SLOVENSKI STANDARD
SIST EN ISO 13702:2000

01-december-2000

Petroleum and natural gas industries - Control and migration of fires and explosions on offshore production installations - Requirements and guidelines (ISO 13702:1999)

Petroleum and natural gas industries - Control and migration of fires and explosions on offshore production installations - Requirements and guidelines (ISO 13702:1999)

Erdöl und Erdgasindustrien - Überwachung und Eindämmung von Feuer und Explosionen auf Offshore-Produktionsplattformen - Anforderungen und Richtlinien

Industries du pétrole et du gaz naturel - Contrôle et atténuation des feux et des explosions dans les installations en mer - Exigences et lignes directrices (ISO 13702:1999)

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13.220.01	Varstvo pred požarom na splošno	Protection against fire in general
75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment

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Petroleum and natural gas industries - Control and mitigation of fires and explosions on offshore production installations - Requirements and guidelines (ISO 13702:1999)

Industries du pétrole et du gaz naturel - Contrôle et atténuation des feux et des explosions dans les installations en mer - Exigences et lignes directrices (ISO 13702:1999)

This European Standard was approved by CEN on 1 March 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

The text of the International Standard ISO 13702:1999 has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" in collaboration with Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum and natural gas industries", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 1999, and conflicting national standards shall be withdrawn at the latest by September 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE FROM CEN/CS: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

Endorsement notice

The text of the International Standard ISO 13702:1999 was approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO 13702

First edition
1999-03-15

Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines

Industries du pétrole et du gaz naturel — Contrôle et atténuation des feux et des explosions dans les installations en mer — Exigences et lignes directrices

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Contents

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 13702 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

Annexes A, B and C of this International Standard are for information only.

Introduction

The successful development of the arrangements required to promote safety and environmental protection during the recovery of hydrocarbon resources, requires a structured approach to the identification and management of health, safety and environmental hazards applied during the design, construction, operation, inspection, maintenance and decommissioning of a facility.

This International Standard has been prepared primarily to assist in the development of new installations and as such it may not be appropriate to apply some of the requirements to existing installations. Retrospective application of this International Standard should only be undertaken where it is reasonably practicable to do so. During the planning for a major change to an installation there may be more opportunity to implement the requirements and a careful review of this International Standard should be undertaken to determine those sections which can be utilised in the change.

The technical content of this International Standard is arranged as follows:

— **Objectives** - lists the goals to be achieved by the control and mitigation measures being described.

— **Functional requirements** - represent the minimum criteria which shall be satisfied to meet the stated objectives. The functional requirements are performance-orientated measures and, as such, should be applicable to the variety of offshore installations utilized for the development of hydrocarbon resources throughout the world.

— **Guidelines** (annex B) - describe recognized practices which should be considered in conjunction with statutory requirements, industry standards and individual operator philosophy, to determine that the measures necessary are implemented for the control and mitigation of fires and explosions. The guidelines are limited to principal elements and are intended to provide specific guidance which, due to the wide variety of offshore operating environments, may in some circumstances not be applicable.

— **Bibliography** - lists documents to which informative reference is made in this International Standard.

Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines

1 Scope

This International Standard describes the objectives, functional requirements and guidelines for the control and mitigation of fires and explosions on offshore installations used for the development of hydrocarbon resources.

This International Standard is applicable to:

— fixed offshore structures;

— floating production, storage and off-take systems;

for the petroleum and natural gas industries.

Mobile offshore units as defined in this International Standard and subsea installations are excluded, although many of the principles contained in this International Standard may be used as guidance.

This International Standard is based on an approach where the selection of control and mitigation measures for fires and explosions is determined by an evaluation of hazards on the offshore installation. The methodologies employed in this assessment and the resultant recommendations will differ depending on the complexity of the production process and facilities, type of facility (i.e. open or enclosed), manning levels, and the environmental conditions associated with the area of operation.

Users of this International Standard should note that while observing its requirements, they should, at the same time, ensure compliance with such statutory requirements, rules and regulations as may be applicable to the individual offshore installation concerned.

2 Terms, definitions and abbreviated terms

2.1 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

2.1.1
abandonment
act of personnel onboard leaving an installation in an emergency

2.1.2
accommodation
place where personnel onboard sleep and spend their off-duty time

NOTE It may include dining rooms, recreation rooms, lavatories, cabins, offices, sickbay, living quarters, galley, pantries and similar permanently enclosed spaces.

2.1.3
active fire protection
AFP
equipment, systems and methods which, following initiation, may be used to control, mitigate and extinguish fires

2.1.4
area classification
division of an installation into hazardous areas and nonhazardous areas and the sub-division of hazardous areas into zones

NOTE This classification is based on the materials which may be present and the probability of a flammable atmosphere developing. Area classification is primarily used in the selection of electrical equipment to minimize the likelihood of ignition if a release occurs.

2.1.5
cellulosic fire
CF
fire involving combustible material such as wood, paper, furniture, etc.

2.1.6
class of fire
type of fire
classification used to facilitate the selection of extinguishers

2.1.7
control
<of hazards> limiting the extent and/or duration of a hazardous event to prevent escalation

2.1.8
control station
CS
place on the installation from which personnel can monitor the status of the installation, initiate appropriate shutdown actions and undertake any emergency communication

2.1.9
deluge system
system to apply fire-water through an array of open spray nozzles by operation of a valve on the inlet to the system

2.1.10
embarkation area
place from which personnel leave the installation during evacuation

EXAMPLES A helideck and associated waiting area or a lifeboat/liferaft boarding area.

2.1.11
emergency depressurization
EDP
controlled disposal of pressurized fluids to a flare or vent system when required to avoid or minimize a hazardous situation

2.1.12
emergency response
action taken by personnel on or off the installation to control or mitigate a hazardous event or initiate and execute abandonment

2.1.13
emergency response team
group of personnel who have designated duties in an emergency

2.1.14
emergency shutdown
ESD
control actions undertaken to shut down equipment or processes in response to a hazardous situation

2.1.15
emergency station
place where emergency response personnel go to undertake their emergency duties

2.1.16
escalation
spread of impact from fires, explosions, toxic gas releases to equipment or other areas thereby causing an increase in the consequences of a hazardous event

2.1.17
escape
act of personnel moving away from a hazardous event to a place where its effects are reduced or removed

2.1.18
escape route
route from an area of an installation leading to a muster area, temporary refuge (TR), embarkation area or means of escape to the sea

2.1.19
essential safety system
any system which has a major role in the control and mitigation of fires and explosions and in any subsequent EER activities

2.1.20
evacuation
the planned method of leaving the installation in an emergency

2.1.21
evacuation, escape and rescue
EER
general term used to describe the range of possible actions including escape, muster, refuge, evacuation, escape to the sea and rescue/recovery

2.1.22
evacuation, escape and rescue strategy
EERS
results of the process that uses information from an evaluation of events which may require EER to determine the measures required and the role of these measures

2.1.23
evacuation route
escape route which leads from the temporary refuge (TR) to the place(s) used for primary or secondary evacuation from the installation

2.1.24 explosion

2.1.24.1
chemical explosion
violent combustion of a flammable gas or mist which generates pressure effects due to confinement of the combustion-induced flow and/or the acceleration of the flame front by obstacles in the flame path

2.1.24.2
physical explosion
explosion arising from the sudden release of stored energy such as from failure of a pressure vessel, or high voltage electrical discharge to earth

2.1.25
fire and explosion strategy
FES
results of the process that uses information from the fire and explosion evaluation to determine the measures required to manage these hazardous events and the role of these measures

2.1.26
flammable atmosphere
mixture of flammable gas or vapour in air which will burn when ignited

2.1.27
functional requirements
minimum criteria which must be satisfied to meet the stated health, safety and environmental objectives

2.1.28
grade of release
<area classification> measure of the likely frequency and duration of a release

NOTE It is independent of the rate of release, the quantity of material released, the degree of ventilation and the characteristics of the fluid.

2.1.29
hazard
potential for human injury, damage to the environment, damage to property, or a combination of these

2.1.30
hazard assessment
process whereby the results of an analysis of a hazard or hazardous event are considered against either judgement, standards or criteria which have been developed as a basis for decision-making

2.1.31
hazardous area
three-dimensional space in which a flammable atmosphere may be expected to be present at such frequencies as to require special precautions for the control of potential ignition sources

2.1.32
hazardous event
incident which occurs when a hazard is realized

EXAMPLES Release of gas, fire, loss of buoyancy.

2.1.33
ignition sources
any source with sufficient energy to initiate combustion

2.1.34
integrated installation
offshore installation which contains, on the same structure, accommodation and utilities in addition to process and/or wellhead facilities

2.1.35
jet fire
JF
ignited release of pressurized, flammable fluids

2.1.36
life jacket
device worn by personnel which has sufficient buoyancy and stability to turn the body of an unconscious person and keep the person's mouth clear of the water

2.1.37
mitigation
<of hazardous event> reduction of the effects of a hazardous event

2.1.38
manned installation
installation on which people are routinely accommodated

2.1.39
mobile offshore unit
mobile platform, including drilling ships, equipped for drilling for subsea hydrocarbon deposits, and mobile platform for purposes other than production and storage of hydrocarbon deposits

2.1.40
muster area
designated area where personnel report when required to do so

2.1.41
operator
individual, partnership, firm or corporation having control or management of operations on the leased area or a portion thereof

NOTE The operator may be a lessee, designated agent of the lessee(s), or holder of operating rights under an approved operating agreement.

2.1.42
passive fire protection
PFP
coating or cladding arrangement or free-standing system which, in the event of fire, will provide thermal protection to restrict the rate at which heat is transmitted to the object or area being protected

2.1.43
pool fire
combustion of flammable or combustible liquid spilled and retained on a surface

2.1.44
prevention
<of hazardous event> reduction of the likelihood of a hazardous event

2.1.45
primary method
<for evacuation> preferred method of leaving the installation in an emergency

2.1.46
rescue
process by which those who have entered the sea directly or in TEMPSC/liferafts are retrieved to a place where medical assistance is available

2.1.47
risk
combination of the chance that a specified undesired event will occur and the severity of the consequences of that event

2.1.48
running liquid fire
fire involving a flammable liquid flowing over a surface

2.1.49
secondary method
<for evacuation> method of leaving the installation which can be carried out in a fully controlled manner under the direction of the person in charge, independent of external support

2.1.50
source of release
point from which flammable gas, liquid or a combination of both can be released into the atmosphere

2.1.51
survival suit
protective suit made of waterproof materials which reduces the body heat-loss of a person wearing it in cold water

2.1.52
temporary refuge
TR
place provided where personnel can take refuge for a predetermined period whilst investigations, emergency response and evacuation preplanning are undertaken

2.1.53
tertiary method
<for escape to the sea> method of leaving the instsllation which relies considerably on the individual's own action

2.1.54
totally enclosed motor-propelled survival craft
TEMPSC
craft capable of sustaining the lives of persons in distress from the time of abandoning the installation

2.1.55
zone
<area classification> distance in any direction from the source of release to the point where the flammable atmosphere has been diluted by air to a sufficiently low level

NOTE Different zone ratings are possible depending on the frequency that flammable mixtures are expected to be present.

2.2 Abbreviated terms

AB	Accommodation Block
AFP	Active Fire Protection
API	American Petroleum Institute
BA	Breathing Apparatus
BOP	Blowout Preventer
CCR	Central Control Room
CF	Cellulosic Fire
CS	Control Station
EDP	Emergency Depressurization
EER	Evacuation, Escape and Rescue
EERS	EER Strategy
ESD	Emergency Shutdown
FES	Fire and Explosion Strategy
SDV	Shutdown valve
F&G	Fire and Gas System
HC	Hydrocarbon
HVAC	Heating, Ventilation and Air Conditioning
OCS	Outer Continental Shelf
IEC	International Electrotechnical Commission
IMO	International Maritime Organization
JF	Jet Fire
PA	Process Area
PFP	Passive Fire Protection
PLC	Programmable Logic Controllers
SSIV	Sub-Sea Isolation Valve
SSSV	Sub-Surface Safety Valve
TEMPSC	Totally Enclosed Motor-Propelled Survival Craft
TR	Temporary Refuge
UPS	Uninterruptable Power Supply
UKOOA	United Kingdom Offshore Operators Association
UA	Utility Area
WH	Wellhead Area

3 Objectives

The principal objectives of this International Standard are, in order of priority:

— safety of personnel;

— protection of the environment;

— protection of assets;

— minimization of financial consequences of fires and explosions.

4 Fire and explosion evaluation and risk management

All companies associated with the offfshore recovery of hydrocarbons shall have, or conduct their activities in accordance with, an effective management system which addresses environmental issues such as described in ISO 14001 or similar[1)], and additionally addresses issues relating to health and safety. One key element of such management systems shall be a process of evaluation and risk management. The starting point for evaluation and risk management is the systematic identification of the hazards and effects which may arise from offshore recovery locations and activities and from the materials which are used or encountered in them. The identification process should be applied to all stages in the life cycle of an installation and to all types of hazards encountered as a consequence of the development of hydrocarbon resources.

The results of the identification process should be used both to evaluate the consequences of hazardous events and to determine appropriate risk reduction. The process of selecting risk-reduction measures will predominantly entail the use of sound engineering judgement, but this may need to be supplemented by a recognition of the particular circumstances which may require deviation from past practices and previously applied codes and standards. In certain circumstances, risk assessment may be able to provide useful input to the decision-making process, providing that the operator has established criteria for this purpose. Risk-reduction measures should include those to prevent incidents (i.e. reduction of the probability of occurrence), to control incidents (i.e. limiting the extent and duration of a hazardous event) and to mitigate the effects (i.e. reduction of the consequences). Preventative measures, such as using inherently safer designs and ensuring asset integrity, should be emphasized wherever practicable. Emergency response measures to recover from incidents should be provided based on the evaluation and should be developed taking into account possible failures of the control and mitigation measures. Based on the results of the evaluation, detailed health, safety and environmental objectives and functional requirements should be set at appropriate levels.

The above is general and applies to all hazards and potentially hazardous events. In the context of fires and explosions, the evaluation of these events may be part of an overall installation evaluation or may be treated as a separate process which provides information to the overall evaluation.

The results of the evaluation process and the decisions taken with respect to the need for, and role of, any risk reduction measures should be recorded so that they are available for those who operate the installation and for those involved in any subsequent change to the installation. For convenience in the remainder of this International Standard, the term 'strategy' has been adopted for this record. Two such strategies are introduced, namely a Fire and Explosion Strategy (FES) and an Evacuation, Escape and Rescue Strategy (EERS). These strategies do not have to be separately documented and the relevant information may be included with other health, safety and environmental information as part of the management of all hazardous events on an installation. The EERS may, for example be included in an overall installation Emergency Response Strategy. For many existing installations, the FES and EERS may be contained in previous risk assessments, or may be restricted to a simple statement of the standards and/or procedures, which are applied to deal with fire and explosion and escape and evacuation aspects of the installation.

The strategies should be updated whenever there is a change to the installation which may affect the management of the fire and explosion hazardous events.

The level of detail in a strategy will vary depending on the scale of the installation and the stage in the installation life cycle when the risk management process is undertaken. For example:

— complex installations, e.g. a large production platform incorporating complex facilities, drilling modules and large accommodation modules, are likely to require detailed studies to address the fire and explosion hazardous events. Typical examples of some of the issues that may need to be addressed for such installations are given in annex C;

— for simpler installations, e.g. a wellhead platform or other small platforms with limited process facilities, it may be possible to rely on application of recognized codes and standards as a suitable base which reflects industry experience for this type of facility;

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1) For example, operators should have an effective management system. Contractors should have either their own management system or conduct their activities consistently with the operators management system.