.5 Ex-rating requirements for equipment in terms of location (zone division)

4.5.1 General requirements for Ex-approved equipment/installation

References for more information/detail requirements:

- Facilities regulations § 78 (ATEX)
- Regulations relating to equipment and safety systems in Ex- hazard areas
- IEC 60079 (all parts, electrical)
- EN 13463 (all parts, mechanical)
- IEC 61892-7 (electrical installations in Ex-hazard areas)
- NORSOK E-001 clause 10.2.2 (requirement for type Ex-proof)

In general, temporary equipment shall not have ignition source potential.

This means that requirements a), b) and c) below shall become company's requirement for the equipment. Alternatively d) may be used in certain situation where equipment that fulfils the requirement for a) or b) is not available and the equipment is placed in a container.

Alternatively e) requires thorough evaluation each case, and when this is finalized, this alternative is not considered as an exception from requirements from this standard.

- a) The equipment or components which shall be usable without limitations with regard to placement on board, shall be Ex-proof for use in zone 1, IIA-T3. This also includes non-electrical equipment (placed on the marked first time after July 1, 2003).
- b) Equipment approved for zone 2 can be used in zone 2 and in non-hazardous areas, provided that it is powered from a source controlled by ignition source control system (for critical equipment this can be manual shutdown based on approved procedures, see clause 4.4.3)
- c) Over pressure ventilated container with equipment and components without Ex-proof design, may be placed in the Ex-hazard zone for which the container is constructed and Ex-certified.
- d) Containers with mechanical ventilation and gas detector as described in 4.4.7 (see clause "Pressuration"), and which contain non Ex-approved equipment or components, but no A-ignition sources (see 3.1.6), shall not be placed in Ex-hazard area
- e) Dispensations from this requirement are allowable if the following conditions are met:
 - The temporary equipment has power supply from sockets on the installation that are connected to the system for ignition source control at the lowest level. All potential ignition sources on the temporary equipment have to be closed down at loss of power.
 - The temporary equipment is only used indoors in mechanically ventilated modules (non- hazardous), or in naturally ventilated areas at an adequate distance from hazardous areas. "At an adequate distance" means that any gas leakage shall be detected by the installation's gas detection system before the explosive gas can reach the container or equipment. Need for additional temporary gas detectors close to the temporary equipment shall be considered.
 - Location and use of temporary equipment is 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.
 - On the declaration of conformity for the temporary equipment (Annex G), it shall be remarked that the equipment requires the thorough evaluation mentioned in this section.

4.5.2 Requirements for Ex-approved containers in terms of location (zone)

For containers with internal equipment that is not Ex-approved, the general requirements in 4.5.1 can be satisfied through a combination of mechanical ventilation and gas alarm system.

The table below shows the zones containers can be placed in, based on

- Ex-rating of the equipment inside the container (lowest Ex-rating for electrical or mechanical equipment),
- mechanical ventilation,
- gas detector in air intake.

Hot work in the container is equivalent to Ex-rating "none". In case of hot work class A, the work processes for the installation related to location and precautions for use, shall be followed,

Pressurised ventilation means that the container shall be protected by overpressure. Where there is a requirement for pressurisation or gas detection, a system for automatic disconnection of ignition sources shall be installed in the event of gas detection or the failure to meet the requirement for overpressure (or air flow).

For Ex-rating requirements, see the regulations for equipment and safety systems in hazardous areas (FUSEX 1996)

For ventilation requirements, see 4.4.7.

Requirements for gas alarm system, see 4.4.3.

Container location

Item	Container parameters			Approved locations		
	Equipment Ex-rating	Mechanical ventilation	Gas detection	Zone 1	Zone 2	Unclass.
1	Approved zone 1	None	No	x	X	x
2	Approved zone 2	Yes, with pressurisation and air lock	Yes	x	X	x
3	Approved zone 2	Yes (alt. natural vent.)	No		X	x
4	Approved zone 2	None (sealed design)	No			x
5	None	Yes, with pressurisation and air lock	Yes	x	X	x
6	None	Yes, with pressurisation	Yes		X	x
7	None	Yes	Yes			x
8	None	None	No			See 4.5.1 e)

4.5.3 Requirements for Ex-proof equipment that must remain in operation in a gas emergency situation

References for more information/detail requirements:

NORSOK S-001 clause 14.4 (disconnection of ignition sources, functional requirements)

Emergency equipment that shall be used in an emergency situation (Escape route lights, PA etc.), for example after shutdown following gas detection, shall be approved for use in zone 1, gas group IIA, temperature rating T3, irrespective of location (in a hazardous or non-hazardous area).

4.6 Marking and tagging

4.6.1 General notes on marking

References for more information/detail requirements

IEC 61892-6 clause 14.3 and 14.5 (marking of control and signal equipment)

NORSOK E-001 clause 9.12 (marking and signs electro/instrument)

NORSOK Z-DP-002 (equipment coding system)

NS 4210 (safety sign.)

- Where necessary to ensure the health and safety of personnel, warning devices and instruction signs shall be provided.
- External signs shall be made of non-corroding material.
- Signs shall be in Norwegian with English translation where necessary.
- Equipment supplied in accordance with EEA directives shall be CE marked and be in accordance with relevant regulations.
- Equipment and components shall be marked with the tag number to the extent required for unambiguous identification in documentation and maintenance programmes.
NORSOK Z-002 should be used for numbering equipment and components.
- Signs shall be in accordance with NS 4210.
- If gas bottles are stored in the container, warning signs shall be installed outside, next to the entry door.
- Marking and signs shall be in Norwegian. Safety signs shall be in Norwegian and English.

4.6.2 EEA regulations and CE marking

See the "Facilities regulations" for the integration of EEA regulations, section XV which states that certain directives listed below do not apply for mobile installations.

For mobile installations, see also § 3. the Facilities regulations.

Product regulations which applies on the Norwegian continental shelf and is considered as regulatory requirements:

- Enkle trykkbeholdere (7.7.1994)
- EMC (15.8.1995)
- ATEX (1.7.2003)
- TPU (29.11.1999)
- Machinery regulations (19.8.1994)

Containers that contain items that are CE marked, (based on or more of the regulatory requirements listed above) are considered to be a separate (combined) product that shall also be CE marked according to these regulations. This applies to temporary equipment that contains, for example, Ex-proof equipment (ATEX), machinery (see the "Machinery regulations") or items that emit or are affected by electromagnetic noise.

Then temporary equipment shall be marked in accordance with the regulations which were in force when the equipment were sold in Norway or in the EEA area for products which are included by the EEA directives. Temporary equipment, - included by an EEA directive that is rebuilt/modified in order to conform to specific requirements from the customer, must be re-assessed and CE-marked.

4.6.3 Temporary equipment identification markings

References for more information/detail requirements

DNV 2.7.1 clause 7

DNV 2.7.3 clause 6

EN 12079-1 clause 9.2

Machinery regulations clause II (declaration of conformity, marking of machinery etc.)

Requirement for equipment considered as deck load (lifted on /off the vessel independently):

- a) A sign shall be placed on the outside, preferably on the container door, with the following information: Maximum gross weight; payload; tare mass; supplier or manufacturer; container description or equipment type (in accordance with the table in 4.1.2, e.g. "Workshop for cold work"); month and year built; manufacturer's serial number; and certificate number.
- b) Markings, preferably in paint, shall be provided externally on minimum one of the sides and roof with the following information: Maximum gross weight; tare weight; and container identification number.
- c) The height of letters and digits on the sides shall be a minimum of 75 mm, and on the roof a minimum of 300 mm.
- d) To make the container more visible it should be marked at the corner posts and edges around the top of the frame with stripes. Stripe width shall be 50 mm with 45-degree angle of alternate orange or red and yellow reflective paint.
- e) Marking of lifting equipment shall comply with DNV 2.7.1 clause 8 or other harmonised standard and in accordance the "Machinery regulations".

Requirement for equipment considered as deckload

- a) Sign with identification number and gross weight.
- b) Further the sign should include information of supplier or manufacturer; container description or equipment type, month and year built and the manufacturer's serial number.

Special signs and marking

Emergency exits

Emergency exits shall be marked with signs both inside and outside as follows: "NØDUTGANG - EMERGENCY EXIT", "MÅ IKKE TILDEKKES - DO NOT BLOCK" (in both Norwegian and English).

Indoor emergency exit signs shall be luminescent.

Pressurised containers

If the container is pressurised, the following signs shall be placed both on the inside and outside of the door: "ADVARSEL – TRYKKOVERVÅKET ROM – HOLD DØREN LUKKET" (WARNING – PRESSURISED ROOM - KEEP DOOR CLOSED).

Identification marking of electrical equipment

To the extent that electrical equipment is tagged, this should be carried out in accordance with NORSOK Z-010, Clause 13.

High voltage equipment and components shall be tagged in accordance with NS 4210.

Marking of interface for hook-up to installation

All hook-up points on the temporary equipment shall have special markings (see 4.7). The markings shall state all the rated values for the system that is to be hooked up to.

Fire-fighting equipment

Supplier shall mark portable fire extinguishers with type and size.

4.7 Hook-up interface**Different interfaces**

To ensure correct and suitable connections to the container, the requisitioner shall specify all relevant interfaces between the temporary equipment and the installation. These interfaces may include

- hook-up of electric power supply,
- hook-up of telephones and loud speaker systems,
- hook-up of signal to and from control room, see 4.4.4,
- hook-up of air,
- hook-up of nitrogen,
- hook-up of steam,
- hook-up of hydraulics,
- hook-up of water,
- hook-up of drains,
- other hook-up (diesel, etc.)

The specification of interface shall be sufficiently detailed and unambiguous so that the equipment can be safely and correctly hooked up to the permanent utilities on the installation. Since hook-up possibilities on the installations are not standardised, the company should record irregularities encountered on the data sheet in Annex B.

Cable for hook-up to installation

For power supply to the equipment, a sturdy, rubber-insulated cable type NMHVO (H07RN-F), at least 35 m long, with a temperature rating of 85 °C (or other cable with documented equal or better properties), shall accompany the equipment.

With equal properties means; pliant/flexible, fire-resistant, grease and oil resistant, and also weather durable (freezing, sun and rain).

The same also applies for hook-up of telephones, PA systems, signals to/from main control room, etc., if installed. All cable penetrations shall have the same fire classification and approval as the walls. Exposed cables shall have additional protection to avoid damage.

4.8 Documentation**4.8.1 Documentation onshore**

The temporary equipment supplier shall establish and maintain a file of documentation to verify that the temporary equipment has been designed, tested, certified and maintained in accordance with this NORSOK standard. This documentation shall be available for review upon request.

The supplier's documentation can include the documents described below.

Structure

- Valid certificate for offshore container and lifting gear.
- Documentation that complies with DNV 2.7.1 clause 5.5 or other harmonised standard and with the "Machinery regulations".

Electrical, instrumentation, mechanical:

- Location, arrangement and specification of hook-up connections.
- Single line diagrams (voltage levels, power consumption, function description).
- Control and connection schematics.
- Layout drawings showing location of equipment in panels and container.
- Technical data for electrical components such as motors, circuit breakers (current/time curves) etc.
- Manufacturer, type, model, measurement range and recommended settings for all protective systems.
- Certificates for all certified equipment, including Ex-approved equipment.
- Schematic of intrinsically safe equipment showing intrinsically safe equipment and other connections in hazardous and non-hazardous areas, with associated cabling.
- Schematic for instrument and utility air systems with requirements for pressure and air volume, and any purity requirements for instrument air (oil, water, dust content etc.).
- Layout drawings for ventilation systems with details of area classification, pressure over/below atmospheric pressure, dampers, air volumes, fans, etc.
- All necessary data for main components with part numbers.
- Test certificates.
- Trouble-shooting documents.
- Nozzle selection tables (high pressure cleaning equipment).
- Layout drawings showing location of all equipment.
- Start-up procedures (diesel engines, compressors, etc.).
- Emergency stop procedures.
- User manuals and other documents necessary to install, operate and maintain the equipment.
- Maintenance programme and maintenance intervals.
- Maintenance journal showing maintenance carried out (history) on all equipment requiring periodic maintenance. In general all maintenance over the past 2 years shall be included. Refer to Annex I for further details.

Health and environment

- Noise data for noise sources.
- Product data sheets for substances used in equipment systems and which represent an environmental, toxic, or health hazard.

4.8.2 Documentation that shall accompany the equipment

The documentation that shall accompany the equipment shall be attached to the container or equipment, in a safe place, which is easy to locate (such as a dedicated marked cabinet designed for offshore climate). The documentation shall be sufficient to ensure safe transport, lifting, installation, hook-up, operation, maintenance etc., and will therefore cover several of the points mentioned in 4.8.1. All documentation which is required to accompany the equipment shall be in Norwegian or English.

The documentation listed below shall be in paper printout (exception as shown in point 4 below is accepted). There must be a table of content which lists all enclosed documentation, and the documentation shall be logically inserted in binders (with dividers between the different sections). Use of other documentation formats (for example electronic format), shall be approved by the company.

The following documents shall always accompany the equipment:

- Overview of all available documentation for the equipment.
- Z-015 Declaration of conformity and Z-015 data sheets for the container and equipment, see Annex G and Annex H.
- Document that describes all the hook-up connections, including test documentation that confirms that the equipment is suitable for the installation's interface, see 4.7.
- User manuals and other documentation that is necessary for installing, operating and maintaining the equipment. If the IOM manual and information is very large, alternatives to paper copies may be acceptable (electronically stored and available for the company)
- Certificate for equipment with special requirements [e.g. EEx ... x (i.e. Ex-certificates with special conditions), PSV, etc.] and also equipment which is built and certified individually (EEx capsules filled with components, wired and re-certified shall include the layout drawings and partlist).
- Certificate for equipment with special requirements, PSV etc.
- Maintenance programme with maintenance intervals.

- Maintenance journal showing maintenance carried out (history) on all equipment requiring periodic maintenance.
- Procedure for manual shutdown of critical equipment with level "c" emergency shutdown as described in 4.4.3.
- List of deviations from requirements in this NORSOK standard and other relevant requirements. These deviations shall also be included in the Z-015 Declaration of conformity, see Annex G.
- Exceptions shall be approved in advance by the responsible person in the company. This approval shall be included in the checklist of the supplier.

4.8.3 Requirements for prior approval of responsible person in the company

In the following circumstances the responsible person in the company (see 3.1.10) shall have given his approval in connection with the requisition, prior to shipment:

No	Z-015 clause. no.	Circumstances which require prior approval
1	4.3.1.2	Use of manned diesel engine unit with protective devices that give an alarm instead of automatic stop
2	4.3.1.3	Use of diesel engine in connection with critical activities, without automatic shutdown from the installation's systems
3	4.3.1.4	Use of diesel engine that is not approved for use in hazardous areas
4	4.3.1.5	Use of diesel engine without gas detector in combustion air inlet
5	4.3.5	Use of steam generator with diesel burner without Ex-approval Use of diesel burner without gasdetector.
6	4.4.3	Use of other critical equipment where emergency shutdown level "c" applies.
7	4.4.6.4	Use of non Ex-proof battery system
8	4.5.1	Use of containers with ignition sources without mechanical ventilation and gas detector, or other skid mounted equipment that is not approved for use in hazardous areas
9	3.1.2 4.8.2 Annex G	Use of container or equipment that does not comply with the requirements in this NORSOK standard or other relevant requirements

On the checklist that is submitted to the coastal base before shipment, the supplier shall, in all cases, add the name of the person in the company who has given approval, the telephone number of this person and the date the approval was received.

When prior approval of the equipment is required, it shall be included in the Z-015 Declaration of conformity, see Annex G.

Annex A

(Informative)

Administrative guidelines

A.1 Introduction

This annex provides a description of typical administrative routines for dealing with temporary equipment. The scope and content of the administrative routines shall comply with the routines and procedures that apply to the requisitioner's organisation.

Below is a flow chart, which illustrates a typical and recommended process, from the requisitioner's order to the return arrival at the hire company.

Page 41 of 65

A.2 Flow chart explanation

A.2.1 Order

At the same time as the temporary equipment is ordered, the requisitioner shall

- a) specify relevant technical requirements, including requirements relating to Ex-proof rating for equipment (zone 1 or zone 2) or non-hazardous area,
- b) specify functional and operational requirements,
- c) state location for the equipment on board, hazardous or non-hazardous area,
- d) state required date and expected duration,
- e) specify interfaces for hook-up to the installation's permanent systems (electric power, telecommunications, instrumentation, compressed air, air connections, water etc.),
- f) state the department(s) that are responsible for the equipment, including responsibility for spare parts and maintenance,
- g) state requirements for personnel assistance from rental company for operating the equipment on the installation,
- h) assess climate conditions.

A.2.2 Contract department

The contract department shall

- a) check that the requisition is filled out completely,
- b) send out enquiries and receive tenders from suppliers,
- c) coordinate tender evaluation with the requisitioner and/or technical discipline department and supplier
- d) be responsible for stipulating in the contract
 - responsibility for maintenance,
 - responsibility for supply of spare parts,
 - responsibility for operating the equipment (if supplier),
 - guarantee liability,
 - handling of any non-conformance handling.

A.2.3 Inspection at coastal base or port before transport to offshore installation

- a) Equipment can be inspected either at the supplier or at the coastal base/port. The inspection shall include documentation and equipment, and shall be carried out before shipping in order to prevent the need for repairs or improvements offshore.

For documentation review, see 4.8.2.

Verification of equipment should include

- visual inspection,
- check of equipment against specifications,
- check in accordance with any checklists that accompany the equipment,
- check of interfaces for hook-up to installation systems, see 4.7.

The inspection results are documented on the checklist from the supplier (see 4.1.1 and Annex C) and filed.

- b) Notification of approval of equipment is to be sent to the requisitioner and supplier.
- c) Freight note issued, equipment packed and prepared for transport to the offshore installation.

A.2.4 User

Prior to use offshore, it is recommended to check that

- a) equipment is placed correctly and the location is checked with regard to the installation's area classification (see also NORSOK S-001, 14.4) and escape routes. Open doors shall not block escape routes. Emergency exits in units shall be taken into account when positioning the unit,
- b) the installation's overview of temporary equipment is updated,
- c) equipment received is visually inspected for any damage during transport,
- d) the documentation received is checked against the order,
- e) the condition of the equipment received is checked against the specifications in the order,
- f) all interfaces for equipment hook-up are located and checked. Hook-up should be carried out and tested before the equipment is used.
- g) If a connected container gets locked, a key shall be available for the contact person of the temporary equipment on board.

During operation

- a) the equipment shall be maintained as described in the maintenance programme,
 - b) the maintenance log shall be kept up to date, e.g. following service and repairs,
 - c) the operator should after one-year's use consider upgrading the hook-up of the temporary equipment to the permanent installation, such as replacing rubber cable with approved installation cable.
- The equipment can still be treated as temporary equipment.

At the end of the rental period and return to land

- a) the equipment is disconnected and made ready for transport to land. A transport manifest shall accompany the equipment back to the rental company,
- b) notification of the end of the hire and return to base shall be sent to the requisitioner and supplier,
- c) the overview of temporary equipment on the installation shall be updated,
- d) an experience report which considers the suitability of the equipment shall be prepared and copied to the user's and the supplier's onshore support departments.

A.2.5 Supplier**General**

The supplier shall carry out conformance evaluation of all its rental units (for use offshore) and keep data sheets for all the units updated, see Annex G and Annex H.

Prior to the delivery, the following shall be carried out:

- a) Upon receipt of the enquiry and prior to preparing a tender, the supplier shall verify that the equipment conforms to the customer's requirements. For equipment or parts of equipment that do not satisfy the requirements, the supplier should consider and implement measures to satisfy the customer's requirements. Such measures can include alterations or replacements. Alternatively, a deviation request from the customer's requirements can be submitted to the customer. Non-conformances relating to statutory requirements e.g. regulations are not normally acceptable.
- b) The supplier shall check that the requirements for technical documentation are fulfilled, see 4.8.2.
- c) Certification requirements shall be fulfilled. This includes lifting gear, Ex-approved electrical equipment and other certification requirements (pressure vessels etc.).
- d) The supplier's tender shall include detailed information about the equipment, the supplier's guarantee liabilities including maintenance responsibility and spare parts following the delivery.
- e) The supplier shall carry out the necessary maintenance, see Annex I. Maintenance programmes and maintenance journal shall accompany the equipment, see 4.8.2.
In particular the safety and shut down functions shall be tested.
- f) The supplier shall check all hook up connections towards the installation. This shall conform with the information in the datasheet for the installation, See Annex B clause 4.7.
- g) Prior to the delivery, the supplier shall carry out a thorough inspection of the equipment. The inspection shall be documented on the checklist (see Annex C), which shall be submitted to the contact person in the company (normally at the coastal base).
- h) For qualification requirements for electricians, see Annex E.

When received after use

- a) the supplier inspects the returned equipment for any damage and defects,
- b) the supplier reviews the experience report and condition report from the user of the equipment in order to carry out any improvements to the relevant equipment or improve the design of new equipment.

Annex B (Normative) Z-015 Data Sheet for installation

Data sheets for installations are only available in English.

ELECTRICAL

Power	Volt	Freq.	Phase curr.	Neut. loaded	System earth	Short circuit level		Distribution protection		Connection platform	Connection temp. equip.	Area
*	[V]	[Hz]	[A]	Yes/No	[S/I/R]**	min [kA]	max [kA]	Fuse [A]	Earth fault [mA]	Description/Type	Description/Type	Module No./Room No.
Rows can be added to the table as necessary												

*	**	
Main - Main Power	S = Solidly (direct earth)	
Emg - Emergency Power	I = Isolated (isolated)	
Ess - Essential Power	R = Resistor (resistance earth)	
UPS - UPS Power		

INSTRUMENT

Function	Signal type	Connection platform	Connection temp. equip.	Area
		Description/Type	Description/Type	Module No./Room No.
Loss of pressure				
Fire				
Gas				
Other				
ESD battery systems				

TELECOM

Function	Signal type	Connection platform	Connection temp. equipment	Area
		Description/Type	Description/Type	Module No./Room No.
PAGA				
Telephone				
Other (insert)				

UTILITIES

Function	Pressure (bar)	Amount/flow Max. capac.	Connection			Area
			Type	Diameter	Material	Module No./Room No.
Plant air						
Instr. air						
Sprinkler						
Seawater						
Freshwater						
Drain						
Other						

LIFTING CAPACITY OFFSHORE CRANES

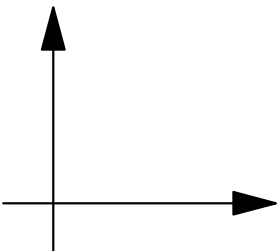
Crane	1 m significant wave height max. load/max. radius	2 m significant wave height max. load/max. radius	3 m significant wave height max. load/max. radius
Rows can be added to the table as necessary			

Rev:_____

Date:_____

Annex C (Normative) Checklist matrixes

See explanation of checklists in 4.1.1.

Control items		Checklist matrixes	Containers													Equip.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Type of container and equipment 																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Shall not be placed in hazardous area		Z-015	Accommodation container (A)	X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

Checklist matrixes		Containers																									Equip.									
Control items	Type of container and equipment	Containers																									Equip.									
		(A)	(B)	(C)	(E)	(G)	(I)	(J)	(L)	(M)	(N)	(O)	(P)	(Y)	(Z)	U01	U02	U03	U04	U05	U06	U07	U08	U09	U10	U98	U99									
2.2 2.3 2.4 2.5 2.6 2.7	↑ Type of container and equipment ↑	Z-015	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
		4.4.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
		4.2.1	X																																	
		4.4.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
		4.2.1	X																																	
		4.4.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
		4.4.2	X			X											X	X																		
		3. ELECTRICAL																																		
		3.1	Cables, glands, equipment etc.	4.4.6.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
		3.2	Insulation resistance - megger	4.8.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
3.3	Earthing (NB bonding of structure)	4.4.6.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
3.4	All external installation Ex-proof	4.4.6.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
3.5	All internal installation Ex-proof	4.4.6.2		X	X	X	X	X	X	X	X	X	X	X	X																					
3.6	Emergency lighting	4.4.6.2	X	X	X	X	X	X	X	X	X	X	X																							
4. HOOK-UP TO INSTALLATION																																				
4.1	Power supply (voltage, freq., plugs)	4.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
4.2	Telephone with plug	4.7	X	X							X	X	X								X															
4.3	PA with plug	4.7	X	X	X						X	X	X								X															
4.4	Alarm signal to control room with plug	4.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
4.5	Shutdown (ESD) from CCR (for battery system etc.)	4.4.3 4.4.6.4	X	X	X	X						X				X					X				X											
5. EQUIPMENT																																				
5.1	Manual emergency stop	4.4.8				X															X	X	X	X	X	X	X									
5.2	Manual shutdown of diesel supply	4.3.1				X															X	X	X	X	X	X	X									
5.3	Drip trays	4.3.1				X															X	X	X	X	X	X	X									
5.4	Shutoff damper in combustion air inlet	4.3.1				X															X	X	X	X	X	X	X									

Checklist matrixes		Containers																								Equip.									
Control items	Type of container and equipment																																		
		(A)	(B)	(C)	(E)	(G)	(I)	(J)	(L)	(M)	(N)	(O)	(P)	(Y)	(Z)	Diesel engines U01	Air compressors U02	Tanks U03	High pressure cleaning equipment U04	Steam generator U05	Mobile crane U06	Well equip., wireline, logging, coilltubing U07	Habitat for hot work Class A U08	Equipment for waste handling U09	Pneumatic/hydraulic pump equipment etc. U10	Non-Ex-proof equipment on skid U98	Ex-proof equipment on skid U99								
5.5	Shutdown if loss of oil pressure					X															X	X	X												
5.6	Shutdown if high cooling water temperature					X													X		X	X	X												
5.7	Shutdown if overspeed					X													X		X	X	X												
5.8	Diesel engine approved for zone 2					X													X		X	X	X												
5.9	Gas detector in combustion air inlet					X													X		X	X	X												
5.10	Flame arrester in exhaust pipe					X													X		X	X	X												
5.11	Spark arrester in exhaust pipe					X													X		X	X	X												
5.12	Safety valve																			X							X								
5.13	Flame guard																			X															
5.14	Low water level alarm																			X															
5.15	Check of limit switches																				X														
	6. DOCUMENTATION																																		
6.1	Lifting certificate	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
6.2	Other technical doc. (drawings, data.)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
6.3	Certificate for equip. with special requ.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
6.4	Maintenance programme	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
6.5	Maintenance journal	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
6.6	User manual	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								

Example of checklist structure for type “X” container

Type “X” – Container	
Container ID number:	Approved for location in zone: Zone 1 ☐ , Zone 2 ☐ , Non-hazardous area ☐
Supplier:	Contact person supplier/telephone:
Company/installation container intended for:	Contact person/requisitioner in the company:

Person in the company responsible for prior approval, see 4.8.3:		
Name:	Telephone:	Date approval received:

	Status: OK=Approved, NA=Not Applicable, NC=Not Checked, D=Defective or missing	Ref. Z-015	Status supplier	Receiving control (company)	Remarks
	1-MECHANICAL				
1.1	Signs and tagging/labelling	4.6	.		.
1.2	Annual inspection (lifting equipment, certificate) supplier shall enter last control date	4.4.1	.		.
			.		.
	2-FIRE, GAS AND SAFETY				
			.		.
	3-ELECTRICAL				
3.1	Cables, glands, equipment etc.	4.4.6	.		.
			.		.
	4-HOOK-UP (INTERFACE) WITH INSTALLATION				
4.1	Power supply (voltage, frequency and plugs)	4.7	.		.
			.		.
	6-DOCUMENTATION				
6.1	Lifting certificate	4.8	.		.
6.2	Other technical documentation (drawings, data sheets etc.)	4.8	.		.
			.		.

Competent person for lifting gear/mechanical devices		Supplier electrician		Company receiving control	
Date:	_____	Date:	_____	Date:	_____
	Signature		Signature		Signature
	Name in capitals		Name in capitals		Name in capitals

Annex D

(Informative)

Equipment not registered as temporary equipment

D.1 Distribution boards

Equipment description

Temporary electrical power distribution and mobile socket units which are used in connection with major modifications, inspections, turnarounds or similar.

Equipment requirements

- a) Temporary distribution panels shall normally be equipped with a socket unit for outgoing circuits.
- b) In general, temporary distribution boards or socket units shall be connected to circuit in the distribution panel on the installation which has ignition source control shutdown at the lowest level.
- c) The connections between the permanent installation (e.g. platform) and temporary installation shall normally be a plug and socket.
- d) Temporary distribution panels or socket units intended for outside use (including in naturally ventilated areas) or in classified areas, shall be Ex-approved.
- e) All outlets in temporary distribution panels shall be fitted with earth fault protection with trip current 30 mA.

D.2 Electrical hand tools/portable equipment

Hand tools shall fulfil the requirements in the "Machinery regulations" and relevant standards, e.g. EN 792.

Electrical equipment, hand tools, requirements and checklist

- a) All electrical hand tools/portable equipment shall be labelled with the owner's name, year and month of last inspection. As confirmation of inspection, it may alternatively be used the year's colour (r as applied to lifting equipment). An Example of electrical portable equipment; portable lamps, temporary lighting, electrical hand tools, extension leads, welding equipment hoovers, adaptors, Temporary distribution panels (D.1) etc.
- b) Extension leads shall be oil-resistant.
- c) Temporary lighting, portable lamps and extension leads for use outside (including in naturally ventilated areas) or in hazardous areas shall be Ex-proof.
- d) Use of non-Ex-proof tools is restricted to non-hazardous areas. In zone 2 areas, non-Ex-proof tools can be used (class B hot work, see 3.1.6) if necessary measures are taken (check the company's procedures).
- e) At the workplace a short adapter can be used (maximum 1 m), consisting of Ex-approved plug and non Ex-proof socket (industrial type), where non-Ex proof electrical tools can be connected.
- f) When using temporary electrical equipment, protection from electric shock in normal use and in the event of fault, shall be assessed. Factors that can influence the choice of safety measure can be air humidity, contact with earth potential and the possibility of evacuation. Solutions that may be relevant include rapid automatic disconnection (earth fault protection) or protection through the use of extra low voltage for safety.
- g) The tool shall normally be connected to the socket that has ignition source shutdown at the lowest level.

D.3 Pneumatic tools,

Requirements and checklist

- a) Pneumatic hand tools that belong to the supplier shall be labeled with the owner's name, year and month of last inspection. As confirmation of inspection, year's colour (as applied to lifting equipment) may be used.
- b) Pneumatic hand tools that may be used in Ex-hazard areas or in natural ventilated area, shall be Ex-approved.
- c) The correct hose shall be used in terms of type, dimension and pressure rating.
- d) The inlet air pressure to the tool shall not exceed 7 bar. If the tool has a lower pressure specification, this pressure shall not be exceeded.
- e) Approved hose connectors and hose clamps shall be used (U-bolts are not allowed).
- f) Crow's foot connections shall be secured with safety pins.
- g) If the air hose to the tool is made up of several lengths, each connection shall also be secured with "Chinese fingers" wire or similar.
- h) Hoses shall be conductive or semi-conductive, see requirement in NEK 50404 clause 5.5.5

It is important to be aware that pneumatic tools are not normally insulated against electric shock.

D.4 Refrigeration- and freezer containers used for transport of supplies

Supplies that require freezing or cooling during transport, will be shipped in special refrigeration/freezer containers. At the coastal base the containers are only registered as load carriers, i.e. containers will not be undergoing a normal receiving inspection compared with other temporary equipment before shipment.

Electrical equipment and container installations are normal industrial standard, (i.e. not Ex-proof design). It may however be required to connect the equipment to power supply on the installation, in order to postpone unloading the container in normal working hours (for example not nighttime).

In accordance to NORSOK Z-015 "Temporary equipment", the container may be in industrial design under certain conditions (ref. Z-015 table title "Container location" 4.5.2) located "at a good distance from Ex-hazard zone".

Based on this and assuming that the conditions below are met, the hook up on board may be carried out by the deck crew.

- a) A maintenance program for all refrigeration/freezer containers shall be established. The log for last maintenance carried out, shall accompany the equipment. Last maintenance cycle shall have been carried out within the last 12 months. After this maintenance the cable shall be marked with the colour of the year (ref.D.2) at the plug.
- b) Hook up onboard is only allowed in locations that are intended for placing these containers.
- c) In these special locations, the containers shall only be connected to particular sockets that shut down in the event of general gas alarm (disconnection at lowest level).
- d) Visual inspection onboard is carried out by deck crew who will report to the responsible electrician if a plug is damaged
- e) After the inspection is carried out, the deck crew may connect the equipment to the socket and energize. The refrigeration unit shall then be checked for normal operation.
- f) It is a condition that the containers are emptied at the first opportunity. The time a container is energized shall not exceed 18 hours.
- g) The container shall not be recorded in the log for temporary equipment onboard.

If nothing else is specified, the following are to be used for connection:

- Plug type: CEAG GHG 511 4306 R0001
- Socket type: CEAG GHG 511 7306 R0001

Annex E

(Normative)

Qualification requirements for supplier personnel

E.1 Qualification requirements for supplier personnel who operate, maintain and repair electrical equipment

The following requirements apply:

- a)** The supplier or user of the equipment is obliged to ensure that requirements for qualifications are in accordance with FKE.
- b)** For work on and operation of installations and equipment, FSL shall be applied.
- c)** The supplier or user of the equipment shall have a qualified electrical contractor (high voltage or low voltage, depending on the installation and equipment) in his company, or agreement with an external qualified electrical engineer for the installation and maintenance of the electrical equipment. For containers or equipment that do not include high voltage equipment, the supplier's electrician can carry out this work.
- d)** For personnel who carry out installation and maintenance of the equipment, specific reference is made to FKE, §13 or §14 (additional competence relating to the particular systems.)

Also required:

- valid training in accordance with FSL (training shall include a low voltage module) and if work includes high voltage equipment also a high voltage module) – (requirement for annual renewal),
 - training in the design of the equipment, in particular hazard factors, functions and maintenance,
 - training in the maintenance of Ex-proof equipment (requirement when the temporary equipment is Ex-proof).
- e)** ROV with voltage level > 1000 VAC
- In connection with work on and operation of such equipment, FSE shall apply.
 - Procedures shall be available for work on, and operation of, the equipment.
 - Personnel who carry out installation, repair and maintenance of the equipment shall have a basic electrician's education and documented training for the equipment and safety procedures.
- f)** Personnel without an electrician's education and who shall operate the equipment and be present in rooms with electrical equipment having operating voltage over 500 V and with an enclosure rating lower than IP 4X., shall have competence based on training that include:
- hazards relating to electricity,
 - examples of injuries following accidents with electrical systems,
 - IP enclosure rating in terms of human protection,
 - how to respond in the event of short-circuiting or fire,
 - responsibilities relating to operation and maintenance of the system,
 - procedures for accompanying unqualified personnel in the room.
- g)** Documentation of the individual person's qualifications and training shall be made available to the company.
- The company shall ensure that the supplier's personnel satisfy the qualification requirements.

E.2 Qualification requirements for signing the declaration of conformity

Refer to Ptil's SHE-regulations,

Framework HSE (Rammeforskriften)

§ 7, Responsibilities pursuant to these regulations

§ 17, Duty to establish, follow up and further develop a management system

§ 18, Qualification and follow-up of other participants

§ 19, Verifications

Management (Styringsforskriften)

§ 24, Organisation of material and information

§ 25 Consent requirements for certain activities

Annex F (Normative) Mono cable

F.1 Safety measures in connection with the use of mono cable in wells

These measures are intended to provide users with guidelines when hooking-up well intervention equipment which requires an electrical power cable and where one of the cable's conductors is the uninsulated wire layer that encircles the insulated conductor(s).

The measures are based on experiences from previous operations and the SINTEF report no. TR A4596 and SINTEF report no. TR F4975.

Activities in which these measures shall be implemented are the use of well tractor or other activities with similar effects.

F.2 Current and voltage limits

The technical surveys performed by SINTEF were aimed at assessing and establishing limiting values for current and voltage which in combination with other safety measures, present no danger to personnel (electric shock), or risk of ignition of any gas mixtures in the area.

The following current and voltage limits are determined:

Alternating current (AC) = 1000 V and 10 A

Direct current (DC) = 1500 V and 25 A

The documentation for the equipment shall include the maximum approved setting on surge voltage protection, overcurrent protection and also short circuit protection (as a function of length of cable).

F.3 Earthing and equipotential contacts

Earthing and equipotential connections shall ensure the prevention of hazardous voltages and/or currents that can represent ignition sources for any gas mixtures, or represent an electric shock hazard for personnel.

Measurement results and calculations in the SINTEF reports no. TR A4596 and TR F4975 show that by carrying out earthing or equipotential connections as described in this NORSOK standard, currents and voltages between the circuit and well equipment or structure in the area will be lower than the values set for explosion-proof equipment rated Exi (intrinsically safe).

Most of the current travels through the structure of the installation, a small part flows into the grease head/flow tubes and returns to the current source via the earth cable from the well to the slipping/winch, while only a minor part returns to the current source via the cable's armouring. The sum of these currents is the total; based on the measurements carried out, no undefined current paths have been identified.

F.4 Non-conformances to regulations or standards, and compensating measures

1	IEC 61892-7, 7.10.1 All cables in hazardous areas shall be sheathed by a non-metallic impervious sheath in combination with braiding or other metal covering for earth faults detection and mechanical protection.		
	Remarks The requirements shall be read in the context of these applications and are related to induce voltages in the armouring or screen where a voltage potential between the armouring and the well's structure potential can occur.	Potential risk That the transition resistance causes dangerous voltage potential. Measurements show that maximum driving current is 240 mV and that the current travels along defined current paths. Ignition source potential is therefore not likely. There is no shock hazard (maximum 240 mV).	Compensating measures Equal Equipotential connections as shown in diagram 1 and diagram 2. In order to take into account the fact that the installation or equipment is non-Ex-proof, work permits are used for ignition source class B
2	IEC 61892-7, 5.6.2.1. If a power system with earthed neutral point is used, the type TN-S system, with separate neutral (N) and protective conductor (PE) throughout the system shall be used. The neutral and the protective conductor shall not be connected together, or combined in a single conductor, in hazardous area.		
	Remarks The requirement shall ensure clearly defined current paths. The current paths are defined and documented through the tests SINTEF has carried out.	Potential risk That the transition resistor causes dangerous voltage potential.	Compensating measures Safety measures as described in pt. 1
3	IEC 61892-4, 4.1 Cables that are manufactured according to IEC 61892-4 are recommended for stationary installations and mobile units.		
	Remarks The requirements shall ensure the minimum quality of cables. Documentation for mono cables is considered satisfactory.	Potential risk None.	Compensating measures Compensating measures are not considered necessary.
4	IEC 61892-4 4.1 has reference to among others IEC 60092-350 (clause.4.2.1) Conductors shall be made of non-alloyed or metallized tempered copper.		
	Remarks Shall ensure environmental durability and conductivity. These are controlled operations and the intention of the regulations is considered addressed.	Potential risk This cable uses steel wire armouring as return wire.	Compensating measures Compensating measures are not considered necessary.
5	IEC 61892-4 Table 2 The minimum cross section permitted is 1,0 mm ²		
	Remarks Shall ensure conductivity and mechanical strength for wires in cables. Conductivity is satisfactorily documented within the given current limits and the cable's mechanical strength satisfies static and dynamic applications.	Potential risk Overheating and mechanical failure.	Compensating measures Compensating measures are not considered necessary.

6	IEC 61892-4 4.1 have reference to IEC 60092-350 (clause.4.1.2) It shall be possible to identify cables in respect of their origin (manufacturer), their rated voltage.etc.		
	Remarks The requirement shall ensure that cables can be identified and documented. The mono cable is documented so that confusions or doubt about specification is unlikely.	Potential risk None.	Compensating measures Compensating measures are not considered necessary.

F.5 Measures to be taken at the installation work area

The following measures shall be implemented at the installation work area, and to be inspected by the company:

- 1) The equipment shall be inspected in accordance with the standard procedure for temporary equipment.
- 2) Work permit for class B hot work is obligatory when energized.
- 3) Check the operator's professional qualifications. If the operator does not have the minimum qualifications (professional electrician or certified professional – electrical cable operations), then all electrical work on the site shall be performed by, or under the supervision of, another qualified electrician.
- 4) Check that the surge protection is set at the correct value (maximum 1000 VAC or 1500 VDC). This is controlled through measuring voltage at the maximum setting of the voltage limiter. Surge protection shall be adjusted if necessary.
- 5) Check that the overload protection is set correctly (maximum 10A AC or 25A DC). See requirement for documentation in clause F.2.
- 6) Check that the short-circuit protection is set in accordance with the circuit's maximum resistance (the length of the cable shall be included in the calculation) see requirement for documentation in clause F.2.
- 7) Check that the well equipment is adequately earthed during testing on deck.
- 8) Check that the system is earthed in the following manner:

Closed well, use of "grease-head":

- a) 70 mm² earth cable from the earth bus bar on the winch and to the deck or structure.
Cables shall be terminated with cable shoes and connected to the earth bus bar on the winch and to the structure. It is recommended to use existing hook-up arrangements to the structure or possibly drill an appropriate bolthole in a support or similar, where this is permitted.
- b) 16 mm² earth cable between the earth terminal on the winch and the slipring unit (cable shoe connections).
- c) 70 mm² earth connection between the power supply's earth bus bar and grease head/flow tube.

With distances exceeding 50 m, the cross-section shall be increased. Two 70mm² cables can, for example, run in parallel. The power supply's earth bus bar can either be in or on the control container or on the winch, depending on the arrangement of the system (see figure F.1 and figure F.2).

Open well:

See details in figure F.3

"Coil tubing":

For coiled tubing, earthing is considered to be ensured by the slip ring and winch substructure connection to the main earth bus bar and the platform's structure. An earth cable is therefore not necessary up to the point where the tubing enters the well.

9) Check that the power supply to the well equipment is disconnected and short circuited while running in and pulling out of the well.

10) The equipment shall be connected to a power outlet with defined ESD function.

Checklist when using mono cable

The responsible electrician on the installation should ensure that the guidelines and measures described above are followed.

Suggested checklist:

Item	Description	Result
1	Check that the equipment is entered into the installation's temporary equipment journal	
2	Check work permit	
3	Check that the person who is to carry out the electrical hook-up is qualified to work on low-voltage electrical systems	
4	Check that the surge protection is set at the correct value	
5	Check that the overload protection is set correctly	
6	Check that the short-circuit protection is set in accordance with the circuit's maximum resistance	
7	Check that the well equipment is adequately earthed during testing on deck	
8	Check that the system is earthed in accordance with the description and Figure F.1 and Figure F.2	
9	Check that the power supply to the well equipment is disconnected and shorted while running in and pulling out of the well	
10	Check that the equipment is connected to a power outlet with defined ESD function	

Figures:

Figure F.1 and Figure F.2 show different methods of system earthing and definition of main earth bar.

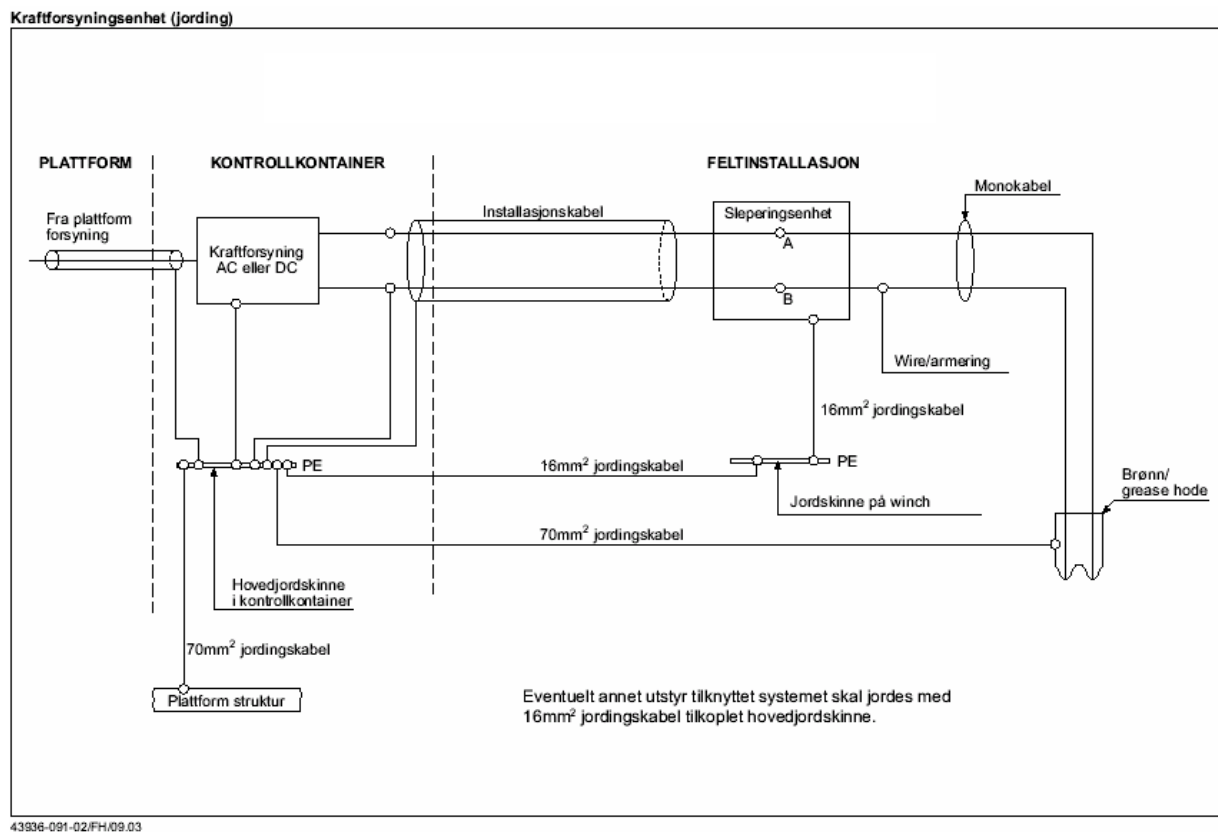


Figure F.1 – Power supply unit is earthed in control container

Text on Figure F.1 – Power supply unit is earthed in the control container

Kraftforsyningsenhet (jording)	Power supply unit (earthing)
Plattform	Platform
Kontrollkontainer	Control container
Installasjonskabel	Installation cable
Feltinstallasjon	Field installation
Fra plattform forsyning	From platform supply
Kraftforsyning AC eller DC	AC or DC power supply
Hovedjordskinne i kontrollkontainer	Main earth bus bar in control container
70 mm ² jordingskabel	70 mm ² earth cable
Plattform struktur	Platform structure
16 mm ² jordingskabel	16 mm ² earth cable
70 mm ² jordingskabel	70 mm ² earth cable
Sleperingsenhet	Slipping unit
Monokabel	Mono cable
Wire/armoring	Wire/armour
16 mm ² jordingskabel	16 mm ² earth cable
Jordskinne på winch	Winch earth bar
Brønn/grease hode	Well/grease head
Eventuelt annet utstyr tilknyttet systemet skal jordes med 16 mm ² jordingskabel tilkopleet hovedjordskinne.	Any other equipment connected to the system shall be earthed using 16 mm ² earth cable connected to the main earth bar.

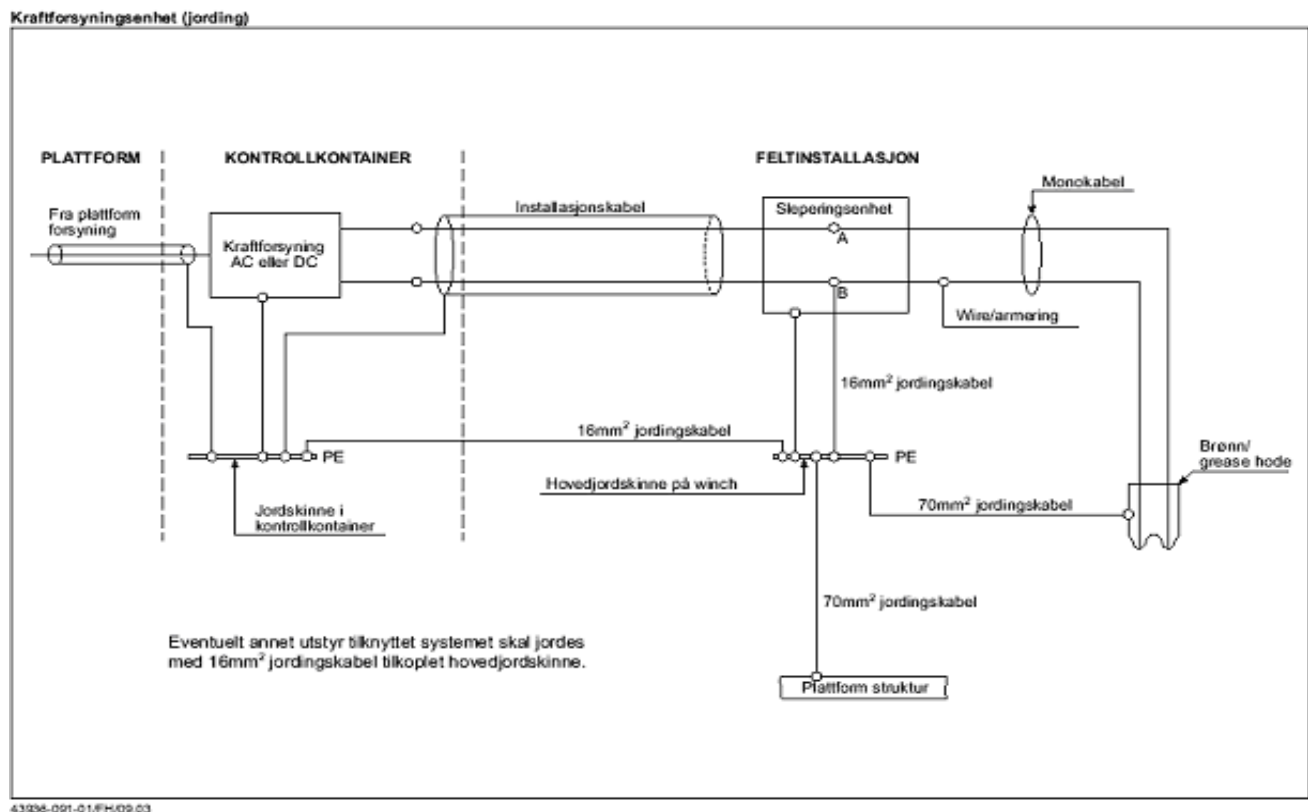


Figure F.2 – Power supply is earthed in slipping unit

Text on Figure F.2 – Power supply is earthed in the slipping unit

Kraftforsyningsenhet	Power supply unit
Plattform	Platform
Kontrollkontainer	Control container
Installasjonskabel	Installation cable
Feltinstallasjon	Field installation
Fra plattform forsyning	From platform supply
Kraftforsyning AC eller DC	AC or DC power supply
Jordskinne i kontrollkontainer	Earth bus bar in control container
70 mm ² jordingskabel	70 mm ² earth cable
Plattform struktur	Platform structure
16 mm ² jordingskabel	16 mm ² earth cable
70 mm ² jordingskabel	70 mm ² earth cable
Sliperingsenhet	Slipping unit
Monokabel	Mono cable
Wire/armoring	Wire/armour
16 mm ² jordingskabel	16 mm ² earth cable
Hovedjordskinne på winch	Main earth bus bar on winch
Brønn/grease hode	Well/grease head
Eventuelt annet utstyr tilknyttet systemet skal jordes med 16 mm ² jordingskabel tilkopleet hovedjordskinne.	Any other equipment connected to the system shall be earthed using 16 mm ² earth cable connected to the main earth bar.

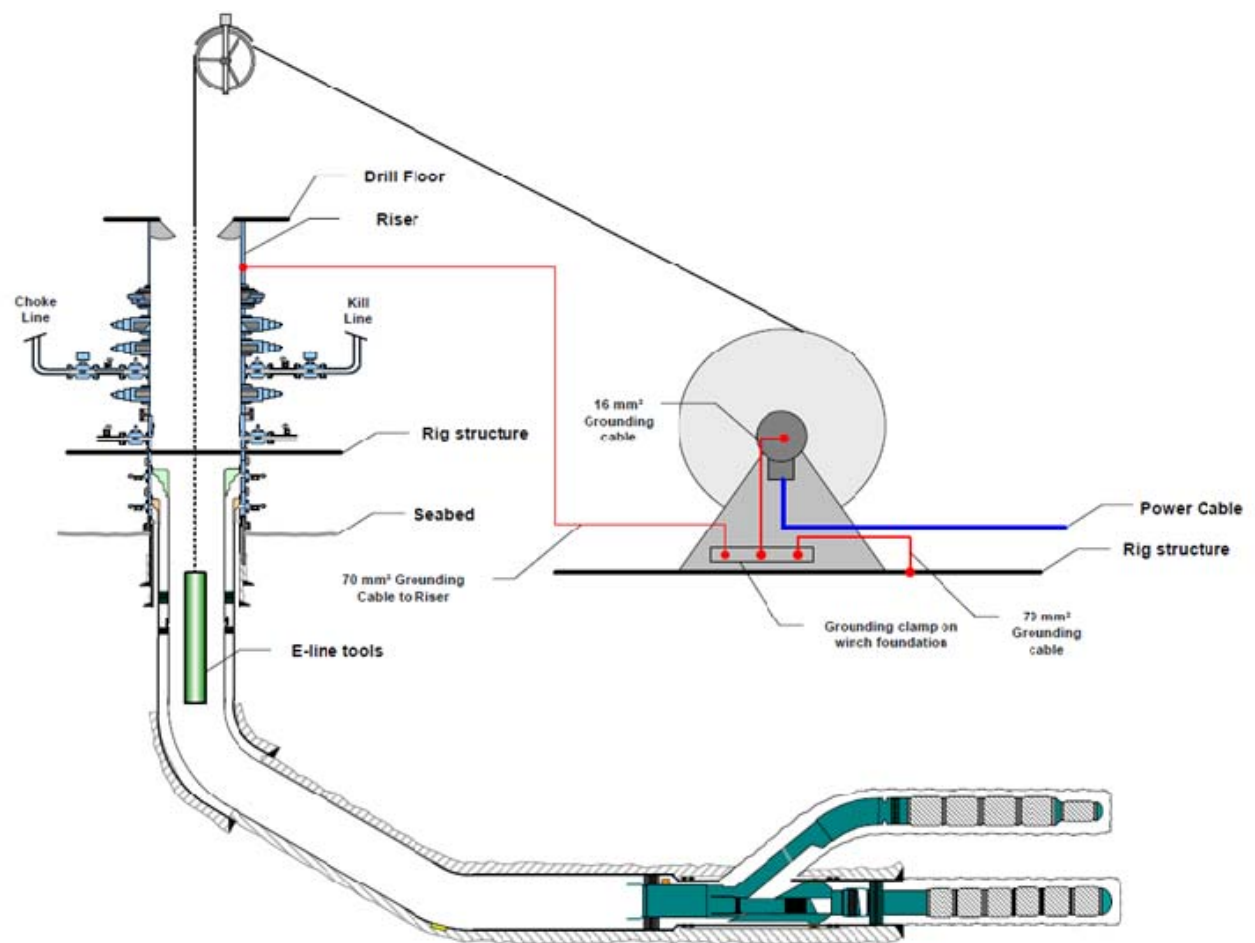


Figure F.3 – Logging in open hole

Annex G (Normative) Z-015 Declaration of conformity

The supplier shall prepare a "Z-015 DECLARATION OF CONFORMITY". The supplier is free to design his own layout for the document including logo, frame, colours, etc.

Example of document; "Z-015 DECLARATION OF CONFORMITY":

Z-015 DECLARATION OF CONFORMITY			
Supplier	ID	Type	Description
This temporary/equipment is designed in accordance with NORSOK Z-015, without non-conformance ☐, with non-conformance (see list below) ☐ Date / name / company / position / signature: This container/equipment is approved for location in Ex-zone: Zone 1 ☐, Zone 2 ☐, Non-hazardous area ☐, Date / name / company / position / signature: Use of this container/this equipment requires clearance in each case (see clause 4.5.1 pt e) This container/equipment is CE-marked, based on the following regulations (EEA directives, enforcement date for when the regulations apply without transition period): - Simple pressure vessels (07.07.1994) ☐ - EMC (15.08.1995) ☐ - ATEX (01.07.2003) ☐ - TPU (29.11.1999) ☐ - Machinery regulations (19.08.1994) ☐ Non-conformance:			
No.	Reference requirement doc. (doc. no. and section)	Description of non-conformance	Compensating measures/remarks
Restrictions or special requirements for use of container/equipment:			
No.	Area of validity (see NOTE)	Description	Name and date (responsible person)
Use of this equipment requires prior acceptance of responsible person in the company, see clause 4.8.3: Yes ☐, No ☐ (If Yes, please list the conditions that require prior acceptance in the remarks column) NOTE - Can for example be installation, company or all.			

Annex H (Normative)

Z-015 Data sheet for temporary equipment

Supplier shall prepare data sheets for each piece of temporary equipment. The data sheet shall contain the elements shown in the tables below, but other information may be added. The supplier is free to design his own layout for the document including logo, frame, colours, etc.

Z-015 DATA SHEET FOR EQUIPMENT/CONTAINER, part 1 (always to be completed)				
Supplier	ID	Type	Description	
Data sheet: Latest revision, date, name, signature:				
Outer dimensions (l x h x b)	Net weight (kg)/ Max. weight (kg)	Approved for location in Ex-zone	Year of manufacture	Latest modification
Hook-up to permanent installation				
Electrical power (maximum), (U, f, In, kW, I _{kmax}): ... V, ...Hz, .. A, .. kW, ...kA)				
Signal (which, type):				
Telecommunications (phone, PAGA):				
Manned when hooked-up to installation Permanent ☐ Periodic ☐ Normally unmanned ☐				

DATA SHEET, part 2, equipment data (relevant parts shall be completed)				
Supplier	ID		Revision date	
Diesel engine (4.3.1)				
Type, manufacturer	Rated Power	Ignition source emergency shutdown (230 V)	Gas detector	Max temp for emergency shutdown
Ex-rating	Exhaust temp. (maximum)	Surface temp. (maximum)	Combustion air inlet arrangement	Exhaust pipe arrangement
Spark arresters	Flame arresters	Overspeed protection	Air dampers	
Safety functions (stop):				
Start system type	Cooling system type	Diesel day tank (volume)		
Compressor (4.3.2)				
Type, manufacturer	Output capacity (m ³ /h, bar)	Safety functions (stop)	Design code	Operating pressure
Type, manufacturer	Output capacity (power)	Ignition source emergency shutdown (230 V)	Gas detector	Monitoring and safety systems
Spark arresters				
Tanks (4.3.3)				
Type, manufacturer	Design code pressure rating	Scope of use/ restrictions	Safety valve last tested	Potential ignition sources
Temperature range				
High pressure cleaning equipment (4.3.4)				
Type, manufacturer	Design code pressure rating	Safety valve last tested	Power supply (electrical/diesel, for diesel, see diesel engine)	Operating temperature range
Ignition source emergency shutdown (Compressor's monitoring and safety devices)				
Diesel burner (4.3.5)				
Type, manufacturer	Output capacity (power)	Ignition source emergency shutdown (230 V)	Gas detector	Max temp. for emergency shutdown
Spark arresters	Flame arresters	Flame protection	Air damper	
Ex-rating	Exhaust temp. (maximum)	Surface temp. (maximum)	Combustion air duct	Exhaust duct
Safety functions (stop):				
Boiler (4.3.5)				
Type, manufacturer	Output capacity (power)	Safety functions (stop):	Design pressure	Operating pressure
				Safety valve

DATA SHEET, part 3, discipline data (relevant parts shall be completed)					
Supplier	ID		Revision date		
Mechanical (4.4.1)					
Lifting devices	Fire classification	Main door (dimensions, inward or outward opening, self- closing mechanism)	Emergency exit (dimensions, inward or outward opening, self- closing mechanism)		
Fire (4.4.2)					
Fire alarm panel (type)	Detectors: Type, number, location	Portable fire extinguishers (number, type, size)	Room fire extinguishing system (description)		
Gas (4.4.3)					
Gas alarm panel (type)	Detectors: Type, number, location	Alarm level (LEL)	Disconnect level (LEL)	Gas type	
Electrical systems (4.4.6)					
Battery or UPS requiring special shutdown:					
Electrical equipment, permanently installed consumers:					
Tag	Description	Voltage, Un (V)	Current, In (A)	Power Pn (kW)	Remarks
Ventilation (4.4.7)					
Size of fan motor (W)	Air volume fan (m ³ /h)	Air changes (per hour)	Pressurisation (Pa)	Shutdown in event of pressurisation loss (time delayed, local alarm type)	

DATA SHEET, part 4, Ex-data (list of Ex-approved equipment)			
Supplier	ID		Revision date
Tag no.	Description	Approved zone	Certificate no.

DATA SHEET, part 5 Working Environment Area Chart (WEAC)			
Supplier	ID		Revision date
Use form in NORSOK S-002, Annex E. Shall be completed for all permanently manned containers (see data sheet part 1).			

Annex I (Normative) Maintenance

A maintenance programme shall be available for temporary equipment (containers and other equipment). All equipment requiring function and condition inspection shall be described separately in the maintenance programme, e.g.:

- Ex-approved equipment
- Lifting equipment
- Circuit protection devices for electrical equipment
- Fire and gas detectors with associated panels
- Shutdown systems and safety systems
- Insulation tests for Electrical equipment and Cable
- Compressors
- Steam generators
- Drive couplings and belts
- Diesel engines
- Safety valves
- Emergency light fittings
- Fire extinguishing equipment

The maintenance programme shall describe the preventive maintenance, with descriptive text and time interval. The programme shall take into account the manufacturer's recommendations, requirements in norms and standards, and the user's or owner's experience.

The supplier shall provide a maintenance journal for documenting the maintenance carried out, see 4.8.2.

Annual recertification of lifting equipment is mandatory.

Gas systems shall have a full scale test at least annually.

Fire systems (included extinguishing equipment) shall at least have an annual test (full scale test if feasible).

Inspection of electrical connections and megging of cables shall at least be performed annually.

PSV's shall have test intervals based on risk evaluation, maximum one year.

Operators who carry out maintenance, shall be able to document competence and training within the relevant disciplines. For electrical work see Annex E.

