

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Abbreviated terms	4
5 Risk management	5
5.1 General	5
5.2 Management of working environment risks in the design process	5
5.3 Mitigating measures — Risk reduction principles	5
5.3.1 Hierarchy of controls	5
5.3.2 ALARP	6
5.4 Special assessment in Arctic environment	6
5.4.1 Input to design specification	6
5.4.2 Risk assessments in operation — Operational solutions	8
6 Management of working environment hazards in Arctic operations	8
6.1 General	8
6.2 Information on climate conditions	8
6.3 Illumination	9
6.4 Visibility	9
6.4.1 General	9
6.4.2 Preventing glare	10
6.5 Physiological and psychosocial effects (human performance)	10
6.6 Noise and vibration	11
6.6.1 General	11
6.6.2 Noise	11
6.6.3 Vibration	11
6.6.4 Hand-arm vibration	11
6.7 Hazardous chemicals	11
6.8 UV radiation	12
6.9 Wildlife	12
7 Environmental and cold climate preconditions	12
7.1 General	12
7.2 Metocean data	12
7.3 Assessment of the need for permanent weather protection	13
7.4 Area wind chill temperature (WCT) — CFD simulations	13
8 Working environment design philosophy and technical solutions	14
8.1 General	14
8.2 Design process and design requirements for Arctic conditions	14
8.3 Enclosures for weather protection	15
8.4 Anti-icing, anti-freezing and de-icing	15
8.5 Anti-icing and anti-freezing measures	16
8.6 De-icing measures	17
8.7 Work areas and access ways protection	17
8.8 Falling ice protection	18
8.9 Anti-slip systems	18
8.10 Cold surfaces protection	18
8.11 Safety equipment	18
8.12 Heat tracing and insulation	19
8.13 Hospital	19
8.14 Living quarters	19

8.15	Cabins.....	19
9	Operational requirements for prevention and management of cold-related problems	19
9.1	General.....	19
9.2	Buddy control system	20
9.3	Background.....	20
9.4	Cold risk management system	20
9.5	Cold risk assessment.....	21
9.5.1	General.....	21
9.5.2	Identification of cold-related problems at work (Stage 1).....	22
9.5.3	Determination of wind cooling (wind chill exposure) (Stage 2).....	22
9.5.4	Work, warm-up and recovery regimes (Stage 3).....	24
9.6	Clothing and personal protection regimes	25
9.6.1	General.....	25
9.6.2	Hand protection.....	26
9.6.3	Foot protection.....	27
9.6.4	Face protection — Cold air protection.....	27
9.6.5	Chemical respiratory protection.....	28
9.7	Fitness for work in the Arctic environment.....	28
9.7.1	General.....	28
9.7.2	Cold-related health risks.....	28
9.7.3	Cold-related health assessment.....	28
9.7.4	Medical health examination associated with operation in the cold	29
9.7.5	Suggested health requirements	29
9.7.6	Other aspects relevant to assessment of fitness for work.....	30
9.8	Health and stress management.....	31
9.8.1	Psychosocial stress exposure.....	31
9.8.2	Health and stress management.....	31
9.9	First aid and medical provision.....	31
9.9.1	Medical support assessment.....	31
9.9.2	Medical facilities.....	31
9.9.3	Medical evacuation.....	32
10	Education, training and supervision	32
	Annex A (informative) Working environment studies and deliverables in project development.....	34
	Annex B (informative) Assessment of weather protection.....	36
	Bibliography	40

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see the following URL: www.iso.org/iso/foreword.html.

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Introduction

Workers in the petroleum and natural gas industries face a number of stressors from the physical and psychosocial environment when working in the Arctic. These include prolonged periods of darkness (polar winter) and light (polar summer), remoteness, noise and vibration, low humidity and cold climate. The combination of different working environment factors can affect people's health and safety. Cold-climate locations, low temperatures and wind can directly affect both equipment (e.g. operability, reliability and integrity) and people (e.g. frostbite, hypothermia and performance decrement). In turn, affected equipment can affect the health and safety of personnel, and poor personnel performance can likewise have a detrimental effect on equipment. It is important to consider and assess all these relationships in order to have confidence in production and health, safety and environmental (HSE) risks at facilities in cold climates. This is illustrated in [Figure 1](#). Based on the outcome of the assessment, approaches for cold-climate risk management should address all aspects of winterization, from prevention through facility design and specification through to working procedures. In addition to this, personal protective equipment (including clothing) may be necessary.

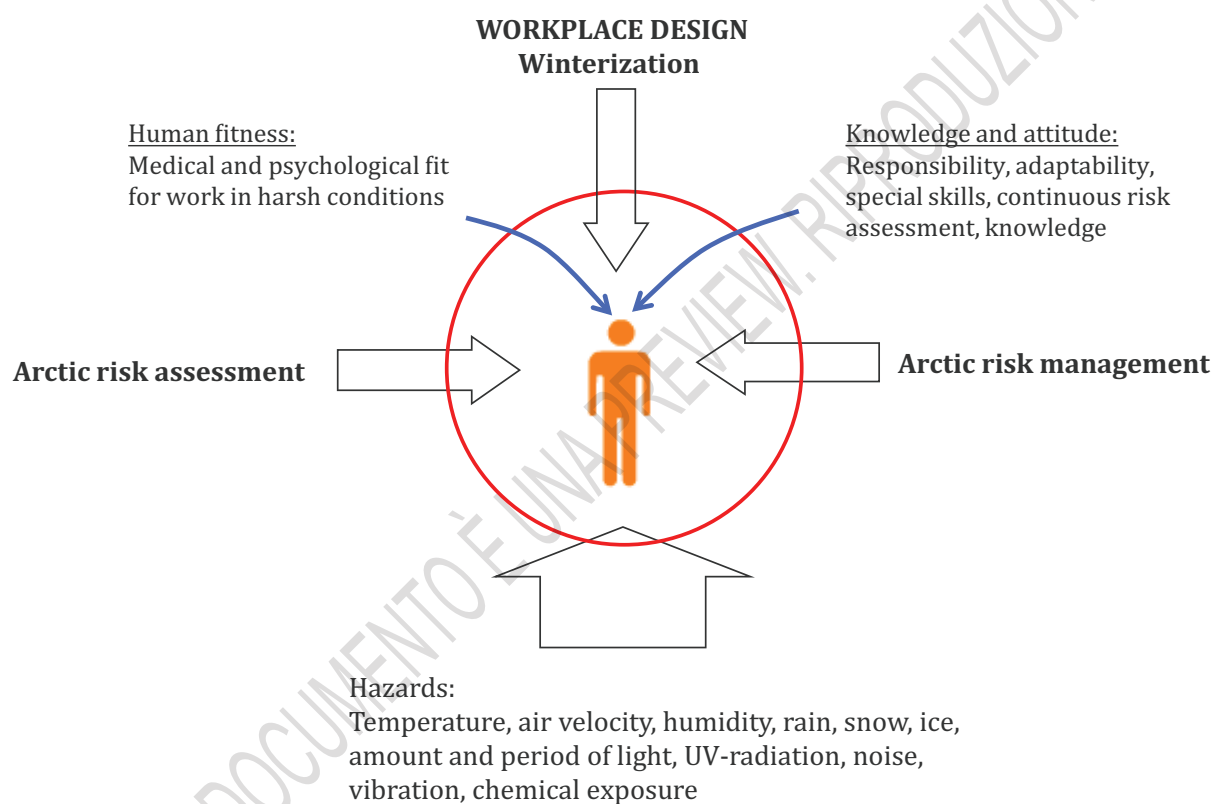


Figure 1 — Hazards and preventive measures to protect people in Arctic environment

Petroleum and natural gas industries — Arctic operations — Working environment

1 Scope

This document describes the working environment that can be expected when operating oil and gas facilities in Arctic environments/climate. This document provides principles and generic guidelines for the design and operation of fixed and floating oil and gas facilities both onshore and offshore.

The aim of this document is to ensure optimal health, safety, human performance and decision-making conditions for people working on oil and gas facilities in Arctic conditions.

This document applies to the design and operation of new facilities and structures, and to modification of existing facilities for operation in the Arctic environment. This also includes offshore and onshore exploration and accommodation units for such activities.

This document is divided into three main parts.

- The first part ([Clause 5](#)) describes the general principles and guidelines for risk management.
- The second part ([Clause 6](#)) describes the general working environment (working environment hazards found in many workplaces and provides some threshold limit values (TLVs) and design references that can be especially challenging in Arctic conditions.
- The third part ([Clause 7](#) to [Clause 9](#)) addresses the climatic conditions expected in the Arctic. [Clause 8](#) describes working environment design and technical solutions, while [Clause 9](#) describes working environment operational requirements for prevention and management of cold-related problems.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 Guide 73, *Risk management — Vocabulary*

ISO 5349-1, *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 1: General requirements*

ISO 5349-2, *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 2: Practical guidance for measurement at the workplace*

ISO 11064-6, *Ergonomic design of control centres — Part 6: Environmental requirements for control centres*

ISO 11079:2007, *Ergonomics of the thermal environment — Determination and interpretation of cold stress when using required clothing insulation (IREQ) and local cooling effects*

ISO 19901-1, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 1: Metocean design and operating considerations*

ISO 19906:2010, *Petroleum and natural gas industries — Arctic offshore structures*

ISO 31000, *Risk management — Principles and guidelines*

IMO MSC/Circ. 982, *Guidelines on ergonomic criteria for bridge equipment and layout*