

ISO/TC 67 N

Date: ~~2017-11~~

ISO/~~TS 17969:2017~~(E)

ISO/TC 67/WG 2

Secretariat: NEN

- Style Definition: bib_comment
- Style Definition: bib_deg
- Style Definition: bib_suffix
- Style Definition: bib_unpubl
- Style Definition: cite_box
- Style Definition: bib_medline
- Deleted: 2016-12-09
- Deleted: DTS
- Deleted: 2016

Petroleum, petrochemical and natural gas industries — Guidelines on competency management for well operations personnel ~~Error! AutoText entry not defined.~~

| |
|--|
| Deleted: ¶ |
| Warning¶ |
| This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.¶ |
| Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.¶ |

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/TS 17969:2017

<https://standards.iteh.ai/catalog/standards/sist/d67eace5-4db8-446b-aff8-5970ef00c472/iso-ts-17969-2017>

Document type: Technical Specification
 Document subtype:
 Document stage: (30) Committee
 Document language: E

D:\temp\macroserver\DOC2PDFRGB\DOC2PDFRGB.BAZZUCCHI@VBAZZUCCHI_118\C069919e_track changes.doc STD Version 2.8f

Deleted: [redacted] notice¶

This ISO document is a working draft or committee draft and is [redacted] protected by ISO. While the reproduction of working drafts or committee drafts in any form for use by participants in the ISO standards development process is permitted without prior permission from ISO, neither this document nor any extract from it may be reproduced, stored or transmitted in any form for any other purpose without prior written permission from ISO.¶

Requests for permission to reproduce this document for the purpose of selling it should be addressed as shown below or to ISO's member body in the country of the requester:¶

[Indicate the full address, telephone number, fax number, telex number, and electronic mail address, as appropriate, of the [redacted] Manager of the ISO member body responsible for the secretariat of the TC or SC within the framework of which the working document has been prepared.]¶

Reproduction for sales purposes may be subject to royalty payments or a licensing agreement.¶

Violators may be prosecuted.¶

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/TS 17969:2017

<https://standards.iteh.ai/catalog/standards/sist/d67eace5-4db8-446b-aff8-5970ef00c472/iso-ts-17969-2017>

| Contents | Page |
|---|-------------|
| Foreword..... | 4 |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms and definitions..... | 1 |
| 4 Competency management system | 3 |
| 4.1 General | 3 |
| 4.2 Benefits of a CMS | 3 |
| 4.3 Comparison of a CMS with an appraisal system | 4 |
| 4.4 Development of a CMS..... | 4 |
| 4.4.1 CMS cycle..... | 4 |
| 4.4.2 Phase 1 — Establish requirements for the CMS..... | 6 |
| 4.4.3 Phase 2 — Design the CMS..... | 7 |
| 4.4.4 Phase 3 — Implement the CMS | 8 |
| 4.4.5 Phase 4 — Maintain and develop competence..... | 9 |
| 4.4.6 Phase 5 — Verify, audit and review the CMS | 11 |
| 5 Application of CMS requirements to well operations personnel | 12 |
| 5.1 General | 12 |
| 5.2 Recommended risk-based approach for well operations..... | 13 |
| 5.3 Competency model..... | 14 |
| 5.3.1 Well competency catalogue | 14 |
| 5.3.2 Proficiency levels..... | 15 |
| 5.3.3 Competency profile..... | 17 |
| 5.4 Team competence..... | 17 |
| 5.5 Leadership skills..... | 18 |
| 5.6 Contract personnel..... | 18 |
| 5.7 Roadmap to ensure competency..... | 18 |
| 6 Examples of competency profiles | 20 |
| Annex A (informative) Example competency assessment information..... | 21 |
| Annex B (informative) Example of competency profile for drilling supervisor | 25 |
| Annex C (informative) Example of competency profile for senior drilling engineer..... | 26 |
| Annex D (informative) Example of competency profile for well examiner | 27 |
| Annex E (informative) Example of competency profile for operations geologist | 28 |
| Bibliography | 29 |

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

This document was prepared by ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*.

This second edition cancels and replaces the first edition (ISO/TS 17969:2015), which has been revised to incorporate the agreed changes that were mistakenly not taken into account in the publication of the first edition.

Formatted: Not Highlight

Formatted: Not Highlight

Deleted: /2/iso-ts-

Petroleum, petrochemical and natural gas industries — Guidelines on competency management for well operations personnel

1 Scope

The purpose of this document is to help members of the oil and gas industry develop, implement, maintain and improve their own competency management systems (CMS) for well operations personnel. This document supports competency management general principles which can be applied to any operation within the industry.

The annexes to this document list example competence profiles for personnel responsible for well integrity. Annex A includes an example worksheet which can be used in performing a competency assessment, to help record the assessment results versus expectation, as well as the resulting action plan to address any gaps identified.

This document is applicable to all operators, service companies and drilling contractors working on wells and well operations.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

competence

ability to undertake responsibilities and to perform activities to a recognised standard on a regular, repeatable basis

Note 1 to entry: Competence is a combination of knowledge, practical and thinking skills, and a person's behaviour.

Note 2 to entry: Standards may be company specific.

EXAMPLE 1 McCoy's Law: competency = knowledge × skills × behaviours.

EXAMPLE 2 Bloom's taxonomy: competency = knowledge × skills × (technical + ability).

3.2

Formatted: Not Highlight

Formatted: Not Highlight

Field Code Changed

Deleted: <http>

Formatted: English (U.K.)

Formatted: Default Paragraph
Font, Underline, Font color: Blue,
English (U.K.)Formatted: Default Paragraph
Font, English (U.K.)

Formatted: Not Highlight

Formatted: Not Highlight

ISO/DTS 17969:2017(E)

competence assessment

process of judging evidence of an individual's performance against agreed competence requirements

Note 1 to entry: The result of such an assessment, potentially in combination with other factors such as work experience, will determine whether that individual has demonstrated competence and to which proficiency level.

Formatted: Not Highlight

3.3

competency catalogue

hierarchical structured list of the competencies required to perform any task

3.4

competency profile

skills and behaviour, each specified at a level of proficiency, required to perform the role or activity in line with the associated risk

3.5

contractor

non-staff member

3.6

independent assessor

approved assessor that utilizes specified objective evidence of competency to assess an individual's skills

Note 1 to entry: The independent assessor shall be an approved individual competent in assessing one's skills based on predetermined and specified objective evidence of competence. This includes, but is not limited to, assessment and debrief techniques as well as competence in the skills being assessed.

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Note 2 to entry: The independent assessor may not be the line manager or the direct supervisor of the individual.

Formatted: Not Highlight

Formatted: Not Highlight

Note 3 to entry: The independent assessor may or may not be from within the same company.

Formatted: Not Highlight

Formatted: Not Highlight

Note 4 to entry: Independence needs to be demonstrated to ensure that a balanced and fair assessment of a person's competency in the subject is completed.

Formatted: Not Highlight

Note 5 to entry: If no one at wellsite can fulfil the role of independent assessor, it is recognized that there may be challenges to have extra personnel at wellsite. Therefore, companies needs to leverage modern technology, simulation, remote monitoring, etc. in order to perform independent assessments.

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

3.7

major accident

significant emission, fire or explosion resulting from uncontrolled events

3.8

proficiency level

level of ability and behaviour attributes within a specific skill

3.9

rubric

set of assessment criteria used to describe and evaluate the important components of a task

Note 1 to entry: A rubric is an effective assessment tool, because it allows different assessors to arrive at similar conclusions when comparing performance to the guidelines shown on the rubric.

Formatted: Not Highlight

3.10

safety-critical competency

type of competence required of personnel in order to carry out an operation which, if carried out incorrectly or inadvertently, can lead to a major accident hazard

3.11

safety-critical task

task performed on a safety-critical element which, if performed incorrectly due to lack of technical skills or knowledge or due to behaviour attributes, can lead to a major accident hazard

4 Competency management system

Formatted: Not Highlight

4.1 General

The purpose of a competency management system (CMS) is to control, in a logical and integrated manner, a cycle of activities within the organization that systematically and consistently promotes the development, assurance and maintenance of competent operations personnel, particularly in safety critical activities. The CMS will enable personnel to be assessed and further developed, contributing to the goal of competent performance at work. A CMS should be user-friendly, workable, auditable and practical.

Formatted: Not Highlight

Formatted: Not Highlight

If an organization has no CMS, the recommended first step is to garner support from the very top of the organization. The system should then be constructed, involving resources from multiple levels of the organization, to create a sense of ownership.

This document contains a number of examples of competency profiles which can be useful for an organization if it has to create profiles for its own staff.

Formatted: Not Highlight

4.2 Benefits of a CMS

An effective, appropriate CMS provides the following benefits:

- assists with compliance with regulatory requirements;
- provides a continuous performance improvement tool for the work force;
- provides a more comprehensive picture of the requirements for a job than a job description alone;
- provides an accurate development analysis, enabling targeted and effective development opportunities;
- provides a measure to calculate the success of training and development interventions;
- provides a framework for ongoing coaching and feedback;
- provides the measurement of proficiency in a specific competency;
- provides a measure of an individual's readiness for a role;
- helps in optimizing training resources and efforts targeting critical skills/competence requirements;
- provides an audit trail of competency assurance.

Formatted: Not Highlight

Formatted: Not Highlight

4.3 Comparison of a CMS with an appraisal system

Performance appraisals generally fall short of the rigour of a competency framework, and therefore are typically not sufficient in isolation to provide a true measure of competence. However, in more recent times many organizations have tried to move to a more competency-based appraisal system in order to provide a more specific measure of performance.

Some key differences between performance appraisals and competence assessment are summarized in Table 1.

Table 1 — Comparison of performance appraisal and competence assessment

| Performance appraisal | Competence assessment |
|--|--|
| Carried out by the line manager or supervisor | Carried out by a competent independent assessor |
| Subjective measure often based on opinion | Objective measure based on evidence |
| Measured against high level work areas often focusing on soft skills | Measured against defined standards of competence |
| A measure of attitude and general performance | A measure of skills, knowledge and behaviour |
| Quality of judgements rarely verified | Quality of judgements routinely verified |

4.4 Development of a CMS

4.4.1 CMS cycle

The main steps or phases by which a CMS can be established, implemented and maintained follow the traditional quality cycle of 'Plan-Do-Check-Act'. These are illustrated in Figure 1 and described in subsequent clauses.

ISO/TS 17969:2017

<https://standards.iteh.ai/catalog/standards/sist/d67eace5-4db8-446b-aff8-5970ef00c472/iso-ts-17969-2017>

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Centered

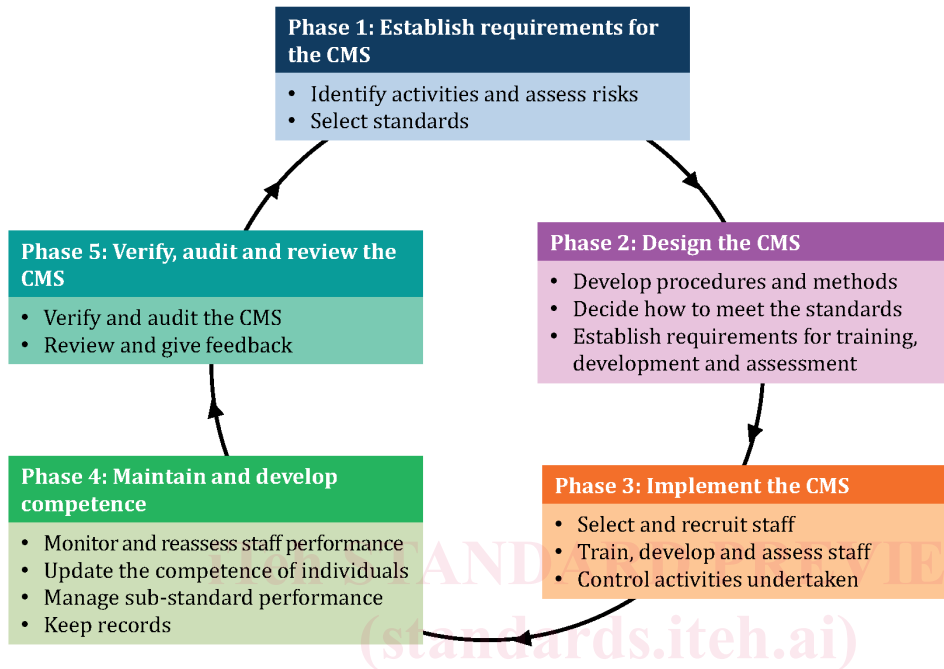


Figure 1 — Competency management system cycle

Establishing a CMS ‘from scratch’ involves starting with Phase 1. However many organizations can already have some, if not all, elements already in place and so can commence at Phase 5 with a review/audit of the CMS, incorporating this guidance as reference.

For application to operational activities and personnel, the following key elements of an effective CMS have been identified within each relevant phase. Within this document, reference is made to specific guidance in these areas:

- a) definition of appropriate competency profiles, skills at specified proficiency levels required for operational activities;
- b) assessment of personnel and their individual competences;
- c) assessment of operational teams and their collective competence;
- d) assessment of contract personnel;
- e) recommendations for management of assessed shortfalls, gaps in competency, and subsequent development;
- f) recommendation for a system for the storage, management and verification of the collected information in a CMS.

Deleted: 17969_ed2fig1.eps¶

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

4.4.2 Phase 1 — Establish requirements for the CMS

4.4.2.1 General

Best practice for CMS dictates that the system is tailored to manage the competencies involved with the organization's particular work activities, in proportion to the assessed risks. Nevertheless, it is possible to identify common considerations for a successful CMS.

Formatted: Not Highlight

These best practices are as follows.

- a) Description of the CMS in a 'stand-alone' controlled document, which forms a part of an organization's management system. Through the inclusion in the management system, the intent is that the CMS is periodically verified through standard processes.
- b) A clearly identified system 'owner', also with responsibility for the overall management system if possible, ensures the CMS is maintained.
- c) Clear identification of individual accountabilities for implementation and maintenance of the CMS helps ensure that the system is effective.
- d) Time-bound (expiration of) competence proficiency levels ensure that an individual's competency is current.

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

4.4.2.2 Responsibilities

Identification of suitable competence is the responsibility of management. The employer should ensure that the employee is competent for the tasks which the employer assigns. For this reason, an organization should ensure that its CMS is integrated into the management system as well as their operational methods throughout all levels. Personnel have the responsibility to develop, maintain and demonstrate the required competency for the role they perform.

Formatted: Not Highlight

Employers are required to provide information, instruction and training for their employees and contractors. This includes defining the format and content of competence profiles and standards to be met by employees and contractors, in order to competently perform their roles. The employer should ensure the competence of their personnel, as a part of the CMS, to ensure that the person can perform their work.

Employers are responsible for keeping records of training, certification, work experience and assessment of their employees. Personnel shall also take responsibility for developing and demonstrating their competence.

Formatted: Not Highlight

Formatted: Not Highlight

One critical area of management support is to ensure that personnel are given sufficient time to fulfil the requirements of the CMS. This means there is no expectation for personnel to complete the competence development and assessment tasks during their time off. Sufficient time should be allowed for within their workload.

Formatted: Not Highlight

In accordance with the assessed risk of a task or skill, a period of validity of a specific competence should be specified by the CMS. Thus, the organization is responsible to clearly document the criteria for retention/re-validation, in line with the risk associated with the skill.

Formatted: Not Highlight

4.4.2.3 Key success factors

The most successful CMSs exist where competence is at the core of an organization's operating culture, and the system is a part of the integrated management system. It is important that senior management

Formatted: Not Highlight

endorse and drive the CMS with the usage of the CMS supported and encouraged throughout all management levels and departments.

One key to success is to clearly distinguish the population and activities covered by the CMS, for example safety-critical tasks only.

The development of a competence policy, or the inclusion of a commitment to competence assurance in other high level policies, can also provide a solid backbone for the system. The CMS works best if tailored to the organization, ensuring adherence to the operating culture as well as the risk and safety measurement for the tasks being carried out by personnel assessed under the system.

Formatted: Not Highlight

Formatted: Not Highlight

A clear line of sight from policy to the practice of competence management throughout operations is of the utmost importance to the success of the system. Ownership of the CMS is critical, especially for those carrying out key tasks within the CMS, such as assessment and verification. Equally important to success is that the population covered by the CMS embraces and understands the value of the system. The demonstration of competence should not detract from the task at hand, and should not become a job in its own right.

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

4.4.2.4 Risk-based approach

A CMS should address critical competencies commensurate with operational risk, consequence and complexity. Operators, service companies and rig contractors, including employers, self-employed persons and installation owners/operators, should assess the risks of their operations and identify critical tasks and risks. These risk analyses should underpin the eventual CMS, ensuring that at a minimum safety-critical tasks, those related to asset integrity through the asset life cycle, are covered by the system.

Formatted: Not Highlight

For organizations operating across a variety of asset types and environments, the CMS should take into account the full scope and range of the activities when requirements are established. For organizations operating within a more limited range of asset types and environments, it can be beneficial to define requirements that are 'fit-for-purpose' for specific work programs.

Some roles included in the CMS also carry business, HSE and relationship risks, and the inclusion of associated competencies can be considered. However, care should be taken to ensure that the CMS does not become complex and cumbersome; trying to encompass all potential variables will result in a system burdensome to operate, quickly becoming obsolete.

4.4.3 Phase 2 — Design the CMS

When designing the CMS, an organization should identify their particular activities, the processes to enable these activities, according to the risk assigned by the organization, and the activities to be included in the CMS, which is documented in a controlled management system.

Formatted: Not Highlight

Key stakeholders should be involved in the CMS design. Once completed, the CMS and its fundamental objectives should be clearly communicated across the organization.

Formatted: Not Highlight

A key decision is the extent to which the CMS is to be integrated within any existing human resources (HR) processes for recruitment, performance appraisals, training and development, etc. Depending on the nature of a particular organization's HR and management system, it can be appropriate to establish a CMS that is managed separately from the HR process, but which makes reference to beneficial and contributory elements of those systems.

Formatted: Not Highlight

Formatted: Not Highlight

The overall training and development requirements should be described within the CMS.

ISO/DTS 17969:2017(E)

Critical elements of the CMS design, specifically related to operations, which should be clearly addressed in this design phase include the following.

- a) An identified overall process 'owner' for the CMS, to whom comments, observations and requests for change can be addressed.
- b) Assignment of accountabilities for implementing the CMS. This should include specific accountabilities for the technical authorities, as defined in the organization's management system and for line management.
- c) The process and responsibilities by which appropriate competency standards for activities are defined and maintained in the organization. This should be assigned to the technical authorities, as defined by the organization's management system.
- d) The process and responsibilities for assessment of personnel and their individual competencies.
- e) The process and responsibilities for assessment of each operational team and their collective competence. The CMS should be designed to provide line managers with assurance that the collective competence of all assigned teams is appropriate to the specific planned activities and their associated risks.
- f) The process and responsibilities for the managing and developing of means to address assessed shortfalls in competency, for both individuals and teams.
- g) The process and responsibilities for the competence management of contractors should be specifically set out within the CMS.
- h) Data protection issues.

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

Formatted: Not Highlight

The CMS can identify levels of competency (proficiency levels), such that individuals can undertake the tasks with varying levels of supervision. Individuals can then gain the additional experience, assessment and training as required by the CMS in order to progress their proficiency level. Individuals may be mentored by more competent individuals. Recent organization recruits or contractors might be assigned provisional levels of competency. This status would allow for supervision and/or mentoring, for a defined probationary period, after which their competency can be reviewed.

Formatted: Not Highlight

4.4.4 Phase 3 — Implement the CMS

A CMS implementation program should be defined and agreed by all parties responsible for its effective implementation. When developing the implementation schedule, the organization should review the following factors:

Formatted: Not Highlight

- a) the coverage of (and resulting requirement to merge or integrate with) any existing CMS;
- b) the operations program;
- c) any required synchronization with other management systems;
- d) formal management of change (MOC) process for implementation.

Review of these factors can require a staged approach for implementation. In any case, the implementation program should define milestones and measures, to ensure that the status can be clearly communicated and understood by all concerned. There is a specific need to elevate the

Formatted: Not Highlight