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RATIFICACIÓN DE DOCUMENTOS EUROPEOS DICIEMBRE 2003

HOJA DE ANUNCIO

En cumplimiento del punto 11.2.6.4 de las Reglas Internas de CEN/CENELEC Parte 2, se ha otorgado el rango de norma española al Documento Europeo siguiente:

Documento Europeo	**Título**	**Fecha de Disponibilidad**
EN ISO 10418:2003	Industrias del petróleo y del gas natural. Instalaciones marítimas. Sistemas de seguridad básicos para procesos en la superficie (ISO 10418:2003). Ratificada por AENOR en diciembre de 2003.	2003-10-15

Este anuncio causará efecto a partir del primer día del mes siguiente al de su publicación en la revista UNE. La correspondiente versión oficial de este documento se encuentra disponible en la sede de AENOR, Calle Génova 6, 28004 MADRID.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 10418

October 2003

ICS 75.180.10

English version

Petroleum and natural gas industries - Offshore production installations - Basic surface process safety systems (ISO 10418:2003)

Industries du pétrole et du gaz naturel - Plates-formes de production en mer - Analyse, conception, installation et essais des systèmes essentiels de sécurité de surface (ISO 10418:2003)

This European Standard was approved by CEN on 3 October 2003.

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 Management Centre 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN ISO 10418:2003 E

Foreword

This document (EN ISO 10418:2003) 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 April 2004, and conflicting national standards shall be withdrawn at the latest by April 2004.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

NOTE FROM CMC 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 ISO 10418:2003 has been approved by CEN as EN ISO 10418:2003 without any modifications.

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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 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10418 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

This second edition cancels and replaces the first edition (ISO 10418:1993), which has been technically revised including the following:

— reference to IEC 61511 is made for instrumentation used as secondary protection;

— risk-based methods of analysis are included as an alternative to the use of safety analysis tables (SATs) and safety analysis checklists (SACs);

— additional guidance is provided on the setting of safety integrity levels for fire and gas and ESD systems;

— additional guidance is provided concerning toxic gases and bypassing and annunciation.

Introduction

Effective management systems are required to address the health and safety aspects of the activities undertaken by all companies associated with the offshore recovery of hydrocarbons[1)]. These management systems should be applied to all stages in the life cycle of an installation and to all related activities. Such a management system, which has been developed for environmental issues, is described in ISO 14001[4] and the principles contained in this International Standard can also be applied to issues relating to health and safety.

One key element of effective management systems is a systematic approach to the identification of hazards and the assessment of the risk in order to provide information to aid decision-making on the need to introduce risk-reduction measures.

Risk reduction is an important component of risk management, and the selection of risk-reduction measures will predominantly entail the use of sound engineering judgement. However, such judgements may need to be supplemented by recognition of the particular circumstances, which may require variation to past practices and previously applied codes and standards.

Risk-reduction measures should include those to prevent incidents (i.e. reducing the probability of occurrence), to control incidents (i.e. limit the extent and duration of a hazardous event) and to mitigate the effects (i.e. reducing the consequences). Preventative measures such as using inherently safer designs and ensuring asset integrity should be emphasized wherever practicable. Measures to recover from incidents should be provided based on risk assessment 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 level and extent of hazard identification and risk assessment activities will vary depending on the scale of the installation and the stage in the installation life cycle when the identification and assessment 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 hazardous events such as fires, explosions, ship collisions, structural damage, etc.;

— for simpler installations, e.g. a wellhead platform 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;

— for installations which are a repeat of earlier designs, evaluations undertaken for the original design may be deemed sufficient to determine the measures needed to manage hazardous events;

— for installations in the early design phases, the evaluations will necessarily be less detailed than those undertaken during later design phases and will focus on design issues rather than management and procedural aspects. Any design criteria developed during these early stages will need to be verified once the installation is operational.

Hazard identification and risk assessment activities may need to be reviewed and updated if significant new issues are identified or if there is significant change to the installation. The above is general and applies to all hazards and potentially hazardous events.

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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 operator's management system.

Process protection system is a term used to describe the equipment provided to prevent, mitigate or control undesirable events in process equipment, and includes relief systems, instrumentation for alarm and shutdown, and emergency support systems. Process protection systems should be provided based on an evaluation that takes into account undesirable events that may pose a safety risk. The results of the evaluation process and the decisions taken with respect to the need for process protection systems should be fully recorded.

If an installation and the associated process systems are sufficiently well understood, it is possible to use codes and standards as the basis for the hazard identification and risk assessment activities that underpin the selection of the required process protection systems. The content of this International Standard is designed to be used for such applications and has been derived from the methods contained in API RP 14C[8] that have proven to be effective for many years. Alternative methods of evaluation may be used, for example based on the structured review techniques described in ISO 17776. Having undertaken an appropriate evaluation, the selection of equipment to use may be based on a combination of the traditional prescriptive approach and new standards that are more risk based.

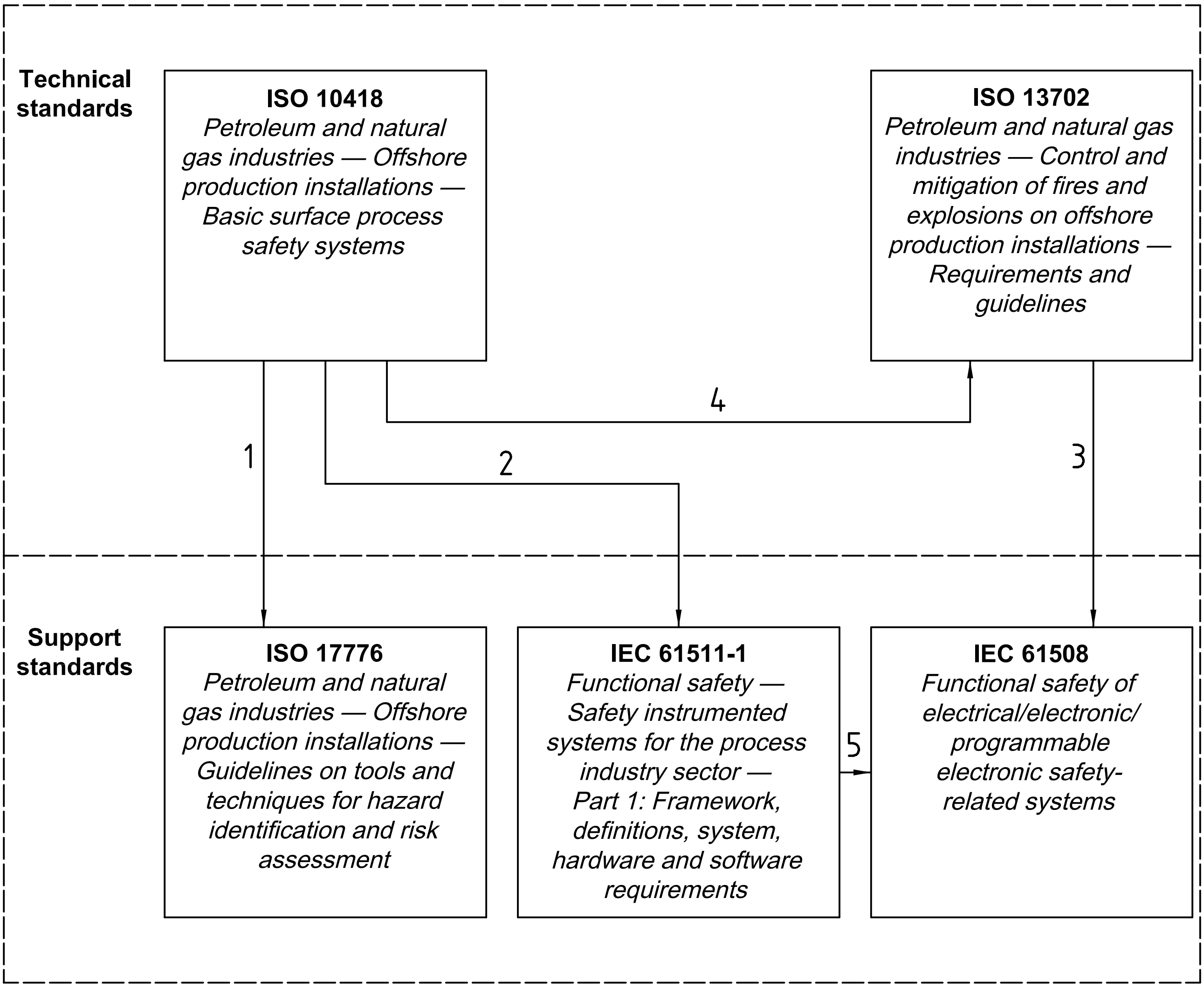
Particular requirements for the control and mitigation of fires and explosions on offshore installations are given in ISO 13702. General requirements for fire and gas and emergency shutdown (ESD) systems are also included in ISO 13702.

This International Standard and ISO 13702 reference new standards on functional safety of instrumented systems. This International Standard refers to IEC 61511-1, which is the process sector implementation of the generic standard IEC 61508 that is referred to in ISO 13702. The relationship between the standards referred to above is presented in Figure 1.

The approach described in this International Standard should be applied in an iterative way. As design proceeds, consideration should be given as to whether any new hazards are introduced and whether any new risk-reduction measures need to be introduced.

It should be recognized that the design, analysis and testing techniques described in this International Standard have been developed bearing in mind the typical installations now in use. Due consideration should therefore be given during the development of process protection systems to the size of the installation, the complexity of the process facilities, the complexity and diversity of the protection equipment and the manning levels required. New and innovative technology may require new approaches.

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 if it is reasonable to do so. During the planning of a major modification 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 clauses which can be adopted during the modification.



Key

1 Tools and techniques for systematic hazard identification and risk analysis

2 Requirements for instrument systems used for sole or secondary protection

3 For safety integrity requirements for fire and gas and emergency shutdown systems

4 Requirements for fire and explosion strategy and support systems

5 Requirements for instrument products used for safety that have not been proven by “prior use”

Figure 1 — Relationship between offshore-relevant standards

Petroleum and natural gas industries — Offshore production installations — Basic surface process safety systems

1 Scope

This International Standard provides objectives, functional requirements and guidelines for techniques for the analysis, design and testing of surface process safety systems for offshore installations for the recovery of hydrocarbon resources. The basic concepts associated with the analysis and design of a process safety system for an offshore oil and gas production facility are described, together with examples of the application to typical (simple) process components. These examples are contained in the annexes of this International Standard.

This International Standard is applicable to

— fixed offshore structures;

— floating production, storage and off-take systems;

for the petroleum and natural gas industries.

This International Standard is not applicable to mobile offshore units and subsea installations, although many of the principles contained in it may be used as guidance.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13702:1999, *Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines*

ISO 17776:2000, *Petroleum and natural gas industries — Offshore production installations — Guidelines on tools and techniques for hazard identification and risk assessment*

IEC 61511-1, *Functional safety — Safety instrumented systems for the process industry sector — Part 1: Framework, definitions, system, hardware and software requirements*

3 Terms, definitions and abbreviated terms

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

3.1 Terms and definitions

3.1.1
abnormal operating condition
condition which occurs in a process component when an operating variable ranges outside of its normal operating limits

3.1.2
atmospheric service
operation at gauge pressures between 0,2 kPa vacuum and 35 kPa pressure

3.1.3
automatically fired vessel
fired vessel having the burner fuel controlled by an automatic temperature or pressure controller

3.1.4
backflow
in a process component, fluid flow in the direction opposite to that of normal flow

3.1.5
blowdown valve
valve used to connect a process system to the system for discharging inventory to the atmosphere

3.1.6
containment
situation in which the hazardous material is held safely in a pressurized system

3.1.7
detectable abnormal condition
abnormal operating condition which can be detected by a sensor

3.1.8
direct ignition source
any source with sufficient energy to initiate combustion

3.1.9
emergency shutdown system
ESD system
system, activated by automatic or manual signals, which undertakes the control actions to shut down equipment or processes in response to a hazardous situation

3.1.10
excess temperature
in a process component, temperature higher than the rated working temperature

3.1.11
fail-closed valve
valve which will move to the closed position upon loss of the power medium or signal

3.1.12
failure
improper performance of a device or equipment item that prevents completion of its design function

3.1.13
fire detection system
system which provides continuous automatic monitoring to alert personnel to the presence of fire and to allow control actions to be initiated either manually or automatically

3.1.14
fired vessel
vessel in which the temperature of a fluid is increased by the addition of heat supplied by a flame contained within a fire tube within the vessel

3.1.15
fire loop
pneumatic control line containing temperature-sensing elements which, when activated, will initiate control actions in response to a hazardous situation

NOTE Examples of temperature-sensing elements are: fusible plugs, synthetic tubing, etc.

3.1.16
flame failure
flame which is inadequate to instantaneously ignite combustible vapours entering the firing chamber of a fired vessel

3.1.17
flowline
piping which directs the well stream from the wellhead to the first downstream process component

3.1.18
flowline segment
any portion of a flowline that has an operating pressure different from another portion of the same flowline

3.1.19
gas blowby
discharge of gas from a process component through a liquid outlet

3.1.20
gas detection system
system which monitors spaces on an offshore installation for the presence and concentration of flammable gases and initiates alarm and control actions at predetermined concentrations

3.1.21
hazardous area
three-dimensional space in which a flammable atmosphere may be expected to be present frequently enough to require special precaution for the control of potential ignition sources

3.1.22
hazardous event
incident which occurs when a hazard is realised

EXAMPLES Release of gas, fire, gas blowby.

3.1.23
high liquid level
in a process component, liquid level above the normal operating level but less than the maximum allowable working level

3.1.24
high pressure
in a process component, pressure in excess of the normal operating pressure but less than the maximum allowable working pressure

NOTE For pipelines, the maximum allowable working pressure is the maximum allowable operating pressure.

3.1.25
HP/LP interface
point in a process plant where operating pressure changes from high pressure to low pressure

NOTE A change in system design pressure or piping class is often associated with the HP/LP interface.

3.1.26
high temperature
in a process component, temperature in excess of the normal operating temperature but less than the maximum allowable working temperature

3.1.27
indirect heated component
vessel or heat exchanger used to increase the temperature of a fluid by heat transfer from another hot fluid

NOTE Examples of hot fluids are steam, hot water, hot oil, or other heated medium.