SLOVENSKI STANDARD
SIST EN ISO 15138:2001

01-junij-2001

Petroleum and natural gas industries - Offshore production installations - Heating, ventilation and air-conditioning (ISO 15138:2000)

Petroleum and natural gas industries - Offshore production installations - Heating, ventilation and air-conditioning (ISO 15138:2000)

Erdöl- und Erdgasindustrie - Offshore-Produktionsanlagen - Heizung, Lüftung und Klimatisierung (ISO 15138:2000)

Industries du pétrole et du gaz naturel - Installations en mer - Chauffage, ventilation et climatisation (ISO 15138:2000)

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ICS:

75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment

SIST EN ISO 15138:2001 **en**

EUROPEAN STANDARD

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English version

Petroleum and natural gas industries - Offshore production installations - Heating, ventilation and air-conditioning (ISO 15138:2000)

Industries du pétrole et du gaz naturel - Installations en mer - Chauffage, ventilation et climatisation (ISO 15138:2000)

Erdöl- und Erdgasindustrie - Offshore-Produktionsanlagen - Heizung, Lüftung und Klimatisierung (ISO 15138:2000)

This European Standard was approved by CEN on 26 October 2000.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This document (EN ISO 15138:2000) 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 May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.

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.

Endorsement notice

The text of ISO 15138:2000 has been approved by CEN as EN ISO 15138:2000 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

Annex ZA
(normative)

Normative references to international publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

Publication	Year	Title	EN	Year
ISO 8861	1998	Shipbuilding - Engine-room ventilation in diesel-engined ships - Design requirements and basis of calculations	EN ISO 8861	1998

INTERNATIONAL STANDARD

ISO 15138

First edition
2000-11-01

Petroleum and natural gas industries — Offshore production installations — Heating, ventilation and air-conditioning

Industries du pétrole et du gaz naturel — Installations en mer — Chauffage, ventilation et climatisation

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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.

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

International Standard ISO 15138 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 through F of this International Standard are for information only.

Petroleum and natural gas industries — Offshore production installations — Heating, ventilation and air-conditioning

1 Scope

This International Standard specifies requirements and provides guidance for design, testing, installation and commissioning of heating, ventilation, air-conditioning and pressurization systems and equipment on all offshore production installations for the petroleum and natural gas industries which are:

— new and existing;

— normally occupied by personnel and not normally occupied by personnel;

— fixed or floating but registered as an offshore production installation.

NOTE For installations that could be subject to "Class" or "IMO/MODU Codes & Resolutions", the user is referred to HVAC requirements under these rules and resolutions. Should these requirements be of a lesser degree than those being considered for a fixed installation, then this International Standard, i.e. requirements for fixed installation, should be utilized.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 8861, *Shipbuilding — Engine-room ventilation in diesel-engined ships — Design requirements and basis of calculations.*

IEC 60079-10, *Electrical apparatus for explosive gas atmospheres — Part 10: Classification of hazardous areas.*

3 Terms and definitions

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

3.1
displacement ventilation
movement of air within a space in piston- or plug-type motion

NOTE No mixing of room air occurs in ideal displacement flow, which is desirable for removing pollutants generated within a space.

3.2
fixed offshore installation
all **facilities** located and installed on **fixed offshore structures**, which are provided to extract oil and gas hydrocarbons from subsea oil and gas reservoirs

3.3
fixed offshore structure
structure permanently fixed to or located on the sea bed, including moored ships and hulls, which is held in position by anchors or tensioned cables and is provided to (structurally) support topsides facilities

NOTE Vessels and drilling rigs, etc. which are in transit or engaged in exploration and appraisal activities are specifically excluded from this definition.

3.4
fugitive emission
emission which is always present on a molecular scale from all potential leak sources in a plant under normal operating conditions

NOTE As a practical interpretation, a fugitive emission is one which cannot be detected by sight, hearing or touch but may be detected using bubble-test techniques or tests of a similar sensitivity.

3.5
open area
area in an open-air situation where vapours are readily dispersed by wind

NOTE Typical air velocities in such areas should rarely be less than 0,5 m/s and should frequently be above 2 m/s.

3.6
temporary refuge
TR
place where personnel can take refuge for a pre-determined period whilst investigations, emergency response and evacuation pre-planning are undertaken

[ISO 13702:1999, definition 2.1.52]

4 Abbreviated terms

AC	Alternating Current
AC/h	Air Changes per hour
AHU	Air Handling Unit
AMCA	Air Movement and Control Association Inc.
API	American Petroleum Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BS	British Standard
CCR	Central Control Room
CFD	Computational Fluid Dynamics
CIBSE	Chartered Institution of Building Services
CMS	Control and Monitoring System
CVU	Constant-Volume Terminal Reheat Unit
DC	Direct Current

DE	Driven End
DX	Direct Expansion
EN	European Standard
ESD	Emergency Shutdown
F&G	Fire and Gas
HAZOP	Hazard and Operability Study
HSE	Health, Safety and Environment
HVAC	Heating, Ventilation and Air Conditioning
HVCA	Heating and Ventilating Contractors' Association
IEC	International Electrotechnical Commission
IMO	International Maritime Organization
IP	Institute of Petroleum
IP	Integrity Protection
LFL	Lower Flammable Limit
LQ	Living Quarters
MODU	Mobile Offshore Drilling Unit
NDE	Non-driven End
NFPA	National Fire Protection Association
NS	Norsk Standard (Norwegian Standard)
QRA	Quantitative Risk Analysis
r.m.s.	Root mean square

5 Design

5.1 Introduction

Clause 5 together with annex A provide requirements and guidance on all aspects of the design of heating, ventilation and air-conditioning (HVAC) systems for offshore installations for the petroleum and natural gas industries. The HVAC systems form part of the safety services of the installation. The safety goals are to:

— prevent, through pressurization, the ingress of potentially flammable gas-air mixtures into all designated nonhazardous areas;

— prevent the formation of potentially hazardous concentrations of flammable gaseous mixtures in hazardous areas by provision of sufficient ventilation for the dilution, dispersion and removal of such mixtures;

— maintain ventilation to all equipment and areas/rooms which are required to be operational during an emergency when the main source of power is unavailable;

— provide a controlled environment in which personnel, plant and systems can operate effectively, including smoke control.

These high-level goals are supported by lower-level goals of a functional nature which are stated later in the appropriate sections of this document.

Subclause 5.2 concentrates on functional requirements in the development of a basis of design for either a new project or major modification to an existing installation. The requirements are related to:

a) platform orientation and layout;

b) hazard identification and hazardous area classification;

c) environmental conditions;

d) choice of natural or mechanical ventilation systems;

e) development of the controls philosophy;

f) material selection;

g) design margins and calculations;

h) design development and validation using wind tunnel testing or Computational Fluid Dynamics (CFD).

Ventilation may be natural (i.e. the wind) or mechanical or a combination of both. Throughout this International Standard, the use of the term "ventilation" should be taken to include either natural or mechanical ventilation, as appropriate.

Natural ventilation is preferred over mechanical ventilation where practical, since it is available throughout gas emergencies, does not rely on active equipment and reduces effort required for HVAC maintenance.

For new designs, the development of a design basis may be progressed using the guidance and examples of good engineering practice that are identified in this document, though it should be recognized that it involves a process of iteration as the design matures and does not take place as the sequential series of steps used in this document to facilitate presentation. The processes outlined here are equally applicable to major redevelopments to existing installations, but some compromise may need to be made as a result of historical decisions regarding layout, equipment selection and the prevailing level of knowledge at the time. The challenge of providing cost-effective solutions in redevelopment may be significantly greater than for a new design.

The finalized basis of design may be recorded on data sheets such as those provided in annex E.

The completed design should be subject to hazard assessment review. The Hazard and Operability Study (HAZOP) technique may be used for this.

In 5.2, objectives are identified which establish the goals. Functional requirements are outlined which will enable the objectives to be achieved. The functional requirements are supported by technical guidance given in annex A, which discusses the suitability of different techniques for different applications and identifies examples of good engineering practice or cost-effective solutions that have been used in some parts of the world. The functional requirements may be satisfied by other methods not identified in this document, but it is the responsibility of the user to assess whether the method is technically acceptable and acceptable to the local regulator.

Subclause 5.3 addresses the fundamental choice in system design, i.e. between natural and mechanical methods of ventilation.

Subclause 5.4 gives functional requirements associated with the design of HVAC systems for different areas of a typical offshore installation which require particular technical considerations due to their location and/or their function.

Figure 1 is intended to illustrate the processes undertaken at various stages of the installation life cycle and to identify reference documents and the appropriate clauses of this International Standard which provide the necessary guidance.

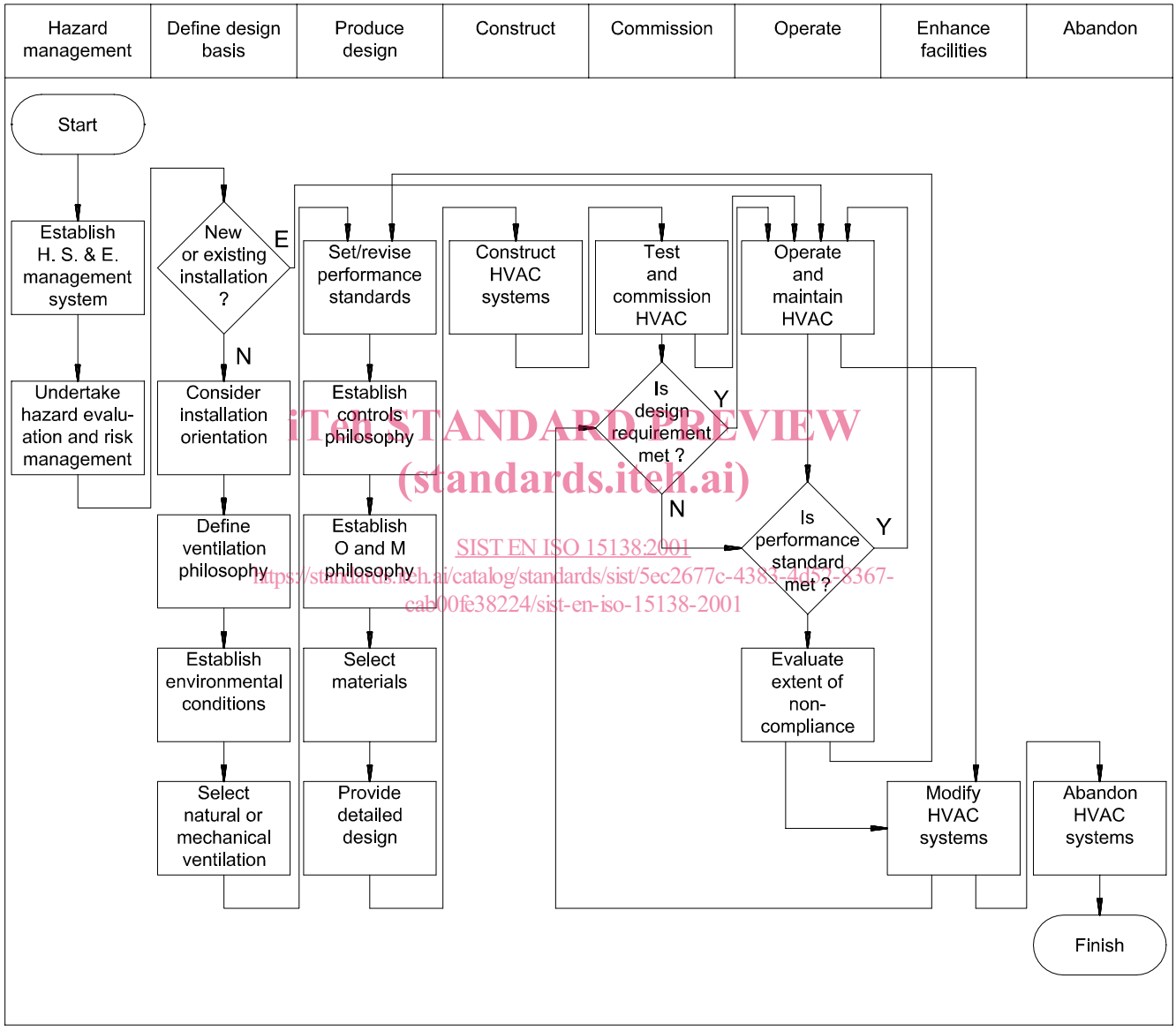

Figure 1 — Application of this International Standard to a project life cycle