

ISO 14000 Family of Standards



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* It should be noted that a new standard, ISO 19011, is in development and once adopted, will replace ISO 14010, ISO 14011, and ISO 14012. It is anticipated that ISO 19011 will be a final standard by 2001.

Document Status...

Bold Face type denotes new information.

Document	Comments	Document	Comments
ISO 14001 (SC1, WG1) <i>Environmental Management Systems — Specification with Guidance for Use</i>	WG1 met in Brazil Nov. 6-11 and did not make much progress on the revisions to ISO 14001. Members of the group will meet again in Orlando, Fla., in February 2001.	ISO 14025 (SC3 WG1) <i>Type 3 Eco-Profile Labeling Technical Report</i>	ISO 14025 passed as a Type 2 Technical Report in July 1999. The document, however, did not receive high praise from ISO delegations, including the SC5 liaison.
ISO 14004 (SC1, WG2) <i>Environmental Management Systems — General Guidelines on Principles, Systems and Supporting Techniques</i>	WG2 met in Brazil Nov. 6-11 and moved several issues forward on the revisions of ISO 14004. Aspects/Impacts and determination of significance are still a major issue for the group, however.	ISO 14031 (SC4) <i>Environmental Performance Evaluation — Guidelines</i>	ISO 14031 is an International Standard. SC4 experts are looking at the document again, however, to see if issues such as external communications can be included.
ISO 14010 (SC2) <i>Guidelines for Environmental Auditing — General Principles on Environmental Auditing</i>	The JWG met in Cancun Sept. 24-29 to examine comments from international delegates on the new ISO 19011 on joint auditing. The document is now in its third CD stage, with release expected in 2002.	ISO TR 14032 (SC4) <i>Environmental Management — Environmental Performance Evaluation — Case Studies Illustrating the Use of ISO 14031</i>	ISO 14032, the Technical Report, passed unanimously at the FDIS stage and now is available through national standards bodies.
ISO 14011 (SC2) <i>Guidelines for Environmental Auditing — Audit Procedures — Auditing of Environmental Management Systems</i>	The JWG met in Cancun Sept. 24-29 to examine comments from international delegates on the new ISO 19011 on joint auditing. The document is now in its third CD stage, with release expected in 2002.	ISO 14040 (SC5 WG1) <i>Environmental Management — Life Cycle Assessment — Principles and Framework</i>	This standard was published in June 1997, after receiving a 97 percent approval rating from ISO TC 207.
ISO 14012 (SC2) <i>Guidelines for Environmental Auditing — Qualification Criteria for Environmental Auditors</i>	The JWG met in Cancun Sept. 24-29 to examine comments from international delegates on the new ISO 19011 on joint auditing. The document is now in its third CD stage, with release expected in 2002.	ISO 14041 (SC5 WG3) <i>Environmental Management — Life Cycle Assessment — Goal and Scope Definition and Inventory Analysis</i>	ISO 14041 was published as an International Standard Oct. 1, 1998. The document passed with 100 percent approval from SC5 experts.
ISO 14015 (SC2 WG4) <i>Environmental Assessments of Sites and Organizations</i>	Work continued in Stockholm on the EASO documents. EASO is now a Draft International Standard. It will be published in March 2001.	ISO 14042 (SC5 WG4) <i>Environmental Management — Life Cycle Assessment — Impact Assessment</i>	ISO 14042 was published as an International Standard on March 9, 2000.
ISO 14020 (SC3 WG3) <i>Goals and Principles of All Environmental Labeling</i>	ISO 14020 was published as an International Standard in late 1998. The document is available through national standards bodies.	ISO 14043 (SC5 WG5) <i>Environmental Management — Life Cycle Assessment — Interpretation</i>	ISO 14043 was published as an International Standard on March 9, 2000.
ISO 14021 (SC3 WG2) <i>Environmental Labels and Declarations — Self-Declaration Environmental Claims — Terms and Definitions</i>	ISO 14021 passed as an International Standard in October 1999 with a high majority. The document is available through national standards bodies.	ISO 14048 (SC5 WG2) <i>Environmental Management — Life Cycle Indicator Format</i>	SC5 continues to work on this document. Working Group 2 will discuss ISO 14048 at its next meeting, scheduled for December in Toronto.
ISO 14024 (SC3 WG1) <i>Environmental Labels and Declarations — Type I — Guiding Principles and Procedures</i>	This document circulated for voting last year as an FDIS. It has been published and is available through national standards bodies.	ISO 14050 (SC6) <i>Terms and Definitions — Guide on the Principles for Terminology Work</i>	SC6 continued its work in Stockholm, but the group may be disbanded in the future.



INTERNATIONAL STANDARD

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Environmental management systems — Specification with guidance for use

*Systèmes de management environnemental — Spécification et lignes
directrices pour son utilisation*

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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.

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 14001 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 1, *Environmental management systems*.

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

Introduction

Organizations of all kinds are increasingly concerned to achieve and demonstrate sound environmental performance by controlling the impact of their activities, products or services on the environment, taking into account their environmental policy and objectives. They do so in the context of increasingly stringent legislation, the development of economic policies and other measures to foster environmental protection, and a general growth of concern from interested parties about environmental matters including sustainable development.

Many organizations have undertaken environmental "reviews" or "audits" to assess their environmental performance. On their own, however, these "reviews" and "audits" may not be sufficient to provide an organization with the assurance that its performance not only meets, but will continue to meet, its legal and policy requirements. To be effective, they need to be conducted within a structured management system and integrated with overall management activity.

International Standards covering environmental management are intended to provide organizations with the elements of an effective environmental management system which can be integrated with other management requirements, to assist organizations to achieve environmental and economic goals. These Standards, like other International Standards, are not intended to be used to create non-tariff trade barriers or to increase or change an organization's legal obligations.

This International Standard specifies the requirements of such an environmental management system. It has been written to be applicable to all types and sizes of organizations and to accommodate diverse geographical, cultural and social conditions. The basis of the approach is shown in figure 1. The success of the system depends on commitment from all levels and functions, especially from top management. A system of this kind enables an organization to establish, and assess the effectiveness of, procedures to set an environmental policy and objectives, achieve conformance with them, and demonstrate such conformance to others. The overall aim of this International Standard is to support environmental protection and prevention of pollution in balance with socio-economic needs. It should be noted that many of the requirements may be addressed concurrently or revisited at any time.

There is an important distinction between this specification which describes the requirements for certification/registration and/or self-declaration of an organization's environmental management system and a non-certifiable guideline intended to provide generic assistance to an organization for implementing or improving an environmental management system. Environmental management encompasses a full range of issues including those with strategic and competitive implications. Demonstration of successful implementation of this International Standard can be used by an organ-

ization to assure interested parties that an appropriate environmental management system is in place.

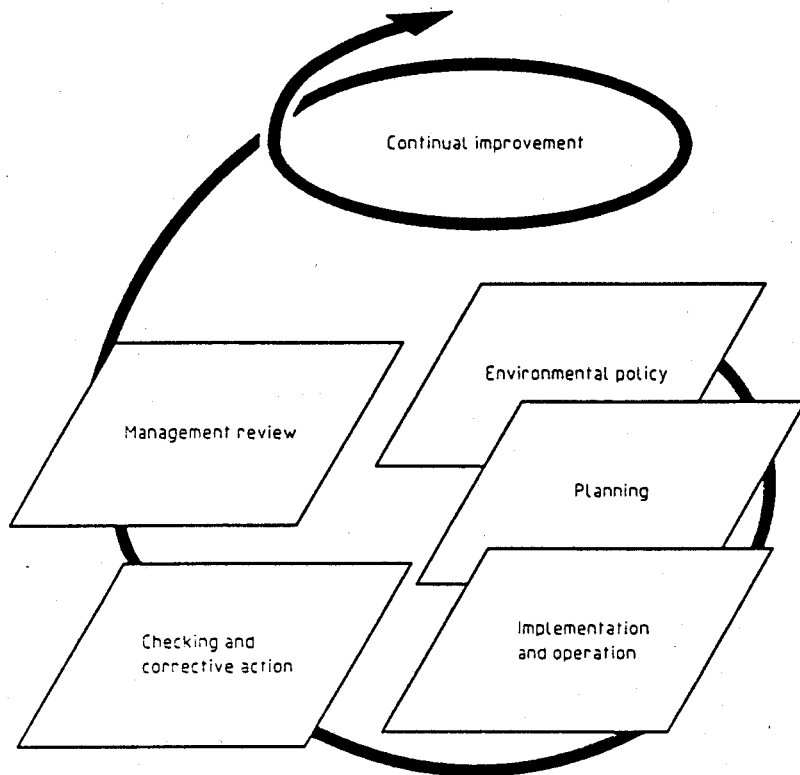


Figure 1 — Environmental management system model for this International Standard

Guidance on supporting environmental management techniques will be contained in other International Standards.

This International Standard contains only those requirements that may be objectively audited for certification/registration purposes and/or self-declaration purposes. Those organizations requiring more general guidance on a broad range of environmental management system issues should refer to ISO 14004:1996, *Environmental management systems — General guidelines on principles, systems and supporting techniques*.

It should be noted that this International Standard does not establish absolute requirements for environmental performance beyond commitment in the policy, to compliance with applicable legislation and regulations and to continual improvement. Thus, two organizations carrying out similar activities but having different environmental performance may both comply with its requirements.

The adoption and implementation of a range of environmental management techniques in a systematic manner can contribute to optimal outcomes for all interested parties. However, adoption of this International Standard will not in itself guarantee optimal environmental outcomes. In order to achieve environmental objectives, the environmental management system should encourage organizations to consider implementation of the best available technology, where appropriate and where economically viable. In addition,

the cost effectiveness of such technology should be fully taken into account.

This International Standard is not intended to address, and does not include requirements for, aspects of occupational health and safety management; however, it does not seek to discourage an organization from developing integration of such management system elements. Nevertheless, the certification/registration process will only be applicable to aspects of the environmental management system.

This International Standard shares common management system principles with the ISO 9000 series of quality system Standards. Organizations may elect to use an existing management system consistent with the ISO 9000 series as a basis for its environmental management system. It should be understood, however, that the application of various elements of the management system may differ due to different purposes and different interested parties. While quality management systems deal with customer needs, environmental management systems address the needs of a broad range of interested parties and the evolving needs of society for environmental protection.

The environmental management system requirements specified in this International Standard do not need to be established independently of existing management system elements. In some cases, it will be possible to comply with the requirements by adapting existing management system elements.

Environmental management systems — Specification with guidance for use

1 Scope

This International Standard specifies requirements for an environmental management system, to enable an organization to formulate a policy and objectives taking into account legislative requirements and information about significant environmental impacts. It applies to those environmental aspects which the organization can control and over which it can be expected to have an influence. It does not itself state specific environmental performance criteria.

This International Standard is applicable to any organization that wishes to

- a) implement, maintain and improve an environmental management system;
- b) assure itself of its conformance with its stated environmental policy;
- c) demonstrate such conformance to others;
- d) seek certification/registration of its environmental management system by an external organization;
- e) make a self-determination and self-declaration of conformance with this International Standard.

All the requirements in this International Standard are intended to be incorporated into any environmental management system. The extent of the application will depend on such factors as the environmental policy of the organization, the nature of its activities and the conditions in which it operates. This International Standard also provides, in annex A, informative guidance on the use of the specification.

The scope of any application of this International Standard must be clearly identified.

NOTE — For ease of use, the subclause of the specification and annex A have related numbers; thus, for example,

4.3.3. and A.3.3 both deal with environmental objectives and targets, and 4.5.4 and A.5.4 both deal with environmental management system audit.

2 Normative references

There are no normative references at present.

3 Definitions

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

3.1

continual improvement

process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy

NOTE — The process need not take place in all areas of activity simultaneously.

3.2

environment

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

NOTE — Surroundings in this context extend from within an organization to the global system.

3.3

environmental aspect

element of an organization's activities, products or services that can interact with the environment

NOTE — A significant environmental aspect is an environmental aspect that has or can have a significant environmental impact.

3.4**environmental impact**

any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services

3.5**environmental management system**

the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy

3.6**environmental management system audit**

a systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization's environmental management system conforms to the environmental management system audit criteria set by the organization, and for communication of the results of this process to management

3.7**environmental objective**

overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable

3.8**environmental performance**

measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets

3.9**environmental policy**

statement by the organization of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets

3.10**environmental target**

detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives

3.11**interested party**

individual or group concerned with or affected by the environmental performance of an organization

3.12**organization**

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE — For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.13**prevention of pollution**

use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution

NOTE — The potential benefits of prevention of pollution include the reduction of adverse environmental impacts, improved efficiency and reduced costs.

4 Environmental management system requirements

4.1 General requirements

The organization shall establish and maintain an environmental management system, the requirements of which are described in the whole of clause 4.

4.2 Environmental policy

Top management shall define the organization's environmental policy and ensure that it

- a) is appropriate to the nature, scale and environmental impacts of its activities, products or services;
- b) includes a commitment to continual improvement and prevention of pollution;
- c) includes a commitment to comply with relevant environmental legislation and regulations, and with other requirements to which the organization subscribes;
- d) provides the framework for setting and reviewing environmental objectives and targets;
- e) is documented, implemented and maintained and communicated to all employees;
- f) is available to the public.

4.3 Planning

4.3.1 Environmental aspects

The organization shall establish and maintain (a) procedure(s) to identify the environmental aspects of its activities, products or services that it can control and over which it can be expected to have an influence, in order to determine those which have or can have significant impacts on the environment. The organization shall ensure that the aspects related to these significant impacts are considered in setting its environmental objectives.

The organization shall keep this information up-to-date.

4.3.2 Legal and other requirements

The organization shall establish and maintain a procedure to identify and have access to legal and other requirements to which the organization subscribes, that are applicable to the environmental aspects of its activities, products or services.

4.3.3 Objectives and targets

The organization shall establish and maintain documented environmental objectives and targets, at each relevant function and level within the organization.

When establishing and reviewing its objectives, an organization shall consider the legal and other requirements, its significant environmental aspects, its technological options and its financial, operational and business requirements, and the views of interested parties.

The objectives and targets shall be consistent with the environmental policy, including the commitment to prevention of pollution.

4.3.4 Environmental management programme(s)

The organization shall establish and maintain (a) programme(s) for achieving its objectives and targets. It shall include

- designation of responsibility for achieving objectives and targets at each relevant function and level of the organization;
- the means and time-frame by which they are to be achieved.

If a project relates to new developments and new or modified activities, products or services, programme(s) shall be amended where relevant to ensure that environmental management applies to such projects.

4.4 Implementation and operation

4.4.1 Structure and responsibility

Roles, responsibility and authorities shall be defined, documented and communicated in order to facilitate effective environmental management.

Management shall provide resources essential to the implementation and control of the environmental management system. Resources include human resources and specialized skills, technology and financial resources.

The organization's top management shall appoint (a) specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities and authority for

- ensuring that environmental management system requirements are established, implemented and maintained in accordance with this International Standard;
- reporting on the performance of the environmental management system to top management for review and as a basis for improvement of the environmental management system.

4.4.2 Training, awareness and competence

The organization shall identify training needs. It shall require that all personnel whose work may create a significant impact upon the environment, have received appropriate training.

It shall establish and maintain procedures to make its employees or members at each relevant function and level aware of

- the importance of conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- the significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance;
- their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system, including emergency preparedness and response requirements;
- the potential consequences of departure from specified operating procedures.

Personnel performing the tasks which can cause significant environmental impacts shall be competent on

the basis of appropriate education, training and/or experience.

4.4.3 Communication

With regard to its environmental aspects and environmental management system, the organization shall establish and maintain procedures for

- a) internal communication between the various levels and functions of the organization;
- b) receiving, documenting and responding to relevant communication from external interested parties.

The organization shall consider processes for external communication on its significant environmental aspects and record its decision.

4.4.4 Environmental management system documentation

The organization shall establish and maintain information, in paper or electronic form, to

- a) describe the core elements of the management system and their interaction;
- b) provide direction to related documentation.

4.4.5 Document control

The organization shall establish and maintain procedures for controlling all documents required by this International Standard to ensure that

- a) they can be located;
- b) they are periodically reviewed, revised as necessary and approved for adequacy by authorized personnel;
- c) the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the environmental management system are performed;
- d) obsolete documents are promptly removed from all points of issue and points of use, or otherwise assured against unintended use;
- e) any obsolete documents retained for legal and/or knowledge preservation purposes are suitably identified.

Documentation shall be legible, dated (with dates of revision) and readily identifiable, maintained in an orderly manner and retained for a specified period. Procedures and responsibilities shall be established and maintained concerning the creation and modification of the various types of document.

4.4.6 Operational control

The organization shall identify those operations and activities that are associated with the identified significant environmental aspects in line with its policy, objectives and targets. The organization shall plan these activities, including maintenance, in order to ensure that they are carried out under specified conditions by

- a) establishing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets;
- b) stipulating operating criteria in the procedures;
- c) establishing and maintaining procedures related to the identifiable significant environmental aspects of goods and services used by the organization and communicating relevant procedures and requirements to suppliers and contractors.

4.4.7 Emergency preparedness and response

The organization shall establish and maintain procedures to identify potential for and respond to accidents and emergency situations, and for preventing and mitigating the environmental impacts that may be associated with them.

The organization shall review and revise, where necessary, its emergency preparedness and response procedures, in particular, after the occurrence of accidents or emergency situations.

The organization shall also periodically test such procedures where practicable.

4.5 Checking and corrective action

4.5.1 Monitoring and measurement

The organization shall establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment. This shall include the recording of information to track performance, relevant operational controls and conformance with the organization's environmental objectives and targets.

Monitoring equipment shall be calibrated and maintained and records of this process shall be retained according to the organization's procedures.

The organization shall establish and maintain a documented procedure for periodically evaluating compliance with relevant environmental legislation and regulations.

4.5.2 Nonconformance and corrective and preventive action

The organization shall establish and maintain procedures for defining responsibility and authority for handling and investigating nonconformance, taking action to mitigate any impacts caused and for initiating and completing corrective and preventive action.

Any corrective or preventive action taken to eliminate the causes of actual and potential nonconformances shall be appropriate to the magnitude of problems and commensurate with the environmental impact encountered.

The organization shall implement and record any changes in the documented procedures resulting from corrective and preventive action.

4.5.3 Records

The organization shall establish and maintain procedures for the identification, maintenance and disposition of environmental records. These records shall include training records and the results of audits and reviews.

Environmental records shall be legible, identifiable and traceable to the activity, product or service involved. Environmental records shall be stored and maintained in such a way that they are readily retrievable and protected against damage, deterioration or loss. Their retention times shall be established and recorded.

Records shall be maintained, as appropriate to the system and to the organization, to demonstrate conformance to the requirements of this International Standard.

4.5.4 Environmental management system audit

The organization shall establish and maintain (a) programme(s) and procedures for periodic environmental

management system audits to be carried out, in order to

- a) determine whether or not the environmental management system
 - 1) conforms to planned arrangements for environmental management including the requirements of this International Standard; and
 - 2) has been properly implemented and maintained; and
- b) provide information on the results of audits to management.

The organization's audit programme, including any schedule, shall be based on the environmental importance of the activity concerned and the results of previous audits. In order to be comprehensive, the audit procedures shall cover the audit scope, frequency and methodologies, as well as the responsibilities and requirements for conducting audits and reporting results.

4.6 Management review

The organization's top management shall, at intervals that it determines, review the environmental management system, to ensure its continuing suitability, adequacy and effectiveness. The management review process shall ensure that the necessary information is collected to allow management to carry out this evaluation. This review shall be documented.

The management review shall address the possible need for changes to policy, objectives and other elements of the environmental management system, in the light of environmental management system audit results, changing circumstances and the commitment to continual improvement.

Annex A (informative)

Guidance on the use of the specification

This annex gives additional information on the requirements and is intended to avoid misinterpretation of the specification. This annex only addresses the environmental management system requirements contained in clause 4.

A.1 General requirements

It is intended that the implementation of an environmental management system described by the specification will result in improved environmental performance. The specification is based on the concept that the organization will periodically review and evaluate its environmental management system in order to identify opportunities for improvement and their implementation. Improvements in its environmental management system are intended to result in additional improvements in environmental performance.

The environmental management system provides a structured process for the achievement of continual improvement, the rate and extent of which will be determined by the organization in the light of economic and other circumstances. Although some improvement in environmental performance can be expected due to the adoption of a systematic approach, it should be understood that the environmental management system is a tool which enables the organization to achieve and systematically control the level of environmental performance that it sets itself. The establishment and operation of an environmental management system will not, in itself, necessarily result in an immediate reduction of adverse environmental impact.

An organization has the freedom and flexibility to define its boundaries and may choose to implement this International Standard with respect to the entire organization, or to specific operating units or activities of the organization. If this International Standard is implemented for a specific operating unit or activity, policies and procedures developed by other parts of the organization can be used to meet the requirements of this International Standard, provided that they are applicable to the specific operating unit or activity that will be subject to it. The level of detail and complexity of the environmental management system, the extent of documentation and the resources devoted to it will be dependent in the size of an organization and the nature of its activities. This may be the case in particular for small and medium-sized enterprises.

Integration of environmental matters with the overall management system can contribute to the effective implementation of the environmental management system, as well as to efficiency and to clarity of roles.

This International Standard contains management system requirements, based on the dynamic cyclical process of "plan, implement, check and review".

The system should enable an organization to

- a) establish an environmental policy appropriate to itself;
- b) identify the environmental aspects arising from the organization's past, existing or planned activities, products or services, to determine the environmental impacts of significance;
- c) identify the relevant legislative and regulatory requirements;
- d) identify priorities and set appropriate environmental objectives and targets;
- e) establish a structure and (a) programme(s) to implement the policy and achieve objectives and targets;
- f) facilitate planning, control, monitoring, corrective action, auditing and review activities to ensure both that the policy is complied with and that the environmental management system remains appropriate;
- g) be capable of adapting to changing circumstances.

A.2 Environmental policy

The environmental policy is the driver for implementing and improving the organization's environmental management system so that it can maintain and potentially improve its environmental performance. The policy should therefore reflect the commitment of top management to compliance with applicable laws and continual improvement. The policy forms the basis upon which the organization sets its objectives and targets. The policy should be sufficiently clear to be capable of being understood by internal and external interested parties and should be periodically reviewed and revised to reflect changing conditions and information. Its area of application should be clearly identifiable.

The organization's top management should define and document its environmental policy within the context of the environmental policy of any broader corporate body of which it is a part and with the endorsement of that body, if there is one.

NOTE — Top management may consist of an individual or group of individuals with executive responsibility for the organization.

A.3 Planning

A.3.1 Environmental aspects

Subclause 4.3.1 is intended to provide a process for an organization to identify significant environmental aspects that should be addressed as a priority by the organization's environmental management system. This process should take into account the cost and time of undertaking the analysis and the availability of reliable data. Information already developed for regulatory or other purposes may be used in this process. Organizations may also take into account the degree of practical control they may have over the environmental aspects being considered. Organizations should determine what their environmental aspects are, taking into account the inputs and outputs associated with their current and relevant past activities, products and/or services.

An organization with no existing environmental management system should, initially, establish its current position with regard to the environment by means of a review. The aim should be to consider all environmental aspects of the organization as a basis for establishing the environmental management system.

Those organizations with operating environmental management systems do not have to undertake such a review.

The review should cover four key areas:

- a) legislative and regulatory requirements;
- b) an identification of significant environmental aspects;
- c) an examination of all existing environmental management practices and procedures;
- d) an evaluation of feedback from the investigation of previous incidents.

In all cases, consideration should be given to normal and abnormal operations within the organization, and to potential emergency conditions.

A suitable approach to the review may include checklists, interviews, direct inspection and measurement,

results of previous audits or other reviews depending on the nature of the activities.

The process to identify the significant environmental aspects associated with the activities at operating units should, where relevant, consider,

- a) emissions to air;
- b) releases to water;
- c) waste management;
- d) contamination of land;
- e) use of raw materials and natural resources;
- f) other local environmental and community issues.

This process should consider normal operating conditions, shut-down and start-up conditions, as well as the realistic potential significant impacts associated with reasonably foreseeable or emergency situations.

The process is intended to identify significant environmental aspects associated with activities, products or services, and is not intended to require a detailed life cycle assessment. Organizations do not have to evaluate each product, component or raw material input. They may select categories of activities, products or services to identify those aspects most likely to have a significant impact.

The control and influence over the environmental aspects of products vary significantly, depending on the market situation of the organization. A contractor or supplier to the organization may have comparatively little control, while the organization responsible for product design can alter the aspects significantly by changing, for example, a single input material. Whilst recognizing that organizations may have limited control over the use and disposal of their products, they should consider, where practical, proper handling and disposal mechanisms. This provision is not intended to change or increase an organisation's legal obligations.

A.3.2 Legal and other requirements

Examples of other requirements to which the organization may subscribe are

- a) industry codes of practice;
- b) agreements with public authorities;
- c) non-regulatory guidelines.

A.3.3 Objectives and targets

The objectives should be specific and targets should be measurable wherever practicable, and where appropriate take preventative measures into account.

When considering their technological options, an organization may consider the use of the best available technology where economically viable, cost-effective and judged appropriate.

The reference to the financial requirements of the organization is not intended to imply that organizations are obliged to use environmental cost-accounting methodologies.

A.3.4 Environmental management programme(s)

The creation and use of one or more programmes is a key element to the successful implementation of an environmental management system. The programme should describe how the organization's objectives and targets will be achieved, including time-scales and personnel responsible for implementing the organization's environmental policy. This programme may be subdivided to address specific elements of the organization's operations. The programme should include an environmental review for new activities.

The programme may include, where appropriate and practical, consideration of planning, design, production, marketing and disposal stages. This may be undertaken for both current and new activities, products or services. For products this may address design, materials, production processes, use and ultimate disposal. For installations or significant modifications of processes this may address planning, design, construction, commissioning, operation and, at the appropriate time determined by the organization, decommissioning.

A.4 Implementation and operation

A.4.1 Structure and responsibility

The successful implementation of an environmental management system calls for the commitment of all employees of the organization. Environmental responsibilities therefore should not be seen as confined to the environmental function, but may also include other areas of an organization, such as operational management or staff functions other than environmental.

This commitment should begin at the highest levels of management. Accordingly, top management should establish the organization's environmental policy and ensure that the environmental management system is implemented. As part of this commitment, the top management should designate (a) specific management representative(s) with defined responsibility and authority for implementing the environmental management system. In large or complex organizations

there may be more than one designated representative. In small or medium sized enterprises, these responsibilities may be undertaken by one individual. Top management should also ensure that appropriate resources are provided to ensure that the environmental management system is implemented and maintained. It is also important that the key environmental management system responsibilities are well defined and communicated to the relevant personnel.

A.4.2 Training, awareness and competence

The organization should establish and maintain procedures for identifying training needs. The organization should also require that contractors working on its behalf are able to demonstrate that their employees have the requisite training.

Management should determine the level of experience, competence and training necessary to ensure the capability of personnel, especially those carrying out specialized environmental management functions.

A.4.3 Communication

Organizations should implement a procedure for receiving, documenting and responding to relevant information and requests from interested parties. This procedure may include a dialogue with interested parties and consideration of their relevant concerns. In some circumstances, responses to interested parties' concerns may include relevant information about the environmental impacts associated with the organization's operations. These procedures should also address necessary communications with public authorities regarding emergency planning and other relevant issues.

A.4.4 Environmental management system documentation

The level of detail of the documentation should be sufficient to describe the core elements of the environmental management system and their interaction and provide direction on where to obtain more detailed information on the operation of specific parts of the environmental management system. This documentation may be integrated with documentation of other systems implemented by the organization. It does not have to be in the form of a single manual.

Related documentation may include

- a) process information;
- b) organizational charts;

- c) internal standards and operational procedures;
- d) site emergency plans.

A.4.5 Document control

The intent of 4.4.5 is to ensure that organizations create and maintain documents in a manner sufficient to implement the environmental management system. However, the primary focus of organizations should be on the effective implementation of the environmental management system and on environmental performance and not on a complex documentation control system.

A.4.6 Operational control

Text may be included here in a future revision.

A.4.7 Emergency preparedness and response

Text may be included here in a future revision.

A.5 Checking and corrective action

A.5.1 Monitoring and measurement

Text may be included here in a future revision.

A.5.2 Nonconformance and corrective and preventive action

In establishing and maintaining procedures for investigating and correcting nonconformance, the organization should include these basic elements:

- a) identifying the cause of the nonconformance;
- b) identifying and implementing the necessary corrective action;
- c) implementing or modifying controls necessary to avoid repetition of the nonconformance;
- d) recording any changes in written procedures resulting from the corrective action.

Depending on the situation, this may be accomplished rapidly and with a minimum of formal planning or it may be a more complex and long-term activity. The associated documentation should be appropriate to the level of corrective action.

A.5.3 Records

Procedures for identification, maintenance and disposition of records should focus on those records needed for the implementation and operation of the

environmental management system and for recording the extent to which planned objectives and targets have been met.

Environmental records may include

- a) information on applicable environmental laws or other requirements;
- b) complaint records;
- c) training records;
- d) process information;
- e) product information;
- f) inspection, maintenance and calibration records;
- g) pertinent contractor and supplier information;
- h) incident reports;
- i) information on emergency preparedness and response;
- j) information on significant environmental aspects;
- k) audit results;
- l) management reviews.

Proper account should be taken of confidential business information.

A.5.4 Environmental management system audit

The audit programme and procedures should cover

- a) the activities and areas to be considered in audits;
- b) the frequency of audits;
- c) the responsibilities associated with managing and conducting audits;
- d) the communication of audit results;
- e) auditor competence;
- f) how audits will be conducted.

Audits may be performed by personnel from within the organization and/or by external persons selected by the organization. In either case, the persons conducting the audit should be in a position to do so impartially and objectively.

A.6 Management review

In order to maintain continual improvement, suitability and effectiveness of the environmental management system, and thereby its performance, the organization's management should review and evaluate the environmental management system at defined intervals. The scope of the review should be comprehen-

sive, though not all elements of an environmental management system need to be reviewed at once and the review process may take place over a period of time.

The review of the policy, objectives and procedures should be carried out by the level of management that defined them.

Reviews should include

a) results from audits;

- b) the extent to which objectives and targets have been met;
- c) the continuing suitability of the environmental management system in relation to changing conditions and information;
- d) concerns amongst relevant interested parties.

Observations, conclusions and recommendations should be documented for necessary action.

Annex B

(informative)

Links between ISO 14001 and ISO 9001

Tables B.1 and B.2 identify links and broad technical correspondences between ISO 14001 and ISO 9001 and *vice versa*.

The objective of the comparison is to demonstrate the combinability of both systems to those organizations already operating one of these International Standards and which may wish to operate both.

A direct link between subclauses of the two International Standards has only been established if the two subclauses are largely congruent in requirements. Beyond that, many detailed cross-connections of minor relevance exist which could not be shown here.

Table B.1 — Correspondence between ISO 14001 and ISO 9001

ISO 14001:1996		ISO 9001:1994	
General requirements	4.1	4.2.1 1st sentence	General
Environmental policy	4.2	4.1.1	Quality policy
Planning			
Environmental aspects	4.3.1	—	
Legal and other requirements	4.3.2	— 1)	
Objectives and targets	4.3.3	— 2)	
Environmental management programme(s)	4.3.4	—	
	—	4.2.3	Quality planning
Implementation and operation			
Structure and responsibility	4.4.1	4.1.2	Organization
Training, awareness and competence	4.4.2	4.18	Training
Communication	4.4.3	—	
Environmental management system documentation	4.4.4	4.2.1 without 1st sentence	General
Document control	4.4.5	4.5	Document and data control
Operational control	4.4.6	4.2.2	Quality system procedures
	4.4.6	4.3 3)	Contract review
	4.4.6	4.4	Design control
	4.4.6	4.6	Purchasing
	4.4.6	4.7	Control of customer-supplied product
	4.4.6	4.9	Process control
	4.4.6	4.15	Handling, storage, packaging, preservation and delivery
	4.4.6	4.19	Servicing
	—	4.8	Product identification and traceability
Emergency preparedness and response	4.4.7	—	
Checking and corrective action			
Monitoring and measurement	4.5.1 1st and 3rd paragraphs	4.10	Inspection and testing
	—	4.12	Inspection and test status
	—	4.20	Statistical techniques
Monitoring and measurement	4.5.1 2nd paragraph	4.11	Control of inspection, measuring and test equipment
Nonconformance and corrective and preventive action	4.5.2 1st part of 1st sentence	4.13	Control of nonconforming product
Nonconformance and corrective and preventive action	4.5.2 without 1st part of 1st sentence	4.14	Corrective and preventive action
Records	4.5.3	4.16	Control of quality records
Environmental management system audit	4.5.4	4.17	Internal quality audits
Management review	4.6	4.1.3	Management review
1) Legal requirements addressed in ISO 9001, 4.4.4. 2) Objectives addressed in ISO 9001, 4.1.1. 3) Communication with the quality stakeholders (customers).			

Table B.2 — Correspondence between ISO 9001 and ISO 14001

ISO 9001:1994		ISO 14001:1996	
Management responsibility			
Quality policy	4.1.1 — — 1) — 2) —	4.2 4.3.1 4.3.2 4.3.3 4.3.4	Environmental policy Environmental aspects Legal and other requirements Objectives and targets Environmental management programme(s)
Organization	4.1.2	4.4.1	Structure and responsibility
Management review	4.1.3	4.6	Management review
Quality system			
General	4.2.1 1st sentence 4.2.1 without 1st sentence	4.1 4.4.4	General requirements Environmental management system documentation
Quality system procedures	4.2.2	4.4.6	Operational control
Quality planning	4.2.3	—	
Contract review	4.3 3)	4.4.6	Operational control
Design control	4.4	4.4.6	Operational control
Document and data control	4.5	4.4.5	Document control
Purchasing	4.6	4.4.6	Operational control
Control of customer-supplied product	4.7	4.4.6	Operational control
Product identification and traceability	4.8	—	
Process control	4.9	4.4.6	Operational control
Inspection and testing	4.10	4.5.1 1st and 3rd paragraphs	Monitoring and measurement
Control of inspection, measuring and test equipment	4.11	4.5.1 2nd paragraph	Monitoring and measurement
Inspection and test status	4.12	—	
Control of nonconforming product	4.13	4.5.2 1st part of 1st sentence	Nonconformance and corrective and preventive action
Corrective and preventive action	4.14	4.5.2 without 1st part of 1st sentence	Nonconformance and corrective and preventive action
	—	4.4.7	Emergency preparedness and response
Handling, storage, packaging, preservation and delivery	4.15	4.4.6	Operational control
Control of quality records	4.16	4.5.3	Records
Internal quality audits	4.17	4.5.4	Environmental management system audit
Training	4.18	4.4.2	Training, awareness and competence
Servicing	4.19	4.4.6	Operational control
Statistical techniques	4.20	—	
	—	4.4.3	Communication
1) Legal requirements addressed in ISO 9001, 4.4.4. 2) Objectives addressed in ISO 9001, 4.1.1. 3) Communication with the quality stakeholders (customers).			

Annex C

(informative)

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Environmental management systems — General guidelines on principles, systems and supporting techniques

*Systèmes de management environnemental — Lignes directrices
générales concernant les principes, les systèmes et les techniques de
mise en œuvre*



The Official U.S. Representative to ISO



Reference number
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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.

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 14004 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 1, *Environmental management systems*.

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

Introduction

0.1 Overview

As concern grows for maintaining and improving the quality of the environment and protecting human health, organizations of all sizes are increasingly turning their attention to the potential environmental impacts of their activities, products or services. The environmental performance of an organization is of increasing importance to internal and external interested parties. Achieving sound environmental performance requires organizational commitment to a systematic approach and to continual improvement of the environmental management system (EMS).

The general purpose of this International Standard is to provide assistance to organizations implementing or improving an EMS. It is consistent with the concept of sustainable development and is compatible with diverse cultural, social and organizational frameworks.

It should be noted that only ISO 14001 contains requirements that may be objectively audited for certification/registration purposes or for self-declaration purposes. Alternatively, this International Standard includes examples, descriptions and options that aid both in the implementation of an EMS and in strengthening its relation to the overall management of the organization.

An EMS provides order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibilities, and ongoing evaluation of practices, procedures and processes.

This International Standard considers the elements of an EMS and provides practical advice on implementing or enhancing such a system. It also provides organizations with advice on how to effectively initiate, improve or sustain an environmental management system. Such a system is essential to an organization's ability to anticipate and meet its environmental objectives and to ensure ongoing compliance with national and/or international requirements.

Environmental management is an integral part of an organization's overall management system. The design of an EMS is an ongoing and interactive process. The structure, responsibilities, practices, procedures, processes and resources for implementing environmental policies, objectives and targets can be coordinated with existing efforts in other areas (e.g. operations, finance, quality, occupational health and safety).

Key principles for managers implementing or enhancing an environmental management system include, but are not limited to, the following.

- Recognize that environmental management is among the highest corporate priorities.

- Establish and maintain communication with internal and external interested parties.
- Determine the legislative requirements and environmental aspects associated with the organization's activities, products or services.
- Develop management and employee commitment to the protection of the environment, with clear assignment of accountability and responsibility.
- Encourage environmental planning throughout the product or process life cycle.
- Establish a process for achieving targeted performance levels.
- Provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an ongoing basis.
- Evaluate environmental performance against the organization's environmental policy, objectives and targets and seek improvement where appropriate.
- Establish a management process to audit and review the EMS and to identify opportunities for improvement of the system and resulting environmental performance.
- Encourage contractors and suppliers to establish an EMS.

Organizations can consider the following different uses of the EMS International Standards.

- Using ISO 14001:1996, *Environmental management systems — Specification with guidance for use* to achieve third-party certification/registration, or self-declaration of an organization's EMS.
- Using this International Standard, or parts of it, to initiate and/or improve its EMS. It is not intended for certification/registration purposes.
- Using this International Standard as a guideline or ISO 14001 as a specification for second-party recognition between contracting parties, which may be suitable for some business relationships.
- Using related ISO documents.

The choice will depend on factors such as:

- organization policy;
- level of maturity of the organization: whether systematic management that can facilitate the introduction of systematic environmental management is already in place;
- possible advantages and disadvantages, influenced by such things as market position, existing reputation and external relations;
- size of the organization.

This International Standard can be used by organizations of any size. Nonetheless, the importance of small and medium-sized enterprises (SMEs) is being increasingly recognized by governments and business. This International Standard acknowledges and accommodates the needs of SMEs.

0.2 Benefits of having an environmental management system

An organization should implement an effective environmental management system in order to help protect human health and the environment from the potential impacts of its activities, products or services; and to assist in maintaining and improving the quality of the environment.

Having an EMS can help an organization provide confidence to its interested parties that

- a management commitment exists to meet the provisions of its policy, objectives, and targets;
- emphasis is placed on prevention rather than corrective action;
- evidence of reasonable care and regulatory compliance can be provided; and
- the systems design incorporates the process of continual improvement.

An organization whose management system incorporates an EMS has a framework to balance and integrate economic and environmental interests. An organization that has implemented an EMS can achieve significant competitive advantages.

Economic benefits can be gained from implementing an environmental management system. These should be identified in order to demonstrate to interested parties, especially shareholders, the value to the organization of good environmental management. It also provides the organization with the opportunity to link environmental objectives and targets with specific financial outcomes and thus to ensure that resources are made available where they provide the most benefit in both financial and environmental terms.

The potential benefits associated with an effective EMS include

- assuring customers of commitment to demonstrable environmental management;
- maintaining good public/community relations;
- satisfying investor criteria and improving access to capital;
- obtaining insurance at reasonable cost;
- enhancing image and market share;
- meeting vendor certification criteria;
- improving cost control;
- reducing incidents that result in liability;
- demonstrating reasonable care;
- conserving input materials and energy;
- facilitating the attainment of permits and authorizations;
- fostering development and sharing environmental solutions;
- improving industry-government relations.

Environmental management systems — General guidelines on principles, systems and supporting techniques

1 Scope

This International Standard provides guidance on the development and implementation of environmental management systems and principles, and their coordination with other management systems.

The guidelines in this International Standard are applicable to any organization, regardless of size, type, or level of maturity, that is interested in developing, implementing and/or improving an environmental management system.

The guidelines are intended for use as a voluntary, internal management tool and are not intended to be used as EMS certification/registration criteria.

2 Normative references

There are no normative references at present.

3 Definitions

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

3.1

continual improvement

process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy

NOTE — The process need not take place in all areas of activity simultaneously.

3.2

environment

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

NOTE — Surroundings in this context extend from within an organization to the global system.

3.3**environmental aspect**

element of an organization's activities, products or services that can interact with the environment

NOTE — A significant environmental aspect is an environmental aspect that has or can have a significant environmental impact.

3.4**environmental impact**

any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services

3.5**environmental management system**

that part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy

3.6**environmental management system audit**

systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization's environmental management system conforms to the environmental management system audit criteria set by the organization, and for communication of the results of this process to management

3.7**environmental objective**

overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable

3.8**environmental performance**

measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets

3.9**environmental policy**

statement by the organization of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets

3.10**environmental target**

detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives

3.11**interested party**

individual or group concerned with or affected by the environmental performance of an organization

3.12**organization**

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE — For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.13**prevention of pollution**

use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution

NOTE — The potential benefits of prevention of pollution include the reduction of adverse environmental impacts, improved efficiency and reduced costs.

4 Environmental management system (EMS) principles and elements

The EMS model (see figure 1) follows the basic view of an organization which subscribes to the following principles.

Principle 1 — Commitment and policy

An organization should define its environmental policy and ensure commitment to its EMS.

Principle 2 — Planning

An organization should formulate a plan to fulfil its environmental policy.

Principle 3 — Implementation

For effective implementation, an organization should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

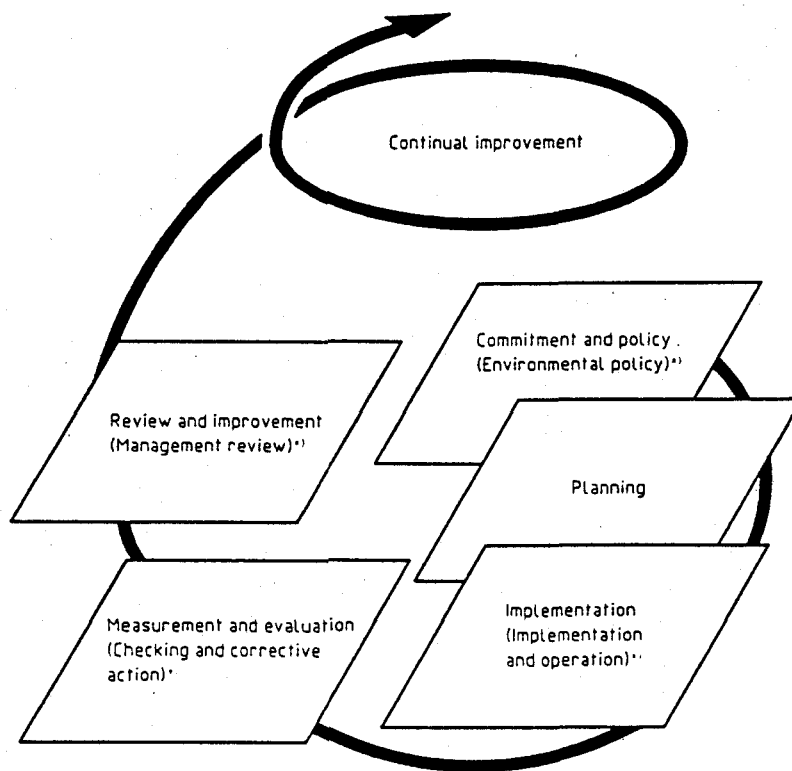
Principle 4 — Measurement and evaluation

An organization should measure, monitor and evaluate its environmental performance.

Principle 5 — Review and improvement

An organization should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

With this in mind, the EMS is best viewed as an organizing framework that should be continually monitored and periodically reviewed to provide effective direction for an organization's environmental activities in response to changing internal and external factors. Every individual in an organization should accept responsibility for environmental improvements.



*) Terms used in ISO 14001.

Figure 1 — Environmental management system model for this International Standard

4.1 Commitment and policy

Principle 1 — Commitment and policy

An organization should define its environmental policy and ensure commitment to its EMS.

4.1.1 General

The organization should begin where there is obvious benefit, for example, by focusing on regulatory compliance, by limiting sources of liability or by making more efficient use of materials.

As the organization grows in experience, and its EMS starts to take shape, procedures, programmes and technologies can be put in place to further improve environmental performance. Then, as the EMS matures, environmental considerations can be integrated into all business decisions.

4.1.2 Top management commitment and leadership

To ensure success, an early step in developing or improving an EMS involves obtaining commitment from the top management of the organization to improve the environmental management of its activities, products or services. The ongoing commitment and leadership of the top management are crucial.

4.1.3 Initial environmental review

The current position of an organization with regard to the environment can be established by means of an initial environmental review. The initial review can cover the following:

- identification of legislative and regulatory requirements;
- identification of environmental aspects of its activities, products or services so as to determine those that have or can have significant environmental impacts and liabilities;
- evaluation of performance compared with relevant internal criteria, external standards, regulations, codes of practice and sets of principles and guidelines;
- existing environmental management practices and procedures;
- identification of the existing policies and procedures dealing with procurement and contracting activities;
- feedback from the investigation of previous incidents of non-compliance;
- opportunities for competitive advantage;
- the views of interested parties;
- functions or activities of other organizational systems that can enable or impede environmental performance.

In all cases, consideration should be given to the full range of operating conditions, including possible incidents and emergency situations.

The process and results of the initial environmental review should be documented and opportunities for EMS development should be identified.

Practical help — Initial environmental review

An important first step is to develop the list of areas to be reviewed. This can include organization activities, specific operations or a specific site.

Some common techniques for conducting a review include

- *questionnaires,*
- *interviews,*
- *checklists,*
- *direct inspection and measurement,*
- *record review,*
- *benchmarking¹⁾.*

Organizations, including SMEs, can consult a number of outside sources such as:

- *government agencies in relation to laws and permits;*
- *local or regional libraries or databases;*
- *other organizations for exchange of information;*
- *industry associations;*
- *larger customer organizations;*
- *manufacturers of equipment in use;*
- *business relations (e.g. with those who transport and dispose of waste);*
- *professional help.*

1) Benchmarking is a technique for studying best practice, whether within the organization, in a competitor's organization or in a different industry, to enable the organization to adopt or improve on it.

4.1.4 Environmental policy

An environmental policy establishes an overall sense of direction and sets the principles of action for an organization. It sets the goal as to the level of environmental responsibility and performance required of the organization, against which all subsequent actions will be judged.

A growing number of international organizations including government, industry associations and citizens' groups have developed guiding principles (see annex A for two examples). Such guiding principles have helped organizations define the overall scope of their commitment to the environment. They also help to give different organizations a common set of values. Guiding principles such as these can assist the organization in developing its policy, which can be as individual as the organization for which it is written.

The responsibility for setting environmental policy normally rests with the organization's top management. The organization's management is responsible for implementing the policy and for providing input to the formulation and modification of the policy.

An environmental policy should consider the following:

- the organization's mission, vision, core values and beliefs;
- requirements of and communication with interested parties;
- continual improvement;
- prevention of pollution;
- guiding principles;
- coordination with other organizational policies (e.g. quality, occupational health and safety);
- specific local or regional conditions;
- compliance with relevant environmental regulations, laws and other criteria to which the organization subscribes.

Some issues to be considered in environmental policy

- 1 *Does the organization have an environmental policy that is relevant to its activities, products and services?*
- 2 *Does the policy reflect the organization's values and guiding principles?*
- 3 *Has the environmental policy been approved by top management and has someone been identified and given the authority to oversee and implement the policy?*
- 4 *Does the policy guide the setting of environmental objectives and targets?*
- 5 *Does the policy guide the organization towards monitoring appropriate technology and management practices?*
- 6 *What commitments are embodied in the environmental policy, for example, support for continual improvement, support for the prevention of pollution, monitoring, meeting or exceeding legal requirements, and consideration of the expectations of interested parties?*

Practical help — Environmental policy

All activities, products or services can cause impacts on the environment. The environmental policy should recognize this.

A detailed review of the guiding principles in annex A can help in drafting an appropriate policy. The issues addressed in the policy depend on the nature of the organization. In addition to compliance with environmental regulations, the policy can state commitments to

- minimize any significant adverse environmental impacts of new developments through the use of the integrated environmental management procedures and planning;*
- development of environmental performance evaluation procedures and associated indicators;*
- embody life cycle thinking;*
- design products in such a way as to minimize their environmental impacts in production, use and disposal;*
- prevent pollution, reduce waste and the consumption of resources (materials, fuel and energy), and commit to recovery and recycling, as opposed to disposal where feasible;*
- education and training;*
- sharing environmental experience;*
- involvement of and communication with interested parties;*
- work towards sustainable development;*
- encourage the use of EMS by suppliers and contractors.*

4.2 Planning

Principle 2 — Planning

An organization should formulate a plan to fulfil its environmental policy.

4.2.1 General

The environmental management system elements relating to planning include

- identification of environmental aspects and evaluation of associated environmental impacts;
- legal requirements;
- environmental policy;
- internal performance criteria;
- environmental objectives and targets;
- environmental plans and management programme.

4.2.2 Identification of environmental aspects and evaluation of associated environmental impacts

An organization's policy, objectives and targets should be based on knowledge about the environmental aspects and significant environmental impacts associated with its activities, products or services. This can ensure that the significant environmental impacts associated with these aspects are taken into account in setting the environmental objectives.

The identification of the environmental aspects is an ongoing process that determines the past, current and potential impact (positive or negative) of an organization's activities on the environment. This process also includes the identification of the potential regulatory, legal and business exposure affecting the organization. It can also include identification of health and safety impacts, and environmental risk assessment.

Some issues to be considered in identification of environmental aspects and evaluation of environmental impacts

- 1 *What are the environmental aspects of the organization's activities, products and services?*
- 2 *Do the organization's activities, products or services create any significant adverse environmental impacts?*
- 3 *Does the organization have a procedure for evaluating the environmental impacts of new projects?*
- 4 *Does the location of the organization require special environmental consideration, for example sensitive environmental areas?*
- 5 *How will any intended changes or additions to activities, products or services affect the environmental aspects and their associated impacts?*
- 6 *How significant or severe are the potential environmental impacts should a process failure occur?*
- 7 *How frequently will the situation arise that could lead to the impact?*
- 8 *What are the significant environmental aspects; considering impacts, likelihood, severity and frequency?*
- 9 *Are the significant environmental impacts local, regional or global in scope?*

Practical help — Identification of environmental aspects and evaluation of associated environmental impacts

The relationship between environmental aspects and environmental impacts is one of cause and effect.

An environmental aspect refers to an element of an organization's activity, product or service which can have a beneficial or adverse impact on the environment. For example, it could involve a discharge, an emission, consumption or reuse of a material, or noise.

An environmental impact refers to the change which takes place in the environment as a result of the aspect. Examples of impacts might include pollution or contamination of water or depletion of a natural resource.

The identification of environmental aspects and the evaluation of associated environmental impacts is a process that can be dealt with in four steps.

Step 1 — Select an activity, a product or service

The selected activity, product or service should be large enough for meaningful examination and small enough to be sufficiently understood.

Step 2 — Identify environmental aspects of the activity, product or service

Identify as many environmental aspects as possible associated with the selected activity, product or service.

Step 3 — Identify environmental impacts

Identify as many actual and potential, positive and negative, environmental impacts as possible associated with each identified aspect.

Examples from the three steps above are shown as follows.

Activity, product or service	Aspect	Impact
Activity — Handling of hazardous materials	Potential for accidental spillage	Contamination of soil or water
Product — Product refinement	Reformulation of the product to reduce its volume	Conservation of natural resources
Service — Vehicle maintenance	Exhaust emissions	Reduction of air emissions

Step 4 — Evaluate significance of impacts

The significance of each of the identified environmental impacts can be different for each organization. Quantification can aid judgement.

Evaluation can be facilitated by considering the following.

Environmental concerns:

- the scale of the impact;
- the severity of the impact;
- probability of occurrence;
- duration of impact.

Business concerns:

- potential regulatory and legal exposure;
- difficulty of changing the impact;
- cost of changing the impact;
- effect of change on other activities and processes;
- concerns of interested parties;
- effect on the public image of the organization.

4.2.3 Legal and other requirements

The organization should establish and maintain procedures to identify, have access to and understand all legal and other requirements to which it subscribes, directly attributable to the environmental aspects of its activities, products or services.

Some issues to be considered in legal and other requirements

- 1 *How does the organization access and identify relevant legal and other requirements?*
- 2 *How does the organization keep track of legal and other requirements?*
- 3 *How does the organization keep track of changes to legal and other requirements?*
- 4 *How does the organization communicate relevant information on legal and other requirements to employees?*

Practical help — Legal and other requirements

To maintain regulatory compliance, an organization should identify and understand regulatory requirements applicable to its activities, products or services. Regulations can exist in several forms:

- those specific to the activity (e.g. site operating permits);
- those specific to the organization's products or services;
- those specific to the organization's industry;
- general environmental laws;
- authorizations, licenses and permits.

Several sources can be used to identify environmental regulations and ongoing changes, including

- all levels of government;
- industry associations or groups;
- commercial databases;
- professional services.

To facilitate keeping track of legal requirements, an organization can establish and maintain a list of all laws and regulations pertaining to its activities, products or services.

4.2.4 Internal performance criteria

Internal priorities and criteria should be developed and implemented where external standards do not meet the needs of the organization or are non-existent. Internal performance criteria, together with external standards, assist the organization in developing its own objectives and targets.

Practical help — Internal performance criteria

Examples of areas where an organization can have internal performance criteria might include

- management systems;
- employee responsibilities;
- acquisition, property management and divestiture;
- suppliers;
- contractors;
- product stewardship;
- environmental communications;
- regulatory relationships;
- environmental incident response and preparedness;
- environmental awareness and training;
- environmental measurement and improvement;
- process risk reduction;
- prevention of pollution and resource conservation;
- capital projects;
- process change;
- hazardous material management;
- waste management;
- water management (e.g. waste, storm, ground);
- air quality management;
- energy management;
- transportation.

4.2.5 Environmental objectives and targets

Objectives should be established to meet the organization's environmental policy. These objectives are the overall goals for environmental performance identified in the environmental policy. When establishing its objectives, an organization should also take into account the relevant findings from environmental reviews, and the identified environmental aspects and associated environmental impacts.

Environmental targets can then be set to achieve these objectives within a specified time-frame. The targets should be specific and measurable.

When the objectives and targets are set, the organization should consider establishing measurable environmental-performance indicators. These indicators can be used as the basis for an environmental-performance evaluation system and can provide information on both the environmental management and the operational systems.

Objectives and targets can apply broadly across an organization or more narrowly to site-specific or individual activities. Appropriate levels of management should define the objectives and targets. Objectives and targets should be periodically reviewed and revised, and should take into consideration the views of interested parties.

Some issues to be considered in environmental objectives and targets

- 1 *How do environmental objectives and targets reflect both the environmental policy and significant environmental impacts associated with the organization's activities, products or services?*
- 2 *How have the employees responsible for achieving the objectives and targets had input into their development?*
- 3 *How have the views of interested parties been considered?*
- 4 *What specific measurable indicators have been established for objectives and targets?*
- 5 *How are objectives and targets regularly reviewed and revised to reflect desired improvements in environmental performance?*

Practical help — Objectives and targets

Objectives can include commitments to

- *reduce waste and the depletion of resources;*
- *reduce or eliminate the release of pollutants into the environment;*
- *design products to minimize their environmental impact in production, use and disposal;*
- *control the environmental impact of sources of raw material;*
- *minimize any significant adverse environmental impact of new developments;*
- *promote environmental awareness among employees and the community.*

Progress towards an objective can generally be measured using environmental performance indicators such as:

- *quantity of raw material or energy used;*
- *quantity of emissions such as CO₂;*
- *waste produced per quantity of finished product;*
- *efficiency of material and energy use;*
- *number of environmental incidents (e.g. excursions above limits);*
- *number of environmental accidents (e.g. unplanned releases);*
- *percentage waste recycled;*
- *percentage recycled material used in packaging;*

- number of vehicle kilometres per unit of production;
- specific pollutant quantities, e.g. NO_x, SO₂, CO, HC, Pb, CFCs;
- investment in environmental protection;
- number of prosecutions;
- land area set aside for wildlife habitat.

An integrated example

Objective: reduce energy required in manufacturing operations.

Target: achieve ten percent reduction of energy consumption compared to the previous year.

Indicator: quantity of fuels and electricity per unit of production.

4.2.6 Environmental management programme(s)

Within the general planning of activities, an organization should establish an environmental management programme that addresses all of its environmental objectives. To be most effective, environmental management planning should be integrated into the organization's strategic plan. Environmental management programmes should address schedules, resources and responsibilities for achieving the organization's environmental objectives and targets.

Within the framework provided by the environmental management planning, an environmental management programme identifies specific actions in order of their priority to the organization. These actions may deal with individual processes, projects, products, services, sites or facilities within a site.

Environmental management programmes help the organization to improve its environmental performance. They should be dynamic and revised regularly to reflect changes in organizational objectives and targets.

Some issues to be considered in environmental management programme(s)

- 1 *What is the organization's process for developing environmental management programmes?*
- 2 *Does the environmental management planning process involve all responsible parties?*
- 3 *Is there a process for periodic reviews of the programme?*
- 4 *How do these programmes address the issues of resources, responsibility, timing and priority?*
- 5 *How are the environmental management programmes responsive to the environmental policy and general planning activities?*
- 6 *How are the environmental management programmes monitored and revised?*

Practical help — Environmental management programme

The following is an example of a process for developing an environmental management programme.

Commitment and policy	Planning	Example
Environmental policy commitment ¹⁾		Conserve natural resources
	Objective 1	Minimize water use wherever technically and commercially practical
	Target 1	Reduce water consumption at selected sites by fifteen percent of present levels within one year
	Environmental programme 1	Water reuse
	Action 1	Install equipment to recycle water used for rinsing in Process A for reuse in Process B

1) This iterative process should be repeated for all policy commitments, objectives and targets.

4.3 Implementation

Principle 3 — Implementation

For effective implementation, an organization should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

4.3.1 General

The capabilities and support required by the organization constantly evolve in response to the changing requirements of interested parties, a dynamic business environment, and the process of continual improvement. To achieve its environmental objectives an organization should focus and align its people, systems, strategy, resources and structure.

For many organizations, implementing environmental management can be approached in stages and should be based on the level of awareness of environmental requirements, aspects, expectations and benefits, and the availability of resources.

4.3.2 Ensuring capability

4.3.2.1 Resources — Human, physical and financial

The appropriate human, physical (e.g. facilities, equipment), and financial resources essential to the implementation of an organization's environmental policies and the achievement of its objectives should be defined and made available. In allocating resources, organizations can develop procedures to track the benefits as well as the costs of their environmentally or related activities. Issues such as the cost of pollution control, wastes and disposal can be included.

Some issues to be considered in human, physical, and financial resources

- 1 *How does the organization identify and allocate the human, technical and financial resources necessary to meet its environmental objectives and targets, including those for new projects?*
- 2 *How does the organization track the costs and benefits of environmental activities?*

Practical help — Human, physical and financial resources

The resource base and the organization structure of the small or medium enterprise (SME) can impose certain limitations on implementation. In order to manage these constraints the SME should, wherever possible, consider cooperative strategies with

- *larger client organizations to share technology and know-how;*
- *other SMEs on a supply chain or local basis to define and address common issues, to share know-how, to facilitate technical development, to use facilities jointly, to establish a way to study the EMS, to collectively engage consultants;*
- *standardization organizations, SME associations, Chambers of Commerce, for training and awareness programmes;*
- *universities and other research centres to support production and innovation.*

4.3.2.2 EMS alignment and integration

To effectively manage environmental concerns, the EMS elements should be designed or revised so that they are effectively aligned and integrated with existing management system elements.

Management system elements that can benefit from integration include

- organization policies;
- resource allocation;
- operational controls and documentation;
- information and support systems;
- training and development;
- organization and accountability structure;
- reward and appraisal systems;
- measuring and monitoring systems;
- communication and reporting.

Some issues to be considered in organizational alignment and integration

- 1 *How has the environmental management system been integrated into the overall business management process?*
- 2 *What is the process for balancing and resolving conflicts between environmental and other business objectives and priorities?*

4.3.2.3 Accountability and responsibility

Responsibility for the overall effectiveness of the EMS should be assigned to (a) senior person(s) or function(s) with sufficient authority, competence and resources.

Operational managers should clearly define the responsibilities of relevant personnel and be responsible and accountable for effective implementation of the EMS and environmental performance. Employees at all levels should be accountable, within the scope of their responsibilities, for environmental performance in support of the overall environmental management system.

Some issues to be considered in accountability and responsibility

- 1 *What are the responsibilities and accountability of personnel who manage, perform and verify work affecting the environment, and are these defined and documented?*
- 2 *What is the relationship between environmental responsibility and individual performance and is this periodically reviewed?*
- 3 *How do the responsible and accountable personnel*
 - obtain sufficient training, resources and personnel for implementation?*
 - initiate action to ensure compliance with environmental policy?*
 - anticipate, identify and record any environmental problems?*
 - initiate, recommend, or provide solutions to those problems?*
 - verify the implementation of such solutions?*
 - control further activities until any environmental deficiency or unsatisfactory condition has been corrected?*
 - obtain appropriate training to act in emergency situations?*
 - gain an understanding of the consequences of non-compliance?*
 - gain an understanding of the accountability that applies to them?*
 - encourage voluntary action and initiatives?*

Practical help — Accountability and responsibility

To ensure effective development and implementation of an EMS, it is necessary to assign appropriate responsibilities. One possible approach for developing environmental responsibilities is indicated below. It should be recognized that companies and institutions have different organizational structures, and need to understand and define environmental responsibilities based upon their own work processes.

The following is a sample model of environmental responsibilities.

Sample environmental responsibilities	Typical person(s) responsible
Establish overall direction	President, chief executive officer (CEO), board of directors
Develop environmental policy	President, CEO, chief environmental manager
Develop environmental objectives, targets and programmes	Relevant managers
Monitor overall EMS performance	Chief environmental manager
Assure regulatory compliance	Senior operating manager
Ensure continual improvement	All managers
Identify customers' expectations	Sales and marketing staff
Identify suppliers' expectations	Purchasers, buyers
Develop and maintain accounting procedures	Finance/accounting managers
Comply with defined procedures	All staff
NOTE — In the case of SMEs the person responsible can be the owner.	

4.3.2.4 Environmental awareness and motivation

Top management has a key role to play in building awareness and motivating employees by explaining the organization's environmental values and communicating its commitment to the environmental policy. It is the commitment of the individual people, in the context of shared environmental values, that transforms an environmental management system from paperwork into an effective process.

All members of the organization should understand and be encouraged to accept the importance of achieving the environmental objectives and targets for which they are responsible and/or accountable. They in turn should encourage, where necessary, the other members of their organization to respond in a similar manner.

Motivation to continually improve can be enhanced when employees are recognized for achieving environmental objectives and targets and encouraged to make suggestions that can lead to improved environmental performance.

Some issues to be considered in environmental awareness and motivation

- 1 How has top management established, reinforced and communicated organizational commitment to the environmental policy?
- 2 To what extent do employees understand, accept and share the environmental values of the organization?
- 3 To what extent do shared environmental values serve to motivate environmentally responsible action?
- 4 How does the organization recognize employees' environmental achievements?

4.3.2.5 Knowledge, skills and training

The knowledge and skills necessary to achieve environmental objectives should be identified. These should be considered in personnel selection, recruitment, training, development of skills and ongoing education.

Appropriate training relevant to the achievement of environmental policies, objectives and targets should be provided to all personnel within an organization. Employees should have an appropriate knowledge base, which includes training in the methods and skills required to perform their tasks in an efficient and competent fashion and knowledge of the impact their activities can have on the environment if performed incorrectly.

The organization should also ensure that contractors working at the site provide evidence that they have the requisite knowledge and skills to perform the work in an "environmentally responsible manner".

Education and training is needed to ensure that employees have appropriate and current knowledge of regulatory requirements, internal standards and the organization's policies and objectives. The level and detail of training may vary according to the task.

Training programmes typically have the following elements:

- identification of employee training needs;
- development of a training plan to address defined needs;
- verification of conformance of training programme to regulatory or organizational requirements;
- training of target employee groups;
- documentation of training received;
- evaluation of training received.

Some issues to be considered in knowledge, skills, and training

- 1 *How does the organization identify environmental training needs?*
- 2 *How are the training needs of specific job functions analysed?*
- 3 *Is training developed and reviewed and modified as needed?*
- 4 *How is the training documented and tracked?*

Practical help — Knowledge, skills and training

Examples of the types of environmental training which can be provided by the organization are as follows.

Type of training	Audience	Purpose
<i>Raising awareness of the strategic importance of environmental management</i>	<i>Senior management</i>	<i>To gain commitment and alignment to the organization's environmental policy</i>
<i>Raising general environmental awareness</i>	<i>All employees</i>	<i>To gain commitment to the environmental policy, objectives and targets of the organization; and instil a sense of individual responsibility</i>
<i>Skills enhancement</i>	<i>Employees with environmental responsibilities</i>	<i>To improve performance in specific areas of the organization, e.g. operations, research and development, and engineering</i>
<i>Compliance</i>	<i>Employees whose actions can affect compliance</i>	<i>To ensure regulatory and internal requirements for training are met</i>

4.3.3 Support action

4.3.3.1 Communication and reporting

Communication includes establishing processes to report internally and, where desired, externally on the environmental activities of the organization in order to

- demonstrate management commitment to the environment;
- deal with concerns and questions about the environmental aspects of the organization's activities, products or services;
- raise awareness of the organization's environmental policies, objectives, targets and programmes;
- inform internal or external interested parties about the organization's environmental management system and performance as appropriate.

Results from EMS monitoring, audit and management review should be communicated to those within the organization who are responsible for performance.

The provision of appropriate information to the organization's employees and other interested parties serves to motivate employees and encourage public understanding and acceptance of the organization's efforts to improve its environmental performance.

Some issues to be considered in communication and reporting

- 1 *What is the process for receiving and responding to employee concerns?*
- 2 *What is the process for receiving and considering the concerns of other interested parties?*
- 3 *What is the process for communicating the organization's environmental policy and performance?*
- 4 *How are the results from EMS audits and reviews communicated to all appropriate people in the organization?*
- 5 *What is the process for making the environmental policy available to the public?*
- 6 *Is internal communication adequate to support continual improvement around environmental issues?*

Practical help — Communication and reporting

a) Items that can be included in reports:

- organization's profile;
- environmental policy, objectives and targets;
- environmental management processes (including interested party involvement and employee recognition);
- environmental performance evaluation (including releases, resource conservation, compliance, product stewardship and risk);
- opportunities for improvement;
- supplementary information, such as glossaries;
- independent verification of the contents.

b) It is important to remember for both internal and external environmental communication and reporting:

- two-way communication should be encouraged;
- information should be understandable and adequately explained;
- information should be verifiable;
- the organization should present an accurate picture of its performance;
- information should be presented in a consistent form (e.g. similar units of measurement to allow for comparison between one period and another).

- c) *An organization can communicate environmental information in a variety of ways:*
- *externally, through an annual report, regulatory submissions, public government records, industry association publications, the media, and paid advertising;*
 - *organization of open days, the publication of telephone numbers where complaints and questions can be directed;*
 - *internally, through bulletin board postings, internal newspapers, meetings and electronic mail messages.*

4.3.3.2 EMS documentation

Operational processes and procedures should be defined and appropriately documented and updated as necessary. The organization should clearly define the various types of documents which establish and specify effective operational procedures and control.

The existence of EMS documentation supports employee awareness of what is required to achieve the organization's environmental objectives and enables the evaluation of the system and environmental performance.

The nature of the documentation can vary depending on the size and complexity of the organization. Where elements of the EMS are integrated with an organization's overall management system, the environmental documentation should be integrated into existing documentation. For ease of use, the organization can consider organizing and maintaining a summary of the documentation to

- collate the environmental policy, objectives and targets;
- describe the means of achieving environmental objectives and targets;
- document the key roles, responsibilities and procedures;
- provide direction to related documentation and describe other elements of the organization's management system, where appropriate;
- demonstrate that the environmental management system elements which are appropriate for the organization are implemented.

Such a summary document can serve as a reference to the implementation and maintenance of the organization's environmental management system.

Some issues to be considered in EMS documentation

- 1 *How are environmental management procedures identified, documented, communicated and revised?*
- 2 *Does the organization have a process for developing and maintaining EMS documentation?*
- 3 *How is EMS documentation integrated with existing documentation where appropriate?*
- 4 *How do employees access EMS documentation needed to conduct their job activities?*

Practical help — EMS documentation

Documents can be in any medium and should be useful and easily understood.

All documentation should be dated (with dates of revision), readily identifiable, organized, and retained for a specified period. The organization should ensure that

- *documents can be identified with the appropriate organization, division, function, activity, and/or contact person;*
- *documents are periodically reviewed, revised as necessary and approved by authorized personnel prior to issue;*
- *the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the system are performed;*
- *obsolete documents are promptly removed from all points of issue and points of use.*

4.3.3.3 Operational control

Implementation is accomplished through the establishment and maintenance of operational procedures and controls to ensure that the organization's environmental policy, objectives and targets can be met.

Practical help — Operational control

The organization should consider the different operations and activities contributing to its significant environmental impacts when developing or modifying operational controls and procedures. Such operations and activities may include

- research and development design and engineering;*
- purchasing;*
- contracting;*
- handling and storage of raw materials;*
- production and maintenance processes;*
- laboratories;*
- storage of products;*
- transportation;*
- marketing, advertising;*
- customer service;*
- acquisition, construction or modification of property and facilities.*

Activities can be divided into three categories:

- activities to prevent pollution and conserve resources in new capital projects, process changes and resources management, property (acquisitions, divestitures and property management), and new products and packaging;*
- daily management activities to assure conformance to internal and external organizational requirements, and to ensure their efficiency and effectiveness;*
- strategic management activities to anticipate and respond to changing environmental requirements.*

4.3.3.4 Emergency preparedness and response

Emergency plans and procedures should be established to ensure that there will be an appropriate response to unexpected or accidental incidents.

The organization should define and maintain procedures for dealing with environmental incidents and potential emergency situations. The operating procedures and controls should include, where appropriate, consideration of

- accidental emissions to the atmosphere;*
- accidental discharges to water and land;*
- specific environment and ecosystem effects from accidental releases.*

The procedures should take into account incidents arising, or likely to arise, as consequences of

- abnormal operating conditions;
- accidents and potential emergency situations.

Practical help — Emergency preparedness and response

Emergency plans can include

- *emergency organization and responsibilities;*
- *a list of key personnel;*
- *details of emergency services (e.g. fire department, spill clean-up services);*
- *internal and external communication plans;*
- *actions taken in the event of different types of emergencies;*
- *information on hazardous materials, including each material's potential impact on the environment, and measures to be taken in the event of accidental release;*
- *training plans and testing for effectiveness.*

4.4 Measurement and evaluation

Principle 4 — Measurement and evaluation

An organization should measure, monitor and evaluate its environmental performance.

4.4.1 General

Measuring, monitoring and evaluating are key activities of an environmental management system which ensure that the organization is performing in accordance with the stated environmental management programme.

4.4.2 Measuring and monitoring (ongoing performance)

There should be a system in place for measuring and monitoring actual performance against the organization's environmental objectives and targets in the areas of management systems and operational processes. This includes evaluation of compliance with relevant environmental legislation and regulations. The results should be analysed and used to determine areas of success and to identify activities requiring corrective action and improvement.

Appropriate processes should be in place to ensure the reliability of data, such as calibration of instruments, test equipment, and software and hardware sampling.

Identifying appropriate environmental performance indicators for the organization should be an ongoing process. Such indicators should be objective, verifiable and reproducible. They should be relevant to the organization's activities, consistent with its environmental policy, practical, cost-effective, and technologically feasible.

NOTE — Examples of environmental performance indicators are shown in "Practical help — Objectives and targets" (4.2.5).

Some issues to be considered in measuring and monitoring

- 1 *How is environmental performance regularly monitored?*
- 2 *How have specific environmental performance indicators been established which relate to the organization's objectives and targets and what are they?*
- 3 *What control processes are in place to regularly calibrate and sample measuring and monitoring equipment and systems?*
- 4 *What is the process to periodically evaluate compliance with relevant legal and other compliance?*

4.4.3 Corrective and preventive action

The findings, conclusions, and recommendations reached as a result of measuring, monitoring, audits and other reviews of the environmental management system should be documented, and the necessary corrective and preventive actions identified. Management should ensure that these corrective and preventive actions have been implemented and that there is systematic follow-up to ensure their effectiveness.

4.4.4 EMS records and information management

Records are evidence of the ongoing operation of the EMS and should cover

- legislative and regulatory requirements;
- permits;
- environmental aspects and their associated impacts;
- environmental training activity;
- inspection, calibration and maintenance activity;
- monitoring data;
- details of non-conformance: incidents, complaints and follow-up action;
- product identification: composition and property data;
- supplier and contractor information;
- environmental audits and management reviews.

A complex range of information can result. The effective management of these records is essential to the successful implementation of the EMS. The key features of good environmental information management include means of identification, collection, indexing, filing, storage, maintenance, retrieval, retention and disposition of pertinent EMS documentation and records.

Some issues to be considered in EMS records and information management

- 1 *What environmental information does the organization need to manage effectively?*
- 2 *What capability does the organization have to identify and track key indicators of performance and other data necessary to achieve its objectives?*
- 3 *How does the organization's record/information management system make information available to the employees who need it when they need it?*

4.4.5 Audits of the environmental management system

Audits of the EMS should be conducted on a periodic basis to determine whether the system conforms to planned arrangements and has been properly implemented and maintained.

Audits of the EMS can be carried out by organization personnel, and/or by external parties selected by the organization. In any case, the person(s) conducting the audit should be in a position to do so objectively and impartially and should be properly trained.

The frequency of audits should be guided by the nature of the operation in terms of its environmental aspects and potential impacts. Also, the results of previous audits should be considered in determining frequency.

The EMS audit report should be submitted in accordance with the audit plan.

4.5 Review and improvement

Principle 5 — Review and improvement

An organization should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

4.5.1 General

A continual improvement process should be applied to an environmental management system to achieve overall improvement in environmental performance.

4.5.2 Review of the environmental management system

The organization's management should, at appropriate intervals, conduct a review of the EMS to ensure its continuing suitability and effectiveness.

The review of the EMS should be broad enough in scope to address the environmental dimensions of all activities, products or services of the organization, including their impact on financial performance and possibly competitive position.

The review of the EMS should include

- a review of environmental objectives, targets and environmental performance;
- findings of the EMS audits;
- an evaluation of its effectiveness;
- an evaluation of the suitability of the environmental policy and the need for changes in the light of
 - changing legislation,
 - changing expectations and requirements of interested parties,
 - changes in the products or activities of the organization,
 - advances in science and technology,
 - lessons learned from environmental incidents,
 - market preferences,
 - reporting and communication.

Some issues to be considered in the review of the EMS

- 1 *How is the EMS periodically reviewed?*
- 2 *How are the appropriate employees involved in the review of the EMS and follow-up?*
- 3 *How are the views of interested parties taken into account in the EMS review?*

4.5.3 Continual improvement

The concept of continual improvement is embodied in the EMS. It is achieved by continually evaluating the environmental performance of the EMS against its environmental policies, objectives and targets for the purpose of identifying opportunities for improvement (see figure 1).

The continual improvement process should

- identify areas of opportunity for improvement of the environmental management system which lead to improved environmental performance;
- determine the root cause or causes of nonconformances or deficiencies;
- develop and implement (a) plan(s) of corrective and preventive action to address root cause(s);
- verify the effectiveness of the corrective and preventive actions;
- document any changes in procedures resulting from process improvement;
- make comparisons with objectives and targets.

Some issues to be considered in corrective and preventive action and continual improvement

- 1 *What process does the organization have to identify corrective and preventive action and improvement?*
- 2 *How does the organization verify that corrective and preventive actions and improvements are effective and timely?*

Annex A (informative)

Examples of international environmental guiding principles

Guiding principles are formal declarations that express the basis on which an environmental policy can be built and which provide a foundation for action.

A.1 The Rio Declaration on Environment and Development

The United Nations Conference on Environment and Development, having met at Rio de Janeiro from 3 to 14 June 1992, reaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, and seeking to build upon it, with the goal of establishing a new and equitable global partnership through the creation of new levels of co-operation among States, key sectors of societies and people, working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system, recognizing the integral and interdependent nature of the Earth, our home proclaims that:

Principle 1

Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

Principle 2

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 3

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 5

All States and people shall co-operate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

Principle 6

The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

Principle 7

States shall co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 8

To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

Principle 9

States should co-operate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

Principle 10

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Principle 11

States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries can be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

Principle 12

States should co-operate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.

Principle 13

States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also co-operate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

Principle 14

States should effectively co-operate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.

Principle 15

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Principle 16

National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Principle 17

Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

Principle 18

States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.

Principle 19

States shall provide prior and timely notification and relevant information to potentially affected States on activities that can have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

Principle 20

Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

Principle 21

The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.

Principle 22

Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interest and enable their effective participation in the achievement of sustainable development.

Principle 23

The environment and natural resources of people under oppression, domination and occupation shall be protected.

Principle 24

Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and co-operate in its further development, as necessary.

Principle 25

Peace, development and environmental protection are interdependent and indivisible.

Principle 26

States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

Principle 27

States and people shall co-operate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

A.2 International Chamber of Commerce (ICC) Business Charter for Sustainable Development**1. Corporate Priority**

To recognize environmental management as among the highest corporate priorities and as a key determinant to sustainable development; to establish policies, programs and practices for conducting operations in an environmentally sound manner.

2. Integrated Management

To integrate these policies, programs and practices fully into each business as an essential element of management in all its functions.

3. Process of Improvement

To continue to improve policies, programs and environmental performance, taking into account technical developments, scientific understanding, consumer needs and community expectations, with legal regulations as starting point; and to apply the same environmental criteria internationally.

4. Employee Education

To educate, train and motivate employees to conduct their activities in an environmentally responsible manner.

5. Prior Assessment

To assess environmental impacts before starting a new activity or project and before decommissioning a facility or leaving a site.

6. Products or services

To develop and provide products or services that have no undue environmental impact and are safe in their intended use, that are efficient in their consumption of energy and natural resources, and that can be recycled, reused, or disposed of safely.

7. Customer Advice

To advise, and where relevant educate, customers, distributors, and the public in the safe use, transportation, storage and disposal of products provided; and to apply similar considerations to the provisions of services.

8. Facilities and Operations

To develop, design and operate facilities and conduct activities taking into consideration the efficient use of energy and materials, the sustainable use of renewable resources, the minimization of adverse environmental impact and waste generation, and the safe and responsible disposal of residual wastes.

9. Research

To conduct or support research on the environmental impacts of raw materials, products, processes, emissions, and wastes associated with the enterprise and on the means of minimizing such adverse impacts.

10. Precautionary Approach

To modify the manufacture, marketing, or use of products or services or the conduct of activities, consistent with scientific and technical understanding, to prevent serious or irreversible environmental degradation.

11. Contractors and Suppliers

To promote the adoption of these principles by contractors acting on behalf of the enterprise, encouraging and, where appropriate, requiring improvements in their practices to make them consistent with those of the enterprise; and to encourage the wider adoption of these principles by suppliers.

12. Emergency Preparedness

To develop and maintain, where significant hazards exist, emergency preparedness plans in conjunction with the emergency services, relevant authorities and the local community, recognizing potential transboundary impacts.

13. Transfer of Technology

To contribute to the transfer of environmentally sound technology and management methods throughout the industrial and public sectors.

14. Contributing to the Common Effect

To contribute to the development of public policy and to business, governmental and intergovernmental programs and educational initiatives that will enhance environmental awareness and protection.

15. Openness to Concerns

To foster openness and dialogue with employees and the public, anticipating and responding to their concerns about potential hazards and impacts of operations, products, wastes or services, including those of transboundary or global significance.

16. Compliance and Reporting

To measure environmental performance; to conduct regular environmental audits and assessments of compliance with company requirements, legal requirements and these principles; and periodically to provide appropriate information to the Board of Directors, shareholders, employees, the authorities and the public.

Annex B **(informative)**

Bibliography

- [1] ISO 14001:1996, *Environmental management systems — Specification with guidance for use.*
- [2] ISO 14010:1996, *Guidelines for environmental auditing — General principles.*
- [3] ISO 14011:1996, *Guidelines for environmental auditing — Audit procedures — Auditing of environmental management systems.*
- [4] ISO 14012:1996, *Guidelines for environmental auditing — Qualification criteria for environmental auditors.*

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INTERNATIONAL STANDARD

**ISO
14010**

First edition
1996-10-01

Guidelines for environmental auditing — General principles

Lignes directrices pour l'audit environnemental — Principes généraux

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International Organization for Standardization
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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.

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 14010 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 2, *Environmental auditing and related environmental investigations*.

Annex A of this International Standard is for information only.

Introduction

Environmental auditing has established itself as a valuable instrument to verify and help improve environmental performance.

This International Standard is intended to guide organizations, auditors and their clients on the general principles common to the conduct of environmental audits. It provides definitions of environmental audit and related terms, and the general principles of environmental auditing.

This is one in a series of International Standards in the field of environmental auditing which also includes

ISO 14011:1996, *Guidelines for environment auditing — Audit procedures — Auditing of environmental management systems.*

ISO 14012:1996, *Guidelines for environmental auditing — Qualification criteria for environmental auditors.*

More International Standards in this series may be prepared in the future.

Guidelines for environmental auditing — General principles

1 Scope

This International Standard provides the general principles of environmental auditing that are applicable to all types of environmental audits. Any activity defined as an environmental audit in accordance with this International Standard should satisfy the recommendations given in it.

2 Definitions

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

NOTE — Terms and definitions in the field of environmental management are given in ISO 14050.

2.1 audit conclusion

professional judgement or opinion expressed by an auditor about the subject matter of the audit, based on and limited to reasoning the auditor has applied to audit findings

2.2 audit criteria

policies, practices, procedures or requirements against which the auditor compares collected audit evidence about the subject matter

NOTE — Requirements may include but are not limited to standards, guidelines, specified organizational requirements, and legislative or regulatory requirements.

2.3 audit evidence

verifiable information, records or statements of fact

NOTES

1 Audit evidence, which can be qualitative or quantitative, is used by the auditor to determine whether audit criteria are met.

2 Audit evidence is typically based on interviews, examination of documents, observation of activities and conditions, existing results of measurements and tests or other means within the scope of the audit.

2.4 audit findings

results of the evaluation of the collected audit evidence compared with the agreed audit criteria

NOTE — The audit findings provide the basis for the audit report.

2.5 audit team

group of auditors, or a single auditor, designated to perform a given audit; the audit team may also include technical experts and auditors-in-training

NOTE — One of the auditors on the audit team performs the function of lead auditor.

2.6 auditee

organization to be audited

2.7 environmental auditor

person qualified to perform environmental audits

NOTE — Qualification criteria for environmental auditors are given, for example, in ISO 14012.

2.8 client

organization commissioning the audit

NOTE — The client may be the auditee, or any other organization which has the regulatory or contractual right to commission an audit.

2.9 environmental audit

systematic, documented verification process of objectively obtaining and evaluating audit evidence to de-

termine whether specified environmental activities, events, conditions, management systems, or information about these matters conform with audit criteria, and communicating the results of this process to the client

2.10

lead environmental auditor

person qualified to manage and perform environmental audits

NOTE — Qualification criteria for lead environmental auditors are given, for example, in ISO 14012.

2.11

organization

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE — Adapted from ISO 14001:1996.

2.12

subject matter

specified environmental activity, event, condition, management system and/or information about these matters

2.13

technical expert

person who provides specific knowledge or expertise to the audit team, but who does not participate as an auditor

3 Requirements for an environmental audit

An environmental audit should focus on clearly defined and documented subject matter. The party (or parties) responsible for this subject matter should also be clearly identified and documented.

The audit should only be undertaken if, after consultation with the client, it is the lead auditor's opinion that

- there is sufficient and appropriate information about the subject matter of the audit;
- there are adequate resources to support the audit process;
- there is adequate cooperation from the auditee.

4 General principles

4.1 Objectives and scope

The audit should be based on objectives defined by the client. The scope is determined by the lead auditor,

in consultation with the client, to meet these objectives. The scope describes the extent and boundaries of the audit.

The objectives and scope should be communicated to the auditee prior to the audit.

4.2 Objectivity, independence and competence

In order to ensure the objectivity of the audit process and its findings and any conclusions, the members of the audit team should be independent of the activities they audit. They should be objective, and free from bias and conflict of interest throughout the process.

The use of external or internal audit-team members is at the discretion of the client. An audit-team member chosen from within the organization should not be accountable to those directly responsible for the subject matter being audited.

The audit-team members should possess an appropriate combination of knowledge, skills and experience to carry out audit responsibilities.

4.3 Due professional care

In the conduct of an environmental audit, auditors should use the care, diligence, skill and judgement expected of any auditor in similar circumstances.

The relationship between the audit-team members and the client should be one of confidentiality and discretion. Unless required by law, the audit-team members should not disclose information or documents obtained during the audit, or the final report, to any third party, without the express approval of the client and, where appropriate, the approval of the auditee.

The auditor should follow procedures that provide for quality assurance.

4.4 Systematic procedures

The environmental audit should be conducted in accordance with these general principles and any guidelines developed for the appropriate type of environmental audit.

NOTE — Guidelines for conducting environmental management system audits are given, for example, in ISO 14011.

To enhance consistency and reliability, the environmental audit should be conducted according to documented and well-defined methodologies and sys-

tematic procedures. For any type of environmental audit, the methodologies and procedures should be consistent. The procedures for one type of environmental audit differ from those of another only where it is essential to the specific character of a given type of environmental audit.

4.5 Audit criteria, evidence and findings

An early and essential step in an environmental audit should be the determination of audit criteria. These criteria at an appropriate level of detail should be agreed between the lead auditor and the client, and then communicated to the auditee.

Appropriate information should be collected, analysed, interpreted and recorded to be used as audit evidence in an examination and evaluation process to determine whether the audit criteria are met.

Audit evidence should be of such a quality and quantity that competent environmental auditors working independently of each other will reach similar audit findings from evaluating the same audit evidence against the same audit criteria.

4.6 Reliability of audit findings and conclusions

The environmental auditing process should be designed to provide the client and auditor with the desired level of confidence in the reliability of the audit findings and any audit conclusions.

The audit evidence collected during an environmental audit will inevitably be only a sample of the information available, partly due to the fact that an environmental audit is conducted during a limited period of time and with limited resources. There is therefore an element of uncertainty inherent in all environmental audits and all users of the results of environmental audits should be aware of this uncertainty.

The environmental auditor should consider the limitations associated with the audit evidence collected during the audit, and the recognition of uncertainty in audit findings and any audit conclusions, and should take these factors into account in planning and conducting the audit.

The environmental auditor should endeavour to obtain sufficient audit evidence so that significant individual audit findings and aggregates of less significant findings, both of which may affect any audit conclusions, are taken into account.

4.7 Audit report

The audit findings and/or a summary thereof should be communicated to the client in a written report. Unless specifically excluded by the client, the auditee should receive a copy of the audit report.

Audit-related information that may be in audit reports, includes, but is not limited to

- a) the identification of the organization audited and of the client;
- b) the agreed objectives and scope of the audit;
- c) the agreed criteria against which the audit was conducted;
- d) the period covered by the audit and the date(s) the audit was conducted;
- e) the identification of the audit-team members;
- f) the identification of the auditee's representatives participating in the audit;
- g) a statement of the confidential nature of the contents;
- h) the distribution list for the audit report;
- i) a summary of the audit process including any obstacles encountered;
- j) the audit conclusions.

The lead auditor in consultation with the client should determine which of these items, together with any additional items, will be included in the report.

NOTE — Normally it should be the responsibility of the client or the auditee to determine any corrective action needed to respond to the audit findings. However, the auditor may provide recommendations when there has been a prior agreement to do so with the client.

Annex A

(informative)

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- [1] ISO 14001:1996, *Environmental management systems — Specification with guidance for use.*
- [2] ISO 14011:1996, *Guidelines for environmental auditing — Audit procedures — Auditing of environmental management systems.*
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INTERNATIONAL STANDARD

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Guidelines for environmental auditing — Audit procedures — Auditing of environmental management systems

*Lignes directrices pour l'audit environnemental — Procédures d'audit —
Audit des systèmes de management environnemental*

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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.

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 14011 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 2, *Environmental auditing and related environmental investigations*.

Annex A of this International Standard is for information only.

Introduction

Organizations of all kinds may have a need to demonstrate environmental responsibility. The concept of environmental management systems (EMS) and the associated practice of environmental auditing have been advanced as one way to satisfy this need. These systems are intended to help an organization establish and continue to meet its environmental policies, objectives, standards and other requirements.

This International Standard provides procedures for the conduct of EMS audits. It is applicable to all types and sizes of organizations operating an EMS.

Guidelines for environmental auditing — Audit procedures — Auditing of environmental management systems

1 Scope

This International Standard establishes audit procedures that provide for the planning and conduct of an audit of an EMS to determine conformance with EMS audit criteria.

2 Normative reference

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 14001:1996, *Environmental Management Systems — Specification with guidance for use*.

ISO 14010:1996, *Guidelines for environmental auditing — General principles*.

ISO 14012:1996, *Guidelines for environmental auditing — Qualification criteria for environmental auditors*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 14010 and ISO 14001 apply, together with the following.

NOTE — Terms and definitions in the field of environmental management are given in ISO 14050.

3.1

environmental management system

that part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy [ISO 14001:1996]

3.2

environmental management system audit

systematic and documented verification process of objectively obtaining and evaluating audit evidence to determine whether an organization's environmental management system conforms to the environmental management system audit criteria, and communicating the results of this process to the client

3.3

environmental management system audit criteria

policies, practices, procedures or requirements, such as those covered by ISO 14001 and, if applicable, any additional EMS requirements against which the auditor compares collected audit evidence about the organization's environmental management system

4 Environmental management system audit objectives, roles and responsibilities

4.1 Audit objectives

An EMS audit should have defined objectives; examples of typical objectives are as follows:

- a) to determine conformance of an auditee's EMS with the EMS audit criteria;
- b) to determine whether the auditee's EMS has been properly implemented and maintained;

- c) to identify areas of potential improvement in the auditee's EMS;
- d) to assess the ability of the internal management review process to ensure the continuing suitability and effectiveness of the EMS;
- e) to evaluate the EMS of an organization where there is a desire to establish a contractual relationship, such as with a potential supplier or a joint-venture partner.

4.2 Roles, responsibilities and activities

4.2.1 Lead auditor

The lead auditor is responsible for ensuring the efficient and effective conduct and completion of the audit within the audit scope and plan approved by the client.

In addition, responsibilities and activities of the lead auditor should cover

- a) consulting with the client and the auditee, if appropriate, in determining the criteria and scope of the audit;
- b) obtaining relevant background information necessary to meet the objectives of the audit, such as details of the auditee's activities, products, services, site and immediate surroundings, and details of previous audits;
- c) determining whether the requirements for an environmental audit as given in ISO 14010 have been met;
- d) forming the audit team giving consideration to potential conflicts of interest, and agreeing on its composition with the client;
- e) directing the activities of the audit team in accordance with the guidelines of ISO 14010 and this International Standard;
- f) preparing the audit plan with appropriate consultation with the client, auditee and audit-team members;
- g) communicating the final audit plan to the audit team, auditee and client;
- h) coordinating the preparation of working documents and detailed procedures, and briefing the audit team;
- i) seeking to resolve any problems that arise during the audit;
- j) recognizing when audit objectives become unattainable and reporting the reasons to the client and the auditee;
- k) representing the audit team in discussions with the auditee, prior to, during and after the audit;
- l) notifying the auditee without delay, of audit findings of critical nonconformities;
- m) reporting to the client on the audit clearly and conclusively within the time agreed with in the audit plan;
- n) making recommendations for improvements to the EMS, if agreed in the scope of the audit.

4.2.2 Auditor

Auditor responsibilities and activities should cover

- a) following the directions of and supporting the lead auditor;
- b) planning and carrying out the assigned task objectively, effectively and efficiently within the scope of the audit;
- c) collecting and analysing relevant and sufficient audit evidence to determine audit findings and reach audit conclusions regarding the EMS;
- d) preparing working documents under the direction of the lead auditor;
- e) documenting individual audit findings;
- f) safeguarding documents pertaining to the audit and returning such documents as required;
- g) assisting in writing the audit report.

4.2.3 Audit team

The process for selecting audit-team members should ensure that the audit team possesses the overall experience and expertise needed to conduct the audit. Consideration should be given to

- a) qualifications as given, for example, in ISO 14012;
- b) the type of organization, processes, activities or functions being audited;
- c) the number, language skills and expertise of the individual audit-team members;
- d) any potential conflict of interest between the audit-team members and the auditee;
- e) requirements of clients, and certification and accreditation bodies.

The audit team may also include technical experts and auditors-in-training that are acceptable to the client, auditee and lead auditor.

4.2.4 Client

Client responsibilities and activities should cover

- a) determining the need for the audit;

- b) contacting the auditee to obtain its full cooperation and initiating the process;
- c) defining the objectives of the audit;
- d) selecting the lead auditor or auditing organization and, if appropriate, approving the composition of the audit team;
- e) providing appropriate authority and resources to enable the audit to be conducted;
- f) consulting with the lead auditor to determine the scope of the audit;
- g) approving the EMS audit criteria;
- h) approving the audit plan;
- i) receiving the audit report and determining its distribution.

4.2.5 Auditee

The responsibilities and activities of the auditee should cover

- a) informing employees about the objectives and scope of the audit as necessary;
- b) providing the facilities needed for the audit team in order to ensure an effective and efficient audit process;
- c) appointing responsible and competent staff to accompany members of the audit team, to act as guides to the site and to ensure that the audit team is aware of health, safety and other appropriate requirements;
- d) providing access to the facilities, personnel, relevant information and records as requested by the auditors;
- e) cooperating with the audit-team to permit the audit objectives to be achieved;
- f) receiving a copy of the audit report unless specifically excluded by the client.

5 Auditing

5.1 Initiating the audit

5.1.1 Audit scope

The audit scope describes the extent and boundaries of the audit in terms of factors such as physical location and organizational activities as well as the manner of reporting. The scope of the audit is determined by the client and the lead auditor. The auditee should normally be consulted when determining the scope of the audit. Any subsequent changes to the audit scope require the agreement of the client and the lead auditor.

The resources committed to the audit should be sufficient to meet its intended scope.

5.1.2 Preliminary document review

At the beginning of the audit process, the lead auditor should review the organization's documentation such as environmental policy statements, programmes, records or manuals for meeting its EMS requirements. In doing so, use should be made of all appropriate background information on the auditee's organization. If the documentation is judged to be inadequate to conduct the audit, the client should be informed. Additional resources should not be expended until further instructions have been received from the client.

5.2 Preparing the audit

5.2.1 Audit plan

The audit plan should be designed to be flexible in order to permit changes in emphasis based on information gathered during the audit, and to permit effective use of resources.

The plan should, if applicable, include

- a) the audit objectives and scope;
- b) the audit criteria;
- c) identification of the auditee's organizational and functional units to be audited;
- d) identification of the functions and/or individuals within the auditee's organization having significant direct responsibilities regarding the auditee's EMS;
- e) identification of those elements of the auditee's EMS that are of high audit priority;
- f) the procedures for auditing the auditee's EMS elements as appropriate for the auditee's organization;
- g) the working and reporting languages of the audit;
- h) identification of reference documents;
- i) the expected time and duration for major audit activities;
- j) the dates and places where the audit is to be conducted;
- k) identification of audit-team members;
- l) the schedule of meetings to be held with the auditee's management;
- m) confidentiality requirements;
- n) report content and format, expected date of issue and distribution of the audit report;
- o) document retention requirements.

The audit plan should be communicated to the client, the audit-team members and the auditee. The client should review and approve the plan.

If the auditee objects to any provisions in the audit plan, such objections should be made known to the lead auditor. They should be resolved between the lead auditor, the auditee and the client before conducting the audit. Any revised audit plan should be agreed between the parties concerned before or during the audit.

5.2.2 Audit-team assignments

As appropriate, each audit-team member should be assigned specific EMS elements, functions, or activities to audit and be instructed on the audit procedure to follow. Such assignments should be made by the lead auditor in consultation with the audit-team members concerned. During the audit, the lead auditor may make changes to the work assignments to ensure the optimal achievement of the audit objectives.

5.2.3 Working documents

The working documents required to facilitate the auditor's investigations may include

- a) forms for documenting supporting audit evidence and audit findings;
- b) procedures and checklists used for evaluating EMS elements;
- c) records of meetings.

Working documents should be maintained at least until completion of the audit; those involving confidential or proprietary information should be suitably safeguarded by the audit-team members.

5.3 Conducting the audit

5.3.1 Opening meeting

There should be an opening meeting. The purpose of an opening meeting is to

- a) introduce the members of the audit team to the auditee's management;
- b) review the scope, objectives and audit plan and agree on the audit timetable;
- c) provide a short summary of the methods and procedures to be used to conduct the audit;
- d) establish the official communication links between the audit team and the auditee;
- e) confirm that the resources and facilities needed by the audit team are available;

- f) confirm the time and date of the closing meeting;
- g) promote the active participation by the auditee;
- h) review relevant site safety and emergency procedures for the audit team.

5.3.2 Collecting audit evidence

Sufficient audit evidence should be collected to be able to determine whether the auditee's EMS conforms to the EMS audit criteria.

Audit evidence should be collected through interviews, examination of documents and observation of activities and conditions. Indications of nonconformity to the EMS audit criteria should be recorded.

Information gathered through interviews should be verified by acquiring supporting information from independent sources, such as observations, records and results of existing measurements. Non-verifiable statements should be identified as such.

The audit team should examine the basis of relevant sampling programmes and the procedures for ensuring effective quality control of sampling and measurement processes, used by the auditee as part of its EMS activities.

5.3.3 Audit findings

The audit team should review all of their audit evidence to determine where the EMS does not conform to the EMS audit criteria. The audit team should then ensure that audit findings of nonconformity are documented in a clear, concise manner and supported by audit evidence.

Audit findings should be reviewed with the responsible auditee manager with a view to obtaining acknowledgement of the factual basis of all findings of nonconformity.

NOTE — If within the agreed scope, details of audit findings of conformity may also be documented, but with due care to avoid any implication of absolute assurance.

5.3.4 Closing meeting

After completion of the audit evidence collection phase and prior to preparing an audit report, the audit team should hold a meeting with the auditee's management and those responsible for the functions audited. The main purpose of this meeting is to present audit findings to the auditee in such a manner as to obtain their clear understanding and acknowledgement of the factual basis of the audit findings.

Disagreements should be resolved, if possible before the lead auditor issues the report. Final decisions on

the significance and description of the audit findings ultimately rest with the lead auditor, though the auditee or client may still disagree with these findings.

5.4 Audit reports and document retention

5.4.1 Preparation of audit report

The audit report is prepared under the direction of the lead auditor, who is responsible for its accuracy and completeness. The topics to be addressed in the audit report should be those determined in the audit plan. Any changes desired at the time of preparation of the report should be agreed upon by the parties concerned.

5.4.2 Content of audit report

The audit report should be dated and signed by the lead auditor. It should contain the audit findings and/or a summary thereof with reference to supporting evidence. Subject to agreement between the lead auditor and the client, the audit report may also include the following:

- a) the identification of the organization audited and of the client;
- b) the agreed objectives, scope and plan of the audit;
- c) the agreed criteria, including a list of reference documents against which the audit was conducted;
- d) the period covered by the audit and the date(s) the audit was conducted;
- e) the identification of the auditee's representatives participating in the audit;
- f) the identification of the audit-team members;
- g) a statement of the confidential nature of the contents;
- h) the distribution list for the audit report;

- i) a summary of the audit process including any obstacles encountered;
- j) audit conclusions such as:
 - EMS conformance to the EMS audit criteria;
 - whether the system is properly implemented and maintained;
 - whether the internal management review process is able to ensure the continuing suitability and effectiveness of the EMS.

5.4.3 Distribution of audit report

The audit report should be sent to the client by the lead auditor. Distribution of the audit report should be determined by the client in accordance with the audit plan. The auditee should receive a copy of the audit report unless specifically excluded by the client. Additional distribution of the report outside the auditee's organization requires the auditee's permission. Audit reports are the sole property of the client, therefore confidentiality should be respected and appropriately safeguarded by the auditors and all report recipients.

The audit report should be issued within the agreed time period in accordance with the audit plan. If this is not possible, the reasons for the delay should be formally communicated to both the client and the auditee and a revised issue date established.

5.4.4 Document retention

All working documents and draft and final reports pertaining to the audit should be retained by agreement between the client, the lead auditor and the auditee, and in accordance with any applicable requirements.

6 Audit completion

The audit is completed once all the activities defined in the audit plan have been concluded.

*Green fields should be...
what corrective...
as a result of the...*

Annex A **(informative)**

Bibliography

- [1] ISO 14050:—¹⁾, *Environmental management — Terms and definitions*.

¹⁾ To be published.

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Descriptors: environments, environmental protection, systems management, environmental audit, procedure.

Price based on 6 pages

INTERNATIONAL STANDARD

**ISO
14012**

First édition
1996-10-01

Guidelines for environmental auditing — Qualification criteria for environmental auditors

*Lignes directrices pour l'audit environnemental — Critères de qualification
pour les auditeurs environnementaux*

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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.

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 14012 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 2, *Environmental auditing and related environmental investigations*.

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

Introduction

To support the application of environmental management systems and environmental auditing, guidance is needed on qualification criteria for environmental auditors. The aim of this International Standard is to provide such guidance.

Internal auditors need the same set of competencies as external auditors but may not meet in all respects the detailed criteria described in this International Standard, depending upon such factors as

- the size, nature, complexity and environmental impacts of the organization;
- the rate of development of the relevant expertise and experience within the organization.

Guidelines for environmental auditing — Qualification criteria for environmental auditors

1 Scope

This International Standard provides guidance on qualification criteria for environmental auditors and lead auditors and is applicable to both internal and external auditors. Criteria for the selection and composition of audit teams are not included, reference is made to ISO 14011 for information on these subjects.

NOTE — This International Standard has been developed in parallel with the development of International Standards on general principles of environmental auditing (ISO 14010) and on guidelines for auditing of environmental management systems (ISO 14011) specifically. It may require revision, if and when ISO develops detailed guidance on other types of environmental audits.

2 Normative reference

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International standards.

ISO 14001:1996, *Environmental management systems — Specification with guidance for use*.

ISO 14010:1996, *Guidelines for environmental auditing — General principles*.

ISO 14011:1996, *Guidelines for environmental auditing — Audit procedures — Auditing of environmental management systems*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 14010 and ISO 14011 apply, together with the following.

NOTE — Terms and definitions in the field of environmental management are given in ISO 14050.

3.1

environmental auditor

person qualified to perform environmental audits

3.2

lead environmental auditor

person qualified to manage and perform environmental audits

3.3

degree

recognized national or international degree, or equivalent qualification, normally obtained after secondary education, through a minimum of three years formal full-time, or equivalent part-time, study

3.4

secondary education

that part of the national educational system that comes after the primary or elementary stage, but that is completed immediately prior to entrance to a university or similar establishment

4 Education and work experience

Auditors should have completed at least secondary education, or equivalent.

Auditors should have appropriate work experience, which contributes to the development of skills and understanding in some or all of the following:

- a) environmental science and technology;
- b) technical and environmental aspects of facility operations;
- c) relevant requirements of environmental laws, regulations and related documents;
- d) environmental management systems and standards against which audits may be conducted;
- e) audit procedures, processes and techniques.

Auditors who have completed only secondary education or equivalent should have a minimum of five years of appropriate work experience. This criterion may be reduced by satisfactory completion of formal post-secondary full-time or part-time education, the contents of which address some or all of the topics listed in items a) to e). Any reduction should not exceed the total period of such education addressing those topics, and the total reduction should not exceed one year.

Auditors who have obtained a degree should have a minimum of four years appropriate work experience. This criterion may be reduced by satisfactory completion of formal post-secondary full-time or part-time education, the contents of which address some or all of the topics listed in items a) to e). Any reduction should not exceed the total period of such education addressing those topics, and the total reduction should not exceed two years.

5 Auditor training

In addition to the criteria described in clause 4, auditors should have completed both formal training and on-the-job training, to develop competence in carrying out environmental audits. Such training may be provided by the auditor's own organization, or by an external organization.

Competence achieved through training should be demonstrated by suitable means, examples of which are given in annex A.

5.1 Formal training

Formal training should address

- a) environmental science and technology;
- b) technical and environmental aspects of facility operations;

- c) relevant requirements of environmental laws, regulations and related documents;
- d) environmental management systems and standards against which audits may be conducted;
- e) audit procedures, processes and techniques.

The criterion for formal training in some or all of these areas may be waived if competence can be demonstrated through accredited examinations or relevant professional qualifications.

5.2 On-the-job training

An auditor should have completed on-the-job training for a total of twenty equivalent workdays of environmental auditing, and for a minimum of four environmental audits. This should include involvement in the entire audit process under the supervision and guidance of the lead auditor. This on-the-job training should occur within a period of not more than three consecutive years.

6 Objective evidence of education, experience and training

Individuals should keep objective evidence of their education, experience and training.

7 Personal attributes and skills

Auditors should possess personal attributes and skills that include, but are not limited to, the following:

- a) competence in clearly expressing concepts and ideas, orally and in writing;
- b) interpersonal skills conducive to the effective and efficient performance of the audit, such as diplomacy, tact and the ability to listen;
- c) the ability to maintain independence and objectivity sufficient to permit the accomplishment of auditor responsibilities;
- d) skills of personal organization necessary to the effective and efficient performance of the audit;
- e) the ability to reach sound judgements based on objective evidence;
- f) the ability to react with sensitivity to the conventions and culture of the country or region in which the audit is performed.

8 Lead auditor

The lead auditor should be an auditor who shows a thorough understanding and application of those personal attributes and skills necessary to ensure effective and efficient management and leadership of the audit process, and who meets either of the following additional criteria.

Either

- Participation in the entire audit process for a total of fifteen additional equivalent workdays of environmental auditing, for a minimum of three additional complete environmental audits; and
- participation as acting lead auditor, under the supervision and guidance of a lead auditor, for at least one of these three audits.

Or

- Demonstration of those attributes and skills to the audit programme management or others, by means such as interviews, observation, references and/or assessments of environmental auditing performance made under quality assurance programmes.

These additional criteria for the lead auditor should be met within a period of not more than three consecutive years.

9 Maintenance of competence

Auditors should maintain their competence by ensuring the currency of their knowledge of

- a) aspects of relevant environmental science and technology;
- b) appropriate technical and environmental aspects of facility operations;
- c) relevant requirements of environmental laws, regulations and related documents;
- d) environmental management systems and related standards against which audits may be conducted;
- e) audit procedures, processes and techniques.

10 Due professional care

Auditors should exercise due professional care, as addressed in ISO 14010, and adhere to an appropriate code of ethics.

11 Language

No auditor should participate unsupported in an audit when unable to communicate effectively in the language necessary for performing his or her responsibilities. When necessary, support should be obtained from a person with the necessary language skills, who is not subject to pressures that could affect the conduct of the audit.

Annex A

(informative)

Evaluating the qualifications of environmental auditors

A.1 General

This annex provides guidance for evaluating the qualifications of environmental auditors as defined in this International Standard.

A.2 Evaluation process

This International Standard may be implemented by the establishment and operation of an evaluation process. The process may be internal or external to the auditor's audit programme management. Its purpose is to evaluate the qualifications of environmental auditors.

This process should be directed by an individual or individuals having current understanding and experience of auditing operations.

The process for evaluating the environmental auditor may be subject to a quality assurance programme.

A.3 Evaluations of education, work experience, training and personal attributes

There should be evidence to show that environmental auditors have acquired and maintained the necessary education, work experience, training and personal attributes described in this International Standard. The evaluation process should include some of the following methods:

- a) interviews with candidates;
- b) written and/or oral assessment or other suitable means;
- c) review of candidates' written work;
- d) discussions with former employers, colleagues, etc.;
- e) role playing;
- f) peer observation under actual audit conditions;
- g) reviewing records of education, experience and training as defined in this International Standard;
- h) consideration of professional certifications and qualifications.

Annex B **(informative)**

Environmental auditor registration body

B.1 General

This annex contains guidance on the development of a body to ensure a consistent approach to the registration of environmental auditors.

The body may act to register environmental auditors directly or accredit other organisations who in turn register environmental auditors according to the criteria contained in this International Standard.

B.2 Auditor registration

If it is appropriate to establish a body for ensuring that environmental auditors are registered in a consistent manner, such a body should be independent and the following guidelines should apply.

The body should establish an evaluation process consistent with that contained in annex A. The process should be subject to a quality assurance programme.

The body should keep a register of environmental auditors who currently meet the criteria specified in this International Standard.

Annex C **(informative)**

Bibliography

- [1] ISO 14050:—¹⁾, *Environment management — Terms and definitions*.

1) To be published.

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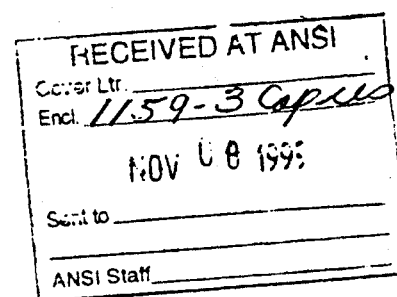
Voting begins on:
1999-11-25

Voting terminates on:
2000-01-25

Environmental management — Life cycle assessment — Life cycle impact assessment

*Management environnemental — Analyse du cycle de vie — Évaluation de
l'impact du cycle de vie*

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ISO/CEN PARALLEL PROCESSING

The CEN Secretary-General has advised the ISO Secretary-General that this final draft International Standard covers a subject of interest to European standardization. Consultation on the ISO/DIS had the same effect for CEN members as a CEN enquiry on a draft European Standard. In accordance with subclause 5.1 of the Vienna Agreement, this final draft, established on the basis of comments received, is hereby submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

Positive votes shall not be accompanied by comments.

Negative votes shall be accompanied by the relevant technical reasons.

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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 14042 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 5, *Life cycle assessment*.

Annex A forms a normative part of this International Standard.

Introduction

Life cycle impact assessment, LCIA, is the third phase of life cycle assessment described in ISO 14040. The purpose of LCIA is to assess a product system's¹⁾ life cycle inventory analysis (LCI) results to better understand their environmental significance. The LCIA phase models selected environmental issues, called impact categories, and uses category indicators²⁾ to condense and explain the LCI results. Category indicators are intended to reflect the aggregate emissions or resource use for each impact category. These category indicators represent the "potential environmental impacts"³⁾ discussed in ISO 14040. In addition, LCIA prepares for the life cycle interpretation phase.

LCIA as part of an overall LCA can, for example, be used to

- identify product system improvement opportunities and assist the prioritization of them,
- characterize or benchmark a product system and its unit processes over time,
- make relative comparisons among product systems based on selected category indicators, or
- indicate environmental issues for which other techniques can provide complementary environmental data and information useful to decision-makers.

While LCIA can assist in these applications, parties should recognize that an extensive assessment of a product system is difficult and may require the use of several different environmental assessment techniques.

¹⁾ In this International Standard, the term "product system" also includes service systems.

²⁾ The full expression for this term is "life cycle impact category indicator".

³⁾ The "potential environmental impacts" referred to in ISO 14040 are a subset of the "environmental impacts" referred to in ISO 14001 due to the use of the functional unit calculation. The "potential environmental impacts" are relative expressions, as they are related to the functional unit of a product system.

Environmental management — Life cycle assessment — Life cycle impact assessment

1 Scope

This International Standard describes and gives guidance on a general framework for the life cycle impact assessment (LCIA) phase of life cycle assessment (LCA), and the key features and inherent limitations of LCIA. It specifies requirements for conducting the LCIA phase and the relationship of LCIA to the other LCA phases.

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 14001:1996, *Environmental management systems — Specification with guidance for use*.

ISO 14040:1997, *Environmental management — Life cycle assessment — Principles and framework*.

ISO 14041:1998, *Environmental management — Life cycle assessment — Goal and scope definition and life cycle inventory analysis*.

ISO 14043:1999, *Environmental management — Life cycle assessment — Life cycle interpretation*.

ISO 14050:1998, *Environmental management — Vocabulary*.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this International Standard, the following terms and definitions given in ISO 14001, ISO 14040, ISO 14041, ISO 14050 and the following apply.

3.1.1

life cycle inventory analysis result

LCI result

outcome of a life cycle inventory analysis that includes the flows crossing the system boundary and provides the starting point for life cycle impact assessment

3.1.2

impact category

class representing environmental issues of concern to which LCI results may be assigned

3.1.3

life cycle impact category indicator

quantifiable representation of an impact category

NOTE The shorter expression "category indicator" is used throughout the text of this International Standard for improved readability.

3.1.4

category endpoint

attribute or aspect of natural environment, human health or resources, identifying an environmental issue of concern

NOTE Figure 2 illustrates this term in further detail.

3.1.5

characterization factor

factor derived from a characterization model which is applied to convert the assigned LCI results to the common unit of the category indicator

NOTE The common unit allows aggregation into category indicator result.

3.1.6

environmental mechanism

system of physical, chemical and biological processes for a given impact category, linking the LCI results to category indicators and to category endpoints

3.2 Abbreviated terms

LCA life cycle assessment

LCI life cycle inventory analysis

LCIA life cycle impact assessment

4 General description of LCIA

4.1 Aim of LCIA

LCIA aims to examine the product system from an environmental perspective using impact categories and category indicators connected with the LCI results. The LCIA phase also provides information for the life cycle interpretation phase.

4.2 Key features of LCIA

Key features of the LCIA are listed below.

- The LCIA phase, in conjunction with other LCA phases, provides a system-wide perspective of environmental and resource issues for one or more product system(s).
- LCIA assigns LCI results to impact categories. For each impact category, the category indicator is selected and the category indicator result, hereafter referred to as indicator result, is calculated. The collection of indicator results, hereafter referred to as the LCIA profile, provides information on the environmental issues associated with the inputs and outputs of the product system.
- LCIA is different from other techniques such as environmental performance evaluation, environmental impact assessment and risk assessment as it is a relative approach based on a functional unit. LCIA may use information gathered by these other techniques.

Clause 8 describes the inherent limitations of LCIA.

4.3 Elements of LCIA

4.3.1 The general framework of the LCIA phase is composed of several mandatory elements that convert LCI results to indicator results. In addition, there are optional elements for normalization, grouping or weighting of the indicator results and data quality analysis techniques. The LCIA phase is only one part of a total LCA study, and shall be coordinated with other phases of LCA as stated in annex A. The elements of the LCIA phase are illustrated in Figure 1.

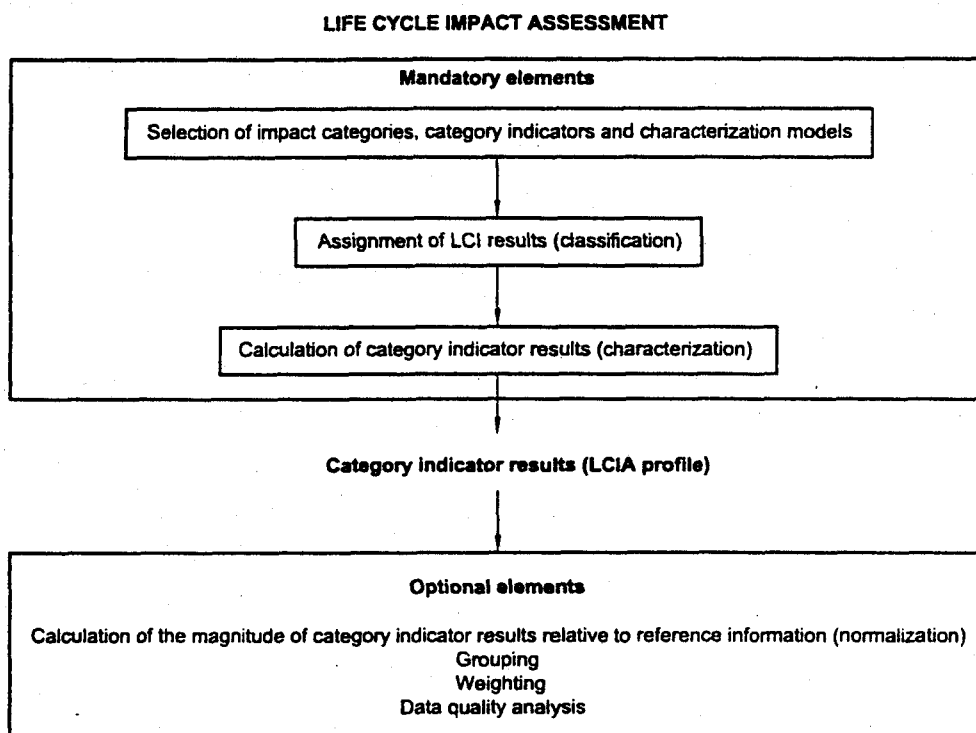


Figure 1 — Elements of the LCIA phase

Separation of the LCIA phase into different elements is necessary for several reasons.

- Each LCIA element is distinct and can be clearly defined.
- The goal and scope definition phase of an LCA study can consider each LCIA element separately.
- A quality assessment of the LCIA methods, assumptions and other decisions can be conducted for each LCIA element.
- LCIA procedures, assumptions and other operations within each element can be made transparent for critical review and reporting.
- The use of values and subjectivity, hereafter referred to as value-choices, within each element, can be made transparent for critical review and reporting.

4.3.2 The mandatory LCIA elements are listed below.

- a) **Selection of impact categories, category indicators and characterization models:** identification of the impact categories, related category indicators and characterization models, category endpoints and the associated LCI results that the LCA study will address. For example, the climate change impact category represents emissions of greenhouse gases (LCI results) using infrared radiative forcing as the category indicator. See also Table 1.
- b) **Assignment of LCI results (classification)** to the impact categories.
- c) **Calculation of category indicator results (characterization).**

The indicator results for different impact categories together represent the LCIA profile for the product system.

Clause 5 describes in more detail the mandatory elements of LCIA mentioned above and in Figure 1, and provides specific requirements.

4.3.3 There are optional elements and information as listed below which can be used depending on the goal and scope of the LCA study.

- a) **Calculating the magnitude of category indicator results relative to reference information (normalization).**
- b) **Grouping:** sorting and possibly ranking of the impact categories.
- c) **Weighting:** converting and possibly aggregating indicator results across impact categories using numerical factors based on value-choices.
- d) **Data quality analysis:** better understanding the reliability of the collection of indicator results, the LCIA profile.

5 Mandatory elements

5.1 General

For the LCIA phase, the outcome of the mandatory elements is the collection of indicator results for the different impact categories.

5.2 Concept of category indicators

Figure 2 illustrates the concept of category indicators based on an environmental mechanism. Every impact category has its own environmental mechanism. The acidification impact category is used in Figure 2 as an example.

Characterization models reflect the environmental mechanism by describing the relationship between the LCI results, category indicators and in some cases category endpoint(s). The characterization model is used to derive the characterization factors. For each impact category, the necessary components include

- identification of the category endpoint(s),
- definition of the category indicator for given category endpoint(s),
- identification of appropriate LCI results that can be assigned to the impact category, taking into account the chosen category indicator and identified category endpoint(s), and
- identification of the characterization model and the characterization factors.

This procedure facilitates the collection, assignment and characterization modelling of appropriate LCI results. This also helps to highlight the scientific and technical validity, assumptions, value-choices and degree of accuracy in the characterization model.

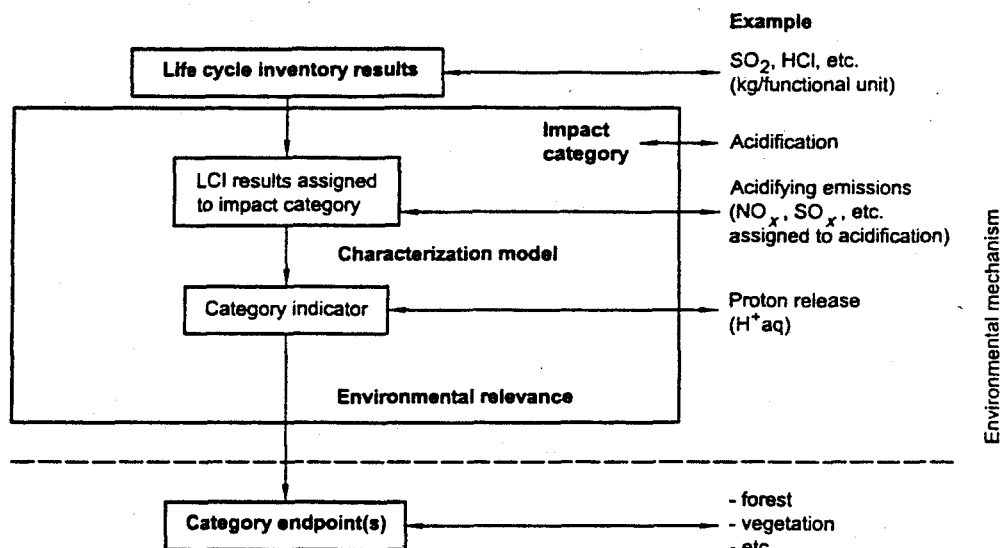


Figure 2 — Concept of category indicators

Table 1 provides examples of terms used in this International Standard. The environmental mechanism is the total of environmental processes related to climate change.

Table 1 — Example of terms

Term	Example
Impact category	Climate change
LCI results	Greenhouse gases
Characterization model	IPCC ^a model
Category indicator	Infrared radiative forcing (W/m ²)
Characterization factor	Global warming potential for each greenhouse gas (kg CO ₂ -equivalents/kg gas)
Indicator result	kg of CO ₂ -equivalents
Category endpoints	Coral reefs, forest, crops
Environmental reference	Degree of linkage between category indicator and category endpoint
NOTE Further examples are provided in ISO/TR 14047 [1].	
^a Intergovernmental Panel on Climate Change.	

5.3 Selection of impact categories, category indicators and characterization models

5.3.1 This subclause provides guidance and requirements for the selection of impact categories, category indicators and characterization models including the criteria for environmental relevance.

For most LCA studies, existing impact categories, category indicators or characterization models will be selected. Whenever impact categories, category indicators and characterization models are selected in an LCA study, the related information shall be referenced. The requirements and recommendations of this subclause apply to the

referenced information. However, in some cases existing impact categories, category indicators or characterization models are not sufficient to fulfil the defined goal and scope of the LCA study, and new ones have to be defined. When new impact categories, category indicators or characterization models are defined, the requirements and recommendations in this subclause also apply.

The category indicator can be chosen anywhere along the environmental mechanism between the LCI results and the category endpoint(s) (see Figure 2).

5.3.2 The following requirements apply for the selection of impact categories, category indicators and characterization models:

- a) the selection of impact categories, category indicators and characterization models shall be consistent with the goal and scope of the LCA study;
- b) the sources for impact categories, category indicators and characterization models shall be referenced;
- c) the selection of impact categories, category indicators and characterization models shall be justified;
- d) accurate and descriptive names shall be provided for the impact categories and category indicators;
- e) the selection of impact categories shall reflect a comprehensive set of environmental issues related to the product system being studied, taking the goal and scope into consideration;
- f) the environmental mechanism and characterization model which relate the LCI results to the category indicator and provide a basis for characterization factors shall be described;
- g) the appropriateness of the characterization model used for deriving the category indicator in the context of the goal and scope of the study shall be described.

5.3.3 In addition, the following recommendations apply for the selection of impact categories, category indicators and characterization models:

- a) the impact categories, category indicators and characterization models should be internationally accepted, i.e. based on an international agreement or approved by a competent international body;
- b) the impact categories should represent the aggregated emissions or resource use of the product system on the category endpoint(s) through the category indicators;
- c) value-choices and assumptions made during the selection of impact categories, category indicators and characterization models should be minimized;
- d) the impact categories, category indicators and characterization models should avoid double counting unless required by the goal and scope definition, for example when the study includes both human health and carcinogenicity;
- e) the characterization model for each category indicator should be scientifically and technically valid, and based upon a distinct identifiable environmental mechanism and/or reproducible empirical observation;
- f) the extent to which the characterization model and the characterization factors are scientifically and technically valid should be identified;
- g) the category indicators should be environmentally relevant.

5.3.4 Depending on the environmental mechanism and the goal and scope, spatial and temporal differentiation of the characterization model relating the LCI results to the category indicator should be considered. The fate and transport of the substances should be part of the characterization model.

LCI results other than mass and energy flow data included in an LCA study, e.g. land use, shall be identified and their relationship to corresponding category indicators shall be determined.

5.3.5 The environmental relevance of the category indicator or characterization model should be clearly stated in terms of the following criteria:

- a) the ability of the category indicator to reflect the consequences of the LCI results on the category endpoint(s), at least qualitatively;
- b) the addition of environmental data or information to the characterization model with respect to the category endpoint(s), including
 - the condition of the category endpoint(s),
 - the relative magnitude of the assessed change in the category endpoints,
 - the spatial aspects, such as area and scale,
 - the temporal aspects, such as duration, residence time, persistence, timing, etc.,
 - the reversibility of the environmental mechanism, and
 - the uncertainty of the linkages between the characterization model and the changes in the category endpoints.

5.4 Assignment of LCI results (classification)

This subclause provides guidance for assignment of LCI results to impact categories (often referred to as classification).

When LCI results are assigned to impact categories, environmental issues associated with the LCI results can be highlighted.

Assignment of LCI results to impact categories should consider the following, unless otherwise required by the goal and scope:

- assignment of LCI results which are exclusive to one impact category;
- identification of LCI results which relate to more than one impact category, including
 - distinction between parallel mechanisms, e.g. SO₂ is allocated between the impact categories of human health and acidification, and
 - allocation among serial mechanisms, e.g. NO_x may be assigned to both ground-level ozone formation and acidification.

If LCI results are unavailable or of insufficient data quality for the LCIA to achieve the goal and scope of the study, either an iterative data collection or an adjustment of the goal and scope is required.

5.5 Calculation of category indicator results (characterization)

This subclause provides guidance and requirements for calculation of indicator results (often referred to as characterization). The calculation involves the conversion of LCI results to common units and the aggregation of the converted results within the impact category. This conversion uses characterization factors. The outcome of the calculation is a numerical indicator result.

The method of calculating indicator results shall be identified and documented, including the value-choices and assumptions used.

The usefulness of the indicator results for a given goal and scope depends on the accuracy, validity and characteristics of the characterization models and characterization factors. The number and kind of simplifying

assumptions and value-choices used in the characterization model for the category indicator also vary between impact categories. A trade-off often exists between characterization model simplicity and accuracy. Variation in the quality of category indicators among impact categories may influence the overall accuracy of the LCA study, for example

- the complexity of the environmental mechanisms between the system boundary and the category endpoint,
- the spatial and temporal characteristics, for example the persistence of a substance in the environment, and
- the dose-response characteristics.

Calculation of indicator results involves two steps:

- a) selection and use of characterization factors to convert the assigned LCI results to common units;
- b) aggregation of the converted LCI results into the indicator result.

One example of a category indicator is infrared radiative forcing. A characterization factor, in this case the global warming potential factor for each greenhouse gas, is used to calculate the converted LCI results for each gas in units of carbon dioxide equivalents. Their contributions are then aggregated into an indicator result in terms of total carbon dioxide equivalents.

Additional data about the environmental condition can enhance the meaning and usability of the indicator results. This issue may also be dealt with in the data quality analysis.

6 Optional elements

6.1 General

This clause describes three optional LCIA elements: normalization, grouping and weighting. These elements may use information from outside the LCIA framework. Such information should be justified and reported. Normalization employs baselines and/or reference information. Grouping and weighting employ value-choices.

6.2 Calculating the magnitude of the category indicator results relative to reference information (normalization)

The aim of the normalization of indicator results is to better understand the relative magnitude for each indicator result of the product system under study. Calculating the magnitude of indicator results relative to reference information (often referred to as normalization) is an optional element which may be helpful in, for example

- checking for inconsistencies,
- providing and communicating information on the relative significance of the indicator results, and
- preparing for additional procedures, such as grouping, weighting or life cycle interpretation.

This procedure transforms an indicator result by dividing it by a selected reference value. Some examples of reference values are

- the total emissions or resource use for a given area, which may be global, regional, national or local,
- the total emissions or resource use for a given area on a *per capita* basis or similar measurement, and
- a baseline scenario, such as a given alternative product system.

The selection of the reference system should consider the consistency of the spatial and temporal scales of the environmental mechanism and the reference value.

The normalization of the indicator results changes the outcome of the mandatory elements of the LCIA phase. It may be desirable to use several reference systems to show the consequence on the outcome of mandatory elements of the LCIA phase. A sensitivity analysis may provide additional information about the choice of reference. The collection of normalized indicator results represents a normalized LCIA profile.

6.3 Grouping

Grouping is assigning impact categories into one or more sets as predefined in the goal and scope definition, and it may involve sorting and/or ranking. Grouping is an optional element with two possible procedures:

- to sort the impact categories on a nominal basis, e.g. by characteristics such as emissions and resources or global regional and local spatial scales;
- to rank the impact categories in a given hierarchy, e.g. high, medium, and low priority.

Ranking is based on value-choices.

The application and use of grouping methods shall be consistent with the goal and scope of the LCA study and it shall be fully transparent.

Different individuals, organizations, and societies may have different preferences, therefore it is possible that different parties will reach different ranking results based on the same indicator results or normalized indicator results.

6.4 Weighting

Weighting is the process of converting indicator results of different impact categories by using numerical factors based on value-choices. It may include aggregation of the weighted indicator results. Weighting is an optional element with two possible procedures:

- to convert the indicator results or normalized results with selected weighting factors;
- to possibly aggregate these converted indicator results or normalized results across impact categories.

Weighting steps are based on value-choices and are not based on natural science.

The application and use of weighting methods shall be consistent with the goal and scope of the LCA study and it shall be fully transparent. Different individuals, organizations and societies may have different preferences, therefore it is possible that different parties will reach different weighting results based on the same indicator results or normalized indicator results. In an LCA study it may be desirable to use several different weighting factors and weighting methods, and to conduct sensitivity analysis to assess the consequences on the LCIA results of different value-choices and weighting methods.

All weighting methods and operations used shall be documented to provide transparency. Data and indicator results or normalized indicator results reached prior to weighting should be made available together with the weighting results. This ensures that

- trade-offs and other information remain available to decision-makers and to others, and
- users can appreciate the full extent and ramifications of the results.

7 Data quality analysis

Additional techniques and information may be needed to better understand the significance, uncertainty and sensitivity of the LCIA results in order to

- help distinguish if significant differences are or are not present,
- remove negligible LCI results, or
- guide the iterative LCIA process.

The need for and choice of techniques depend upon the accuracy and detail needed to fulfil the goal and scope of the LCA study.

The specific techniques and their purposes are described below.

- Gravity analysis (e.g. Pareto analysis) is a statistical procedure which identifies those data having the greatest contribution to the indicator result. These items may then be investigated with increased priority to ensure that sound decisions are made.
- Uncertainty analysis, as defined in ISO 14041, describes the statistical variability in data sets in order to determine if indicator results from the same impact category are significantly different from each other.
- Sensitivity analysis, as defined in ISO 14041, measures the extent to which changes, e.g. in the LCI results, characterization models, etc., influence the indicator results. Likewise, the extent to which modifications in the calculation procedures influence the LCIA profile can be examined.

Due to the iterative procedure of LCA, the result of the data quality analysis may further guide the LCI phase, e.g. refining cut-off criteria or collecting data that may have been excluded. See also annex A.

8 Limitations of LCIA

The LCIA addresses only the environmental issues that are identified in the goal and scope. Therefore, LCIA is not a complete assessment of all environmental issues of the product system under study.

LCIA has inherent limitations.

- LCIA is, wherever possible, a technical and scientific procedure. However, value-choices are used in the selection of impact categories, category indicators and characterization models, and in normalization, grouping, weighting and other procedures.
- LCIA typically excludes spatial, temporal, threshold and dose-response information, and combines emissions or activities over space and/or time. This may diminish the environmental relevance of the indicator result.
- Category indicators may vary in precision among impact categories, due to differences
 - between the characterization model and the corresponding environmental mechanism, e.g. spatial and temporal scales,
 - in the use of simplifying assumptions, and
 - within available scientific knowledge.
- LCIA results do not predict impacts on category endpoints, exceeding of thresholds, safety margins or risks.
- LCIA cannot always demonstrate significant differences among impact categories and the related indicator results of alternative product systems. This may be due to the

- limited development of the characterization models used in characterization, sensitivity analysis and uncertainty analysis for the LCIA phase,
- limitations of the LCI phase, such as setting system boundaries that do not encompass all possible unit processes for a product system or include all inputs and outputs of every unit process, since there are cut-offs and data gaps,
- limitations of the LCI phase, such as insufficient LCI data quality which may for instance be caused by uncertainties or differences in allocation and aggregation procedures, and
- limitations in the collection of inventory data appropriate and representative for each impact category.

9 Comparative assertions disclosed to the public

This clause applies to the LCIA phase which provides support for comparative assertions disclosed to the public. Requirements given are in addition to those in ISO 14040:1997, 5.1.2.4 and clause 7, and ISO 14041:1998, clause 7.

LCIAs which support comparative assertions shall employ a sufficiently comprehensive set of category indicators. The comparison shall be conducted category indicator by category indicator. LCIAs shall not provide the sole basis of comparative assertions of overall environmental superiority or equivalence as additional information may be necessary to overcome some of the limitations stated in clause 8.

Weighting, as described in 6.4, shall not be used for comparative assertions⁴⁾ disclosed to the public.

Category indicators used to support comparative assertions disclosed to the public should be internationally accepted. As a minimum, such category indicators shall be

- scientifically and technically valid, i.e. using a distinct identifiable environmental mechanism and/or reproducible empirical observation, and
- environmentally relevant, i.e. have sufficiently clear links to the category endpoint(s) including, but not limited to, spatial and temporal characteristics.

NOTE For additional information about environmental mechanism and environmental relevance, see clause 5.

An analysis of results for sensitivity and uncertainty shall be conducted for studies aimed at supporting comparative assertions.

10 Reporting and critical review

10.1 General

This clause provides requirements on the reporting and critical review of the LCIA results. These requirements are in addition to those listed in ISO 14040 and ISO 14041.

10.2 Reporting of LCIA

10.2.1 If a third-party report in accordance with ISO 14040:1997, clause 6, is prepared, the report shall include the following items:

⁴⁾ A comparative assertion is an "environmental claim regarding the superiority or equivalence of one product versus a product which performs the same function" [ISO 14040:1997].

- a) the LCIA procedures, calculations and results of the study;
- b) limitations of the LCIA results relative to the defined goal and scope of the LCA study;
- c) the relationship of LCIA results to the defined goal and scope, see annex A;
- d) the relationship of the LCIA to the LCI results, see annex A;
- e) impact categories considered, including a rationale for their selection and a reference to their source;
- f) descriptions of or reference to all characterization models, characterization factors and methods used, including all assumptions and limitations;
- g) descriptions of or reference to all value-choices used in relation to impact categories, characterization models, characterization factors, normalization, grouping, weighting and, elsewhere in the LCIA, a justification for their use and their influence on the results, conclusions and recommendations;
- h) a statement that the LCIA results are relative expressions and do not predict impacts on category endpoints, exceedence of thresholds, safety margins or risks.

10.2.2 When included as a part of the LCA study, the following items shall also be included if a third-party report in accordance with ISO 14040:1997, clause 6, is prepared:

- a) a description and justification of the definition and description of any new impact categories, category indicators or characterization models used for the LCIA;
- b) a statement and justification of any grouping of the impact categories;
- c) any further procedures that transform the indicator results and a justification of the selected references, weighting factors, etc.;
- d) any analysis of the indicator results, for example sensitivity and uncertainty analysis or the use of environmental data, including any implication for the results;
- e) data and indicator results reached prior to any normalization, grouping or weighting shall be made available together with the normalized, grouped or weighted results;

10.2.3 In addition, for comparative assertions disclosed to the public, the report shall include the following items:

- a) an evaluation of the completeness of the LCIA;
- b) a statement as to whether or not international acceptance exists for the selected category indicators and a justification for their use;
- c) a justification for the scientific and technical validity and environmental relevance of the category indicators used in the study;
- d) the results of the uncertainty and sensitivity analyses;
- e) an evaluation of the significance of the differences found;
- f) if grouping is included in the LCA study:
 - the procedures and results used for grouping;
 - a statement that conclusions and recommendations derived from grouping are based on value-choices;
 - a justification of the criteria used for normalization and grouping (these can be personal, organizational or national value-choices);

- the statement that "ISO 14042 does not specify any specific methodology or support the underlying value-choices used to group the impact categories";
- the statement that "The value-choices and judgements within the grouping procedures are the sole responsibilities of the commissioner of the study (e.g. government, community, organization, etc.)".

10.2.4 Where relevant, the items listed in this subclause should also be considered in the elaboration of other kinds of reports where LCIA results are used.

NOTE 1 A graphical presentation of LCIA results as part of the report may be useful, but it should be considered that this invites implicit comparisons and conclusions.

NOTE 2 Due to the inherent complexity of the LCIA phase, the above-mentioned documentation in addition to that required in ISO 14040 may be desired for internal and two-party reports.

10.3 Critical review

The type of critical review performed shall be defined as part of the goal and shall be consistent with ISO 14040:1997, 7.3.

When the LCA study is intended to be used for a comparative assertion disclosed to the public, a critical review shall be conducted as presented in ISO 14040:1997, 7.3.3.

For LCIA, the expertise of reviewers in the scientific disciplines relevant to the important impact categories of the study, in addition to other expertise and interest, shall be considered. The review should include the ability of the classification, characterization, normalization, grouping and weighting elements to support the life cycle interpretation phase of the LCA study.

Annex A **(normative)**

Relationship of life cycle impact assessment to the LCA framework

A.1 General

The LCIA phase shall be carefully planned to achieve the goal and scope of an LCA study. Therefore, the relationship between LCIA and the other phases of LCA shall be clearly understood.

A.2 Relationship to goal and scope definition

The goal and scope definition phase should be reviewed in order to

- identify specific objectives for the LCIA phase of the LCA study,
- identify the environmental issues and concerns to be addressed,
- select the impact categories which address the identified environmental issues and concerns,
- identify the level of detail, scientific and technical validity, and environmental relevance necessary for the impact categories, category indicators and characterization models,
- select a category indicator for each impact category,
- identify other technical requirements and information related to the LCIA phase needed for the LCA study,
- identify the use of value-choices,
- determine the level of aggregation, e.g. spatial, for indicator results from different impact categories,
- determine the data quality analysis needs,
- identify the documentation and transparency requirements for reporting, which increase significantly from screening applications to comparative assertions disclosed to the public,
- define the reference(s) and calculations for each category indicator if transformation of category indicators with reference values is performed, and
- define the set of value-choices used and the procedures by which these are selected and applied if normalization, grouping or weighting are performed.

A.3 Relationship to life cycle inventory analysis

LCI analysis and LCIA are interdependent activities that require coordination. The characteristics of LCIA impact categories, category indicators and characterization models direct the collection of specific LCI data. The following shall be considered as possible omissions and sources of uncertainty:

- whether the quality of the LCI data and results are sufficient to conduct the LCIA in accordance with the study goal and scope definition;

- whether the system boundary and data cut-off decisions have been sufficiently reviewed to ensure the availability of LCI results necessary to calculate indicator results for the LCIA;
- whether the environmental relevance of the LCIA indicator results is decreased due to the LCI functional unit calculation, system wide averaging, aggregation and allocation.

A.4 Relationship to life cycle interpretation

LCIA results feed into the life cycle interpretation phase. The degree of transparency and completeness are also important in view of the iterative nature of the LCA study. As life cycle interpretation should reflect the applications and limitations of the LCA study, it is important to examine

- the selection of impact categories, category indicators and characterization models, assignment of LCI results, and calculation of category indicator results,
- the assumptions and value-choices used,
- the effects of these decisions, assumptions, etc. on the indicator results,
- the need for or the results of sensitivity and uncertainty analyses, their relative contribution to the indicator results for impact categories, environmental data, and information from other environmental techniques,
- whether the LCIA results after quality assessment indicate that any significant differences do or do not exist, and
- whether these significant differences are meaningful to the environment.

Bibliography

- [1] ISO/TR 14047 ⁵⁾, *Environmental management — Life cycle assessment — Examples for the application of ISO 14042.*

5) To be published.

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Environmental management — Life cycle assessment — Life cycle interpretation

*Management environnemental — Analyse du cycle de vie — Interprétation
du cycle de vie*

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ISO/CEN PARALLEL PROCESSING

The CEN Secretary-General has advised the ISO Secretary-General that this final draft International Standard covers a subject of interest to European standardization. Consultation on the ISO/DIS had the same effect for CEN members as a CEN enquiry on a draft European Standard. In accordance with subclause 5.1 of the Vienna Agreement, this final draft, established on the basis of comments received, is hereby submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

Positive votes shall not be accompanied by comments.

Negative votes shall be accompanied by the relevant technical reasons.

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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 14043 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 5, *Life cycle analysis*.

Annex A of this International Standard is for information only.

Introduction

This International Standard on life cycle interpretation describes the final phase of the life cycle assessment (LCA) procedure, in which the results of a life cycle inventory analysis (LCI) and — if conducted — of a life cycle impact assessment (LCIA), or both, are summarized and discussed as a basis for conclusions, recommendations and decision-making in accordance with the goal and scope definition.

An LCA study begins with the goal and scope definition phase and finishes with the interpretation phase.

Life cycle interpretation is a systematic procedure to identify, qualify, check and evaluate information from the results of the LCI and/or LCIA of a product system, and to present them in order to meet the requirements of the application as described in the goal and scope of the study. The practitioner undertaking the LCA study should be in close contact with the commissioner throughout the study in order to ensure that specific questions are addressed. This communication also has to be maintained through the life cycle interpretation phase. Therefore, transparency throughout the life cycle interpretation phase is essential. Where preferences, assumptions or value-choices are involved, these need to be clearly stated by the LCA practitioner in the final report.

LCA is but one of several tools to help in decision-making, irrespective of the application, for example for information purposes (documentation of existing product systems), for improvements (implementation of changes to existing product systems) or for establishment of a new product system.

Life cycle interpretation may also demonstrate links which exist between LCA and other environmental management techniques, by rationalizing and focusing on the results. It is therefore important not only to look backward from application to the life cycle interpretation phase (and the other phases) of the LCA but also forward, e.g. to the concurrent use of other techniques.

Life cycle interpretation includes communication, to give credibility to the results of other LCA phases (namely the LCI and LCIA), in a form that is both comprehensible and useful to the decision-maker.

Whereas decisions based on technical performance, economic or social aspects are outside the LCA study, environmental issues chosen for inclusion as part of the goal and scope definition may reflect such issues.

Environmental management — Life cycle assessment — Life cycle interpretation

1 Scope

This International Standard provides requirements and recommendations for conducting the life cycle interpretation in LCA or LCI studies.

This International Standard does not describe specific methodologies for the life cycle interpretation phase of LCA and LCI studies.

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 14040:1997, *Environmental management — Life cycle assessment — Principles and framework*.

ISO 14041:1998, *Environmental management — Life cycle assessment — Goal and scope definition and inventory analysis*.

ISO 14042:—¹⁾, *Environmental management — Life cycle assessment — Life cycle impact assessment*.

ISO 14050:1998, *Environmental management — Vocabulary*.

3 Terms and abbreviated terms

3.1 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 14040, ISO 14041, ISO 14042 and ISO 14050 and the following apply.

3.1.1

completeness check

process of verifying whether information from the preceding phases of an LCA or an LCI study is sufficient for reaching conclusions in accordance with the goal and scope definition

1) To be published.

3.1.2

consistency check

process of verifying that the assumptions, methods and data are consistently applied throughout the study and in accordance with the goal and scope definition

NOTE The consistency check should be performed before conclusions are reached.

3.1.3

evaluation

(life cycle interpretation) second step within the life cycle interpretation phase to establish confidence in the results of the LCA or LCI study

NOTE Evaluation includes the completeness check, sensitivity check, consistency check, and any other validation that may be required in accordance with the goal and scope definition of the study.

3.1.4

sensitivity check

process of verifying that the information obtained from a sensitivity analysis is relevant for reaching the conclusions and giving recommendations

3.2 Abbreviated terms

LCA life cycle assessment

LCI life cycle inventory analysis

LCIA life cycle impact assessment

4 General description of life cycle interpretation

4.1 Objectives of life cycle interpretation

The objectives of life cycle interpretation are to analyse results, reach conclusions, explain limitations and provide recommendations based on the findings of the preceding phases of the LCA or LCI study and to report the results of the life cycle interpretation in a transparent manner.

Life cycle interpretation is also intended to provide a readily understandable, complete and consistent presentation of the results of an LCA or an LCI study, in accordance with the goal and scope definition of the study.

4.2 Key features of life cycle interpretation

The key features of life cycle interpretation are:

- a) the use of a systematic procedure to identify, qualify, check, evaluate and present the conclusions based on the findings of an LCA or LCI study, in order to meet the requirements of the application as described in the goal and scope of the study;
- b) the use of an iterative procedure both within the interpretation phase and with the other phases of an LCA or an LCI study;
- c) the provision of links between LCA and other techniques for environmental management by emphasizing the strengths and limits of an LCA or an LCI study in relation to its goal and scope definition.

4.3 Elements of life cycle interpretation

The life cycle interpretation phase of an LCA or an LCI study comprises three elements as depicted in Figure 1, as follows:

- identification of the significant issues based on the results of the LCI and LCIA phases of LCA;
- evaluation which considers completeness, sensitivity and consistency checks;
- conclusions, recommendations and reporting.

4.4 Relationship

The relationship of the interpretation phase to other phases of LCA is shown in Figure 1.

The goal and scope definition and interpretation phases of life cycle assessment frame the study, whereas the other phases of LCA (LCI and LCIA) produce information on the product system.

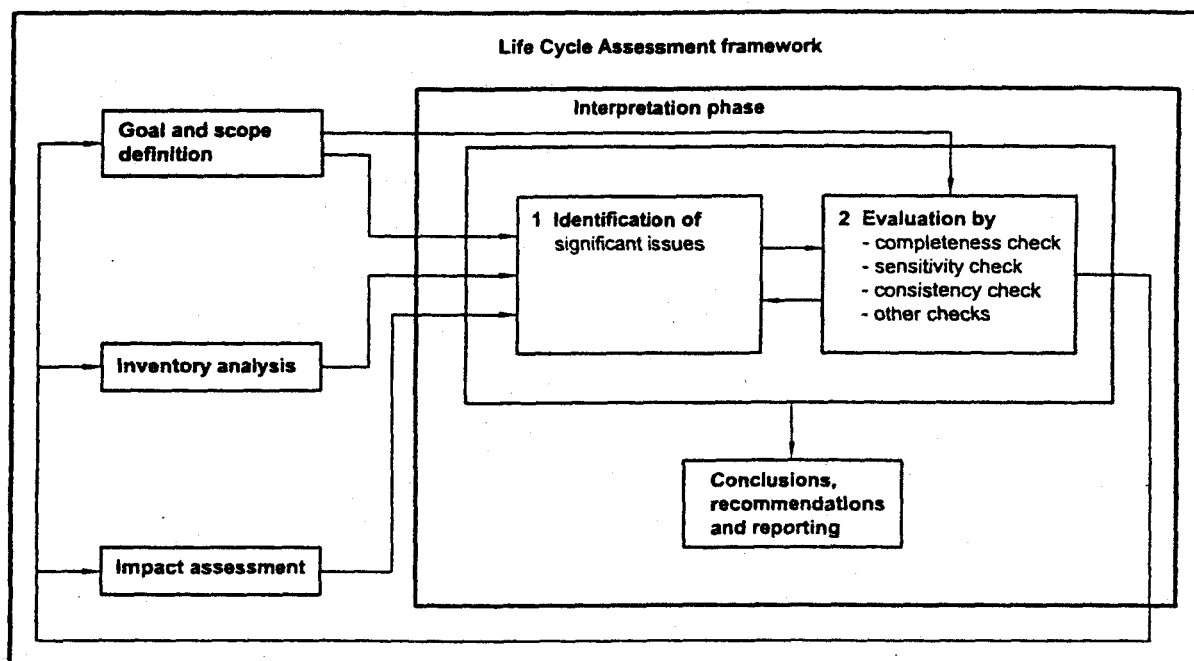


Figure 1 — Relationships of the elements within the interpretation phase with the other phases of LCA

5 Identification of significant issues

5.1 Objective

NOTE See clause A.2 in annex A for examples.

The objective of this element is to structure the results from the LCI or LCIA phases in order to determine the significant issues, in accordance with the goal and scope definition and interactively with the evaluation element. The purpose of this interaction is to include the implications of the methods used, assumptions made, etc. in the preceding phases, such as allocation rules, cut-off decisions, selection of impact categories, category indicators and models, etc.

5.2 Identification and structuring of information

There are four types of information required from the findings of the preceding phases of the LCA or the LCI study:

- a) the findings from the preceding phases (LCI and LCIA), which shall be assembled and structured together with information on data quality. These results should be structured in an appropriate manner, e.g. in accordance with the stages in the life cycle, the different processes or unit operations in the product system, transportation, energy supply and waste management. This may be in the form of data lists, tables, bar diagrams or other appropriate representation of the inputs and outputs and/or category indicators results. Therefore, all relevant results available at the time will be gathered and consolidated for further analysis;
- b) methodological choices, such as allocation rules and product system boundaries from the LCI and category indicators and models used in LCIA;
- c) the value-choices used in the study as found in the goal and scope definition;
- d) the role and responsibilities of the different interested parties as found in the goal and scope definition in relation to the application, and also the results from a concurrent critical review process, if conducted.

5.3 Determining the significant issues

When the results from the preceding phases (LCI, LCIA) have been found to meet the demands of the goal and scope of the study, the significance of these results shall then be determined. The results from both the LCI phase and/or LCIA phase are used for this purpose. This should be done as an iterative process with the evaluation element.

Significant issues can be:

- inventory data categories, such as energy, emissions, waste, etc.;
- impact categories, such as resource use, Global Warming Potential, etc.;
- essential contributions from life cycle stages to LCI or LCIA results, such as individual unit processes or groups of processes like transportation and energy production.

Determining significant issues of a product system can be simple or complex. This International Standard does not provide guidance on why an issue may or may not be relevant in a study, or why an issue may or may not be significant for a product system.

A variety of specific approaches, methods and tools are available to identify environmental issues and to determine their significance.

6 Evaluation

6.1 Objectives and requirements

(See clause A.2 in annex A for examples)

The objectives of the evaluation element are to establish and enhance the confidence in and the reliability of the results of the LCA or the LCI study, including the significant issues identified in the first element of the interpretation. The results should be presented in a manner which gives the commissioner or any other interested party a clear and understandable view of the outcome of the study.

The evaluation shall be undertaken in accordance with the goal and scope of the study, and should take into account the final intended use of the study results.

During the evaluation, the use of the following three techniques shall be considered:

- a) completeness check (see 6.2);
- b) sensitivity check (see 6.3);

- c) consistency check (see 6.4).

The results of uncertainty analysis and assessment of data quality should supplement these checks.

6.2 Completeness check

6.2.1 Objective

The objective of the completeness check is to ensure that all relevant information and data needed for the interpretation are available and complete.

6.2.2 Missing or incomplete information

If any relevant information is missing or incomplete, the necessity of such information for satisfying the goal and scope of the LCA or LCI study shall be considered.

If this information is considered unnecessary, the reason for this should be recorded, after which it is possible to proceed with the evaluation.

If any missing information is considered necessary for determining the significant issues, the preceding phases (LCI, LCIA) should be revisited, or alternatively the goal and scope definition should be adjusted.

This finding and its justification shall be recorded.

6.3 Sensitivity check

6.3.1 Objective

The objective of the sensitivity check is to assess the reliability of the final results and conclusions by determining whether they are affected by uncertainties in the data, allocation methods or calculation of category indicator results, etc.

This assessment shall include the results of the sensitivity analysis and uncertainty analysis, if performed in the preceding phases (LCI, LCIA), and may indicate the need for further sensitivity analysis.

6.3.2 Recommendations for conducting a sensitivity check

The level of detail required in the sensitivity check depends mainly upon the findings of the inventory analysis and, if conducted, the impact assessment.

In a sensitivity check, consideration shall be given to:

- a) the issues predetermined by the goal and scope of the LCA or LCI study;
- b) the results from all other phases of LCA or LCI study and;
- c) expert judgements and previous experiences.

The output of the above sensitivity check determines the need for more extensive and/or precise sensitivity analysis as well as apparent effects on the study results.

The inability of a sensitivity check to find significant differences between different study alternatives does not automatically lead to the conclusion that such differences do not exist. The differences may exist but cannot be identified or quantified due to uncertainties related to the data and methods used.

The lack of any significant differences may be the end result of the study.

When an LCA is used to support a comparative assertion that is disclosed to the public, the evaluation element shall include interpretative statements based on detailed sensitivity analysis.

6.4 Consistency check

6.4.1 Objective

The objective of the consistency check is to determine whether the assumptions, methods and data are consistent with the goal and scope.

6.4.2 Checklist

If relevant to the LCA or LCI study, or required as part of the goal and scope definition, the following questions shall be addressed.

- a) Are differences in data quality along a product system life cycle and between different product systems consistent with the goal and scope of the study?
- b) Have the regional and/or temporal differences, if any, been consistently applied?
- c) Have allocation rules and system boundaries been consistently applied to all product systems?
- d) Have the elements of impact assessment been consistently applied?

7 Conclusions and recommendations

7.1 Objective

The objective of this third element of the life cycle interpretation is to draw conclusions and make recommendations for the intended audience of the LCA or LCI study.

7.2 Conclusions

Drawing conclusions from a study should be done interactively with the other elements in the life cycle interpretation phase. A logical sequence for the process is as follows:

- a) identify the significant issues;
- b) evaluate the methodology and results for completeness, sensitivity and consistency;
- c) draw preliminary conclusions and check that these are consistent with the requirements of the goal and scope of the study, including, in particular, data quality requirements, predefined assumptions and values, and application-oriented requirements;
- d) if the conclusions are consistent, report as full conclusions. Otherwise return to previous steps a), b) or c) as appropriate.

7.3 Recommendations

Whenever appropriate to the goal and scope of the study, specific recommendations to decision-makers should be justified.

Recommendations shall be based on the final conclusions of the study, and shall reflect a logical and reasonable consequence of the conclusions.

Recommendations should relate to the intended application as mentioned in ISO 14040.

8 Reporting

The report shall give a complete and unbiased account of the study, as detailed in ISO 14040. In reporting the interpretation phase, full transparency in terms of value-choices, rationales and expert judgements made shall be strictly observed.

9 Other investigations

9.1 Critical review

The decision on the type of critical review shall be recorded.

NOTE The types of critical review are presented in 7.3 of ISO 14040:1997.

Where the study is used to support a comparative assertion that is disclosed to the public, a critical review shall be conducted as presented in 7.3.3 of ISO 14040:1997.

Annex A (informative)

Examples of Life Cycle Interpretation

A.1 General

This informative annex is intended to provide constructed examples of the elements within the interpretation phase of an LCA or an LCI study, in order to help users understand how Life Cycle Interpretation can be processed.

A.2 Examples for the identification of significant issues

The identification element (see clause 5) is performed in iteration with the evaluation element (see clause 6). It consists of the identification and structuring of information and the subsequent determination of any significant issues. The structuring of the available data and information is an iterative process undertaken in conjunction with the LCI and, if performed, LCIA phases, as well as with the goal and scope definition. This structuring of information may have been completed previously in either the LCI or LCIA, and is intended to provide an overview of the results of these earlier phases. This facilitates the determination of important and environmentally relevant issues, as well as the drawing of conclusions and recommendations. On the basis of this structuring process, any subsequent determination is performed using analytical techniques.

Depending on the goal and scope of the study, different structuring approaches can be useful. Amongst others, the following possible structuring approaches can be recommended for use:

- a) differentiation of individual *life cycle stages*; e.g. production of materials, manufacturing of the studied product, use, recycling and waste treatment (see Table A.1);
- b) differentiation between *groups of processes*, e.g. transportation, energy supply (see Table A.4);
- c) differentiation between processes under different degrees of *management influence*, e.g. own processes, where changes and improvements can be controlled, and processes which are determined by external responsibility, such as national energy policy, supplier specific boundary conditions etc. (see Table A.5);
- d) differentiation between the individual *unit processes*. This is the highest resolution possible.

The output of this structuring process may be presented as a two-dimensional matrix in which, for example, the above-mentioned differentiation criteria form the columns and the inventory inputs and outputs or individual category indicators results form the rows. It may also be possible to undertake this structuring procedure for individual impact categories for a more detailed examination.

The determination of significant issues is based on structured information.

Data on the relevance of individual inventory data categories can be predetermined in the goal and scope definition, or be available from the inventory analysis or from other sources, such as the environmental management system or the environmental policy of the company. Several possible methods exist. Depending on the goal and scope of the study and the level of detail required, the following methods can be recommended for use:

- *contribution analysis*, in which the contribution of life cycle stages (see Tables A.2 and A.8) or groups of processes (see Table A.4) to the total result are examined, by, for example, expressing the contribution as a percent of the total;

- *dominance analysis*, in which, by means of statistical tools or other techniques such as quantitative or qualitative ranking (e.g. ABC Analysis), remarkable or significant contributions are examined (see Table A.3);
- *influence analysis*, in which the possibility of influencing the environmental issues is examined (see Table A.5);
- *anomaly assessment*, in which, based on previous experience, unusual or surprising deviations from expected or normal results are observed. This allows a later check and guides improvement assessments (see Table A.6).

The result of this determination process may also be presented as a matrix, in which the above-mentioned differentiation criteria form the columns, and the inventory inputs and outputs or the category indicator results form the rows.

It is also possible to undertake this procedure for any specific inventory inputs and outputs selected from the goal and scope definition, or for any single impact category, as a possibility for a more detailed examination. Within this process of identification no data is changed or recalculated. The only modification made is the conversion into percentages, etc.

In the following tables, examples are given as to how a structuring process can be performed. The proposed structuring methods are suitable for both LCI and possible LCIA results.

The structuring criteria are based either on the specific requirements of the goal and scope definition or on the findings of the LCI or LCIA.

Table A.1 gives an example of structuring LCI inputs and outputs by groups of unit processes representing various life cycle stages, expressed as percentages in Table A.2.

Table A.1 — Structuring of LCI inputs and outputs to life cycle stages

LCI input/output	Materials production kg	Manufacturing processes kg	Use phases kg	Others kg	Total kg
Hard coal	1 200	25	500	—	1 725
CO ₂	4 500	100	2 000	150	6 750
NO _x	40	10	20	20	90
Phosphate	2,5	25	0,5	—	28
AOX ^a	0,05	0,5	0,01	0,05	0,61
Municipal waste	15	150	2	5	172
Tailings	1 500	—	—	250	1 750

^a AOX = Absorbable Organic Halides.

Analysis of the contributions of the LCI results from Table A.1 identifies the processes or life cycle stages which contribute the most to different inputs and outputs. On this basis, later evaluation can reveal and state the meaning and stability of those findings, which then are the bases for conclusions and recommendations. This evaluation can either be qualitative or quantitative.

Table A.2 — Percentage contribution of LCI inputs and outputs to life cycle stage

LCI input/output	Materials production %	Manufacturing processes %	Use phases %	Others %	Total %
Hard coal	69,6	1,5	28,9	—	100
CO ₂	66,7	1,5	29,6	2,2	100
NO _x	44,5	11,1	22,2	22,2	100
Phosphate	8,9	89,3	1,8	—	100
AOX	8,2	82,0	1,6	8,22	100
Municipal waste	8,7	87,2	1,2	2,9	100
Tailings	85,7	—	—	14,3	100

In addition, these results can be ranked and prioritized, either by individual ranking procedures or by predefined rules from the goal and scope definition. Table A.3 shows the results of such a ranking procedure, using the following ranking criteria:

- A: most important, significant influence, i.e. contribution > 50 %
- B: very important, relevant influence, i.e. 25 % < contribution ≤ 50 %
- C: fairly important, some influence, i.e. 10 % < contribution ≤ 25 %
- D: little important, minor influence, i.e. 2,5 % < contribution ≤ 10 %
- E: not important, negligible influence, i.e. contribution < 2,5 %

Table A.3 — Ranking of LCI inputs and outputs to life cycle stages

LCI input/output	Materials production	Manufacturing processes	Use phases	Others	Total kg
Hard coal	A	E	B	—	1 725
CO ₂	A	E	B	D	6 750
NO _x	B	C	C	C	90
Phosphate	D	A	E	—	28
AOX	D	A	E	D	0,61
Municipal waste	D	A	E	D	172
Tailings	A	—	—	C	1 750

In Table A.4, the same LCI example is used to demonstrate another possible structuring option. This table shows the example of structuring LCI inputs and outputs into different process groups.

Table A.4 — Structuring matrix sorted into process groups

LCI input/output	Energy supply kg	Transport kg	Others kg	Total kg
Hard coal	1 500	75	150	1 725
CO ₂	5 500	1 000	250	6 750
NO _x	65	20	5	90
Phosphate	5	10	13	28
AOX	0,01	—	0,6	0,61
Municipal waste	10	120	42	172
Tailings	1 000	250	500	1 750

The other techniques, such as determining the relative contribution and ranking to selected criteria, follow the same procedure as shown in Tables A.2 and A.3.

Table A.5 shows an example of LCI inputs and outputs ranked as to the degree of influence and structured in groups of unit processes, representing process groups for different LCI inputs and outputs. The degree of influence is indicated here by:

- A: significant control, large improvement possible
- B: small control, some improvement possible
- C: no control

Table A.5 — Ranking of the degree of influence on the LCI inputs and outputs sorted into process groups

LCI input/output	Power grid mix	Site energy supply	Transport	Others	Total kg
Hard coal	C	A	B	B	1 725
CO ₂	C	A	B	A	6 750
NO _x	C	A	B	C	90
Phosphate	C	B	C	A	28
AOX	C	B	—	A	0,61
Municipal waste	C	A	C	A	172
Tailings	C	C	C	C	1 750

Table A.6 shows the example of an LCI result, assessed with respect to anomalies and unexpected results and structured in groups of unit processes, representing process groups for different LCI inputs and outputs. The anomalies and unexpected results are marked by:

- : Unexpected result, i.e. contribution too high or too low
- #: Anomaly, i.e. certain emissions where no emissions are supposed to occur
- : No comment

Anomalies can represent errors in calculations or data transfer. Therefore, they should be considered carefully. Checking of LCI or LCIA results is recommended before making conclusions.

Unexpected results also should be re-examined and checked.

Table A.6 — Marking of anomalies and unexpected results of the LCI inputs and outputs of process groups

LCI input/output	Power grid mix	Site energy supply	Transport	Others	Total kg
Hard coal	○	○	●	○	1 725
CO ₂	○	○	●	○	6 750
NO _x	○	○	○	○	90
Phosphate	○	○	#	○	28
AOX	○	○	○	○	0,61
Municipal waste	○	●	○	●	172
Tailings	○	○	○	○	1 750

The example in Table A.7 demonstrates a possible structuring process on the basis of LCIA results. It shows a category indicator result, Global Warming Potential (GWP), structured in groups of unit processes, representing life cycle stages for different category indicators.

The analysis of the contributions of specific substances to the category indicator result from Table A.7 identifies the processes or life cycle stages with the highest contributions.

Table A.7 — Structuring of a category indicator result (GWP) against life cycle stages

Global Warming Potential (GWP) from	Materials production CO ₂ -equiv.	Manufacturing processes CO ₂ -equiv.	Use phases CO ₂ -equiv.	Others CO ₂ -equiv.	Total GWP CO ₂ -equiv.
CO ₂	500	250	1 800	200	2 750
CO	25	100	150	25	300
CH ₄	750	50	100	150	1 050
N ₂ O	1 500	100	150	50	1 800
CF ₄	1 900	250	—	—	2 150
Others	200	150	120	80	550
Total	4 875	900	2 320	505	8 600

Table A.8 — Structuring of a category indicator result (GWP) against life cycle stages, expressed as a percentage

GWP from	Materials production %	Manufacturing processes %	Use phases %	Others %	Total GWP %
CO ₂	5,8	2	20,9	2,3	31,9
CO	0,3	1,1	1,7	0,3	3,4
CH ₄	8,7	0,6	1,2	1,8	12,3
N ₂ O	17,4	1,2	1,8	0,6	21
CF ₄	22,1	2,9	—	—	25,0
Others	2,4	1,7	1,4	0,9	6,4
Total	56,7	10,4	27	5,9	100

In addition, methodological issues can be considered, by e.g. running different options as scenarios. The influence of e.g. allocations rules and cut-off choices can easily be examined by either showing the results in parallel with those for other assumptions, or determining which emissions really occur.

In the same way, the influence of characterization factors for the LCIA (e.g. GWP 100 vs. GWP 500) or data set choices for normalization and weighting, if applied, can be illustrated by demonstrating the differences in effect of the various assumptions on the result.

In summarizing, the identification is aiming at providing a structured approach for the later evaluation of the study's data, information and findings. Subjects recommended for consideration are, amongst others:

- individual *inventory* data categories: emissions, energy and material resources, waste, etc.;
- individual *processes*, unit processes or groups thereof;
- individual *life cycle stages*;
- individual *category indicators*.

A.3 Examples of the evaluation element

A.3.1 General

The evaluation element and the identification element are procedures which are carried out simultaneously. In an iterative procedure, several issues and tasks are discussed in more detail, in order to determine the reliability and stability of the results from the identification element.

A.3.2 Completeness check

The completeness check attempts to ensure that the full required information and data from all phases have been used and are available for interpretation. In addition, data gaps are identified and the need to complete the data acquisition is evaluated. The identification element is a valuable basis for these considerations. Table A.9 shows an example of the completeness check. Nevertheless completeness can only be an empirical value, ensuring that no major known aspects have been forgotten.

Table A.9 — Summary of a completeness check

Unit process	Option A	Complete?	Action required	Option B	Complete?	Action required
Material production	X	Yes		X	Yes	
Energy supply	X	Yes		X	No	Recalculate
Transport	X	?	Check inventory	X	Yes	
Processing	X	No	Check inventory	X	Yes	
Packaging	X	Yes		—	No	Compare A
Use	X	?	Compare B	X	Yes	
End of life	X	?	Compare B	X	?	Compare A
X: data entry available.						
—: no data entry present.						

Results from Table A.9 reveal that several tasks need to be done. In case of recalculation or rechecking of the original inventory, a feedback loop is required.

For example, in the case concerning a product for which the waste management is not known, a comparison between two possible options may be performed. This comparison may lead to an in-depth study of the waste management phase, or to the conclusion that the difference between the two alternatives is not significant or not relevant for the given goal and scope.

The basis for this survey is to use a checklist which includes the required inventory parameters (such as emissions, energy and material resources, waste, etc.), required life cycle stages and processes, as well as the required category indicators, etc.

A.3.3 Sensitivity check

Sensitivity analysis (sensitivity check) tries to determine the influence of variations in assumptions, methods and data on the results. Mainly, the sensitivity of the most significant issues identified is checked. The procedure of sensitivity analysis is a comparison of the results obtained using certain given assumptions, methods or data with the results obtained using altered assumptions, methods or data.

In sensitivity analysis, typically the influence on the results of varying the assumptions and data by some range, e.g. $\pm 25\%$, is checked. Both results are then compared. Sensitivity can be expressed as the percentage of change or as the absolute deviation of the results. On this basis, significant changes in the results (e.g. larger than 10 %) can be identified.

The performance of sensitivity analysis can also either be required in the goal and scope definition, or be determined during the study based on experience or on assumptions. For the following examples of assumptions, methods or data, sensitivity analysis may be considered valuable:

- rules for allocation;
- cut-off criteria;
- boundary setting and system definition;
- judgements and assumptions concerning data;
- selection of impact category;
- assignment of inventory results (classification);
- calculation of category indicator results (characterization);
- normalized data;
- weighted data;
- weighting method;
- data quality.

Tables A.10, A.11 and A.12 demonstrate how the sensitivity check can be performed on basis of the existing sensitivity analysis results from LCI and LCIA.

Table A.10 — Sensitivity check on allocation rule

Hard coal demand	Option A	Option B	Difference
Allocation by mass, MJ	1 200	800	400
Allocation by economic value, MJ	900	900	0
Deviation, MJ	– 300	+ 100	400
Deviation, %	– 25	+ 12,5	Significant
Sensitivity, %	25	12,5	

The conclusions which can be drawn from Table A.10 are that allocation has a significant influence, and that under the circumstances no real difference exists between Options A and B.

Table A.11 — Sensitivity check on data uncertainty

Hard coal demand	Material production	Manufacturing process	Use phases	Total
Base case	200	250	350	800
Altered assumption	200	150	350	700
Deviation	0	– 100	0	– 100
Deviation, %	0	– 40		– 12,5
Sensitivity, %	0	40	0	12,5

The conclusions which can be drawn from Table A.11 are that significant changes occur, and that variations alter the result. If the uncertainty here has significant influence, a renewed data collection is indicated.

Table A.12 — Sensitivity check on characterization data

GWP data input/effect	Option A	Option B	Difference
Score for GWP = 100 CO ₂ -equiv.	2 800	3 200	400
Score for GWP = 500 CO ₂ -equiv.	3 600	3 400	- 200
Deviation	+ 800	+ 200	600
Deviation, %	+ 28,6	+ 6,25	Significant
Sensitivity, %	28,6	6,25	

The conclusions which can be drawn from Table A.12 are that significant changes occur, that altered assumptions can change or even invert conclusions, and that the difference between Options A and B is smaller than originally expected.

A.3.4 Consistency check

The consistency check attempts to determine whether the assumptions, methods, models and data are consistent either along a product's life cycle or between several options. Inconsistencies are, for example:

- differences in *data sources*, e.g. Option A is based on literature, whereas Option B is based on primary data;
- differences in *data accuracy*, e.g. for Option A a very detailed process tree and process description is available, whereas Option B is described as a cumulated black-box system;
- differences in *technology coverage*, e.g. data for Option A are based on experimental process (e.g. new catalyst with higher process efficiency on a pilot plant level), whereas data for Option B are based on existing large-scale technology;
- differences with *time-related coverage*, e.g. data for Option A describe a recently developed technology, whereas Option B is described by a technology mix, including both recently built and old plants;
- differences in *data age*, e.g. data for Option A are 5-year-old primary data, whereas data for Option B are recently collected;
- differences in *geographical coverage*, e.g. data for Option A describe a representative European technology mix, whereas Option B describes one European Union member country with a high-level environmental protection policy, or one single plant.

Some of these inconsistencies may be accommodated in line with the goal and scope definition. In all other cases, significant differences exist and their validity and influence need to be considered before drawing conclusions and making recommendations.

Table A.13 provides an example of the results of a consistency check for an LCI study.

Table A.13 — Result of a consistency check

Check	Option A		Option B		Compare A and B ?	Action
Data source	Literature	OK	Primary	OK	Consistent	No action
Data accuracy	Good	OK	Weak	Goal and scope not met	Not consistent	Revisit B
Data age	2 years	OK	3 years	OK	Consistent	No action
Technology coverage	State-of-the-art	OK	Pilot plant	OK	Not consistent	Study target = no action
Time-related coverage	Recent	OK	Actual	OK	Consistent	No action
Geographical coverage	Europe	OK	USA	OK	Consistent	No action

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GUIDE 66

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General requirements for bodies operating assessment and certification/registration of environmental management systems (EMS)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

Draft Guides adopted by the responsible Committee or Group are circulated to national bodies for voting. Publication as a Guide requires approval by at least 75 % of the national bodies casting a vote.

ISO/IEC Guide 66 was prepared by the ISO Committee on Conformity Assessment (CASCO).

Introduction

Certification/registration of the environmental management system (EMS) of an organization is one means of providing assurance that the certified/registered organization has implemented a system for the management of the environmental aspects of its activities, products or services in line with the organization's environmental policy.

This Guide specifies requirements, the observance of which is intended to ensure that certification/registration bodies operate third-party certification/registration systems in a consistent and reliable manner, thereby facilitating their acceptance on a national and international basis. This Guide should serve as a foundation for the recognition of relevant national systems in the interests of international trade.

This Guide is intended for use by bodies, however described, which carry out the functions of assessment and certification/registration of EMS. For convenience of drafting, such bodies are referred to as "certification/registration bodies". This wording should not be an obstacle to the use of this Guide by bodies with other designations which undertake activities which it covers. Indeed, this Guide should be usable by any body involved in EMS assessment.

EMS certification/registration involves the assessment of an organization's EMS but does not imply achievement of specific levels of environmental performance of its activities, product(s) or service(s). Evidence of conformity to the appropriate EMS standard or other normative document and any supplementary documentation will be in the form of a certification/registration document or an EMS certificate.

While this Guide is intended for use by bodies concerned with recognizing the competence of certification/registration bodies, many provisions contained herein may be useful in second-party assessment procedures.

General requirements for bodies operating assessment and certification/registration of environmental management systems (EMS)

1 Scope

This Guide specifies general requirements for a third-party body operating EMS certification/registration to meet if it is to be recognized as competent and reliable in the operation of EMS certification/registration.

The requirements contained in this Guide are written, above all, to be considered as general requirements for any body operating certification/registration of EMS.

NOTE In some countries, the bodies which verify conformity of EMS to specified standards are called "certification bodies", in others "registration bodies", in others "assessment and registration bodies" or "certification/registration bodies" and, in still others, "registrars". For ease of understanding, this Guide always refers to such bodies as "certification/registration bodies". This should not be understood to be limiting.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Guide. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Guide 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/IEC Guide 2:1996, *General terms and their definitions concerning standardization and related activities*.

ISO 8400:1994, *Quality management and quality assurance — Vocabulary*.

ISO 10011-1:1990, *Guidelines for auditing quality systems — Part 1: Auditing*.

ISO 14010:1996, *Guidelines for environmental auditing — General principles*.

ISO 14011:1996, *Guidelines for environmental auditing — Audit procedures — Auditing of environmental management systems*.

ISO 14012:1996, *Guidelines for environmental auditing — Qualification criteria for environmental auditors*.

ISO 14050:1998, *Environmental management — Vocabulary*.

3 Definitions

For the purposes of this Guide, the relevant definitions given in ISO/IEC Guide 2, ISO 8402, ISO 14050 and the following definitions apply.

3.1

organization

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.2

certification/registration body

third party that assesses and certifies/registers the EMS of organizations with respect to published EMS standards or other normative documents and any supplementary documentation required under the system

3.3

certification/registration document

document indicating that an organization's EMS conforms to specified EMS standards and any supplementary documentation required under the system

3.4

certification/registration system

system having its own rules of procedure and management for carrying out the assessment leading to the issuance of a certification/registration document and its subsequent maintenance.

4 Requirements for certification/registration bodies

4.1 Certification/registration body

4.1.1 General provisions

4.1.1.1 The policies and procedures under which the certification/registration body operates shall be non-discriminatory, and they shall be administered in a non-discriminatory manner. Procedures shall not be used to impede or inhibit access by applicants other than as specified in this Guide.

4.1.1.2 The certification/registration body shall make its services accessible to all applicants. There shall not be undue financial or other conditions. Access shall not be conditional upon the size of the organization or membership of any association or group, nor shall certification/registration be conditional upon the number of organizations already certified/registered.

4.1.1.3 The criteria against which the EMS of an applicant is assessed shall be those outlined in the EMS standards or other normative documents relevant to the function performed. If an explanation is required as to the application of these documents to a specific certification/registration programme, it shall be formulated by relevant and impartial committees or persons possessing the necessary technical competence, and shall be published by the certification/registration body.

4.1.1.4 The certification/registration body shall confine its requirements, assessment and decision on certification/registration to those matters specifically related to the scope of the certification/registration being considered.

4.1.1.5 The maintenance and evaluation of legal compliance is the responsibility of the organization. The certification/registration body shall restrict itself to checks and samples required in order to establish confidence that the EMS functions in this regard. The certification/registration body shall verify that the organization has evaluated legal and regulatory compliance and can show that action has been taken in cases of non-compliance with relevant legislation and regulations.

4.1.2 Structure

The structure of the certification/registration body shall be such as to give confidence in its certifications/registrations.

In particular, the certification/registration body shall

- a) be impartial;
- b) be responsible for its decisions relating to the granting, maintaining, extending, reducing, suspending and withdrawing of certification/registration;
- c) identify the management (committee, group or person) which will have overall responsibility for all of the following:
 - 1) performance of assessment and certification/registration as defined in this Guide,
 - 2) the formulation of policy matters relating to the operation of the certification/registration body,
 - 3) decisions on certification/registration,
 - 4) supervision of the implementation of its policies,
 - 5) supervision of the finances of the certification/registration body,
 - 6) delegation of authority to committees or individuals, as required, to undertake defined activities on its behalf;
- d) have documents which demonstrate that it is a legal entity;
- e) have a documented structure which safeguards impartiality, including provisions to assure the impartiality of the operations of the certification/registration body; this structure shall enable the participation of all parties significantly concerned in the development of policies and principles regarding the content and functioning of the certification/registration system;
- f) ensure that each decision on certification/registration is taken by a person or persons different from those who carried out the assessment;
- g) have rights and responsibilities relevant to its certification/registration activities;
- h) have adequate arrangements to cover liabilities arising from its operations and/or activities;
- i) have the financial stability and resources required for the operation of a certification/registration system;
- j) employ a sufficient number of personnel having the necessary education, training, technical knowledge and experience for performing certification/registration functions relating to the type, range and volume of work performed under a responsible senior executive;
- k) have a quality system, as outlined in 4.1.4, giving confidence in its ability to operate a certification/registration system for organizations to which it offers certification/registration;
- l) have policies and procedures that distinguish between certification/registration of organizations and any other activities in which the body is engaged;
- m) together with its senior executive and staff, be free from any commercial, financial and other pressures which might influence the results of the certification/registration process;
- n) have formal rules and structures for the appointment and operation of any committees which are involved in the certification/registration process or the development and maintenance of the certification/registration system; such committees shall be free from any commercial, financial and other pressure that might influence decisions (see note 1);
- o) ensure that activities of related bodies do not affect the confidentiality, objectivity or impartiality of its certifications/registrations and shall not offer or provide
 - 1) those services that it certifies/registers others to perform,
 - 2) consulting services to obtain or maintain certification/registration,

- 3) services to design, implement or maintain EMS or related management systems (see note 2);
- p) have policies and procedures for the resolution of complaints, impartial and independent resolution of appeals, and disputes received from organizations or other parties about the handling of certification/registration or any other related matters.

NOTE 1 A structure where members are chosen to provide a balance of interests, where no single interest predominates, will be deemed to satisfy provision n).

NOTE 2 Other products, processes or services may be offered, directly or indirectly, provided they do not compromise the confidentiality, objectivity or impartiality of its certification/registration process and decisions.

4.1.3 Subcontracting

When a certification/registration body decides to subcontract work related to certification/registration (e.g. audits) to an external body or person, a properly documented agreement covering the arrangements, including confidentiality and conflict of interests, shall be drawn up. The certification/registration body shall

- a) take full responsibility for such subcontracted work and maintain its responsibility for granting, maintaining, extending, reducing, suspending or withdrawing certification/registration;
- b) ensure that the subcontracted body or person is competent and complies with the applicable provisions of this Guide and is not involved, either directly or through its employer, with the design, implementation or maintenance of an EMS or related management system(s) in such a way that impartiality could be compromised;
- c) obtain the consent of the applicant or certified/registered organization.

NOTE Requirements a) and b) are also relevant, by extension, when a certification/registration body uses, for granting its own certification/registration, work provided by another certification/registration body with which it has signed an agreement.

4.1.4 Quality system

4.1.4.1 The management of the certification/registration body with executive responsibility for quality shall define and document its policy for quality, including objectives for quality and its commitment to quality. The management shall ensure that this policy is understood, implemented and maintained at all levels of the organization.

4.1.4.2 The certification/registration body shall operate a quality system in accordance with the relevant elements of this Guide and appropriate to the type, range and volume of work performed. This quality system shall be documented and the documentation shall be available for use by the staff of the certification/registration body. The certification/registration body shall ensure effective implementation of the documented quality system procedures and instructions. The certification/registration body shall designate a person with direct access to its highest executive level who, irrespective of other responsibilities, shall have defined authority to

- a) ensure that a quality system is established, implemented and maintained in accordance with this Guide;
- b) report on the performance of the quality system to the management of the certification/registration body for review and as a basis for improvement of the quality system.

4.1.4.3 The quality system shall be documented in a quality manual and associated quality procedures, and the quality manual shall contain or refer to at least the following

- a) a quality policy statement;
- b) a brief description of the legal status of the certification/registration body, including the names of its owners, if applicable, and, if different, the names of the persons who control it;
- c) the names, qualifications, experience and terms of reference of the senior executive and other certification/registration personnel influencing the quality of the certification/registration function;
- d) an organizational chart showing lines of authority, responsibility and allocation of functions stemming from the senior executive and, in particular, the relationship between those responsible for the assessment and those taking decisions regarding certification/registration;

- e) a description of the structure of the certification/registration body, including details of the management (committee, group or person) identified in 4.1.2 c), its constitution, terms of reference and rules of procedure;
- f) the policy and procedures for conducting management reviews;
- g) administrative procedures including document control;
- h) the operational and functional duties and services pertaining to quality, so that the extent and limits of each person's responsibility are known to all concerned;
- i) the policy and procedures for the recruitment and training of certification/registration body personnel (including auditors) and monitoring their performance;
- j) a list of its subcontractors and details of the procedure for assessing, recording and monitoring their competence;
- k) the procedures for handling nonconformities and for assuring the effectiveness of any corrective actions taken;
- l) the policy and procedures for implementing the certification/registration process, including
 - 1) the conditions for issue, retention and withdrawal of certification/registration documents,
 - 2) verifying the use and applicability of documents used in the certification/registration of the EMS,
 - 3) the procedures for assessing and certifying/registering the organization's EMS,
 - 4) the procedures for surveillance and re-assessment of certified/registered organizations;
- m) the policy and procedure for dealing with appeals, complaints and disputes;
- n) the procedures for conducting internal audits based on the provisions of ISO 10011-1.

4.1.5 Conditions for granting, maintaining, extending, reducing, suspending and withdrawing certification/registration

4.1.5.1 The certification/registration body shall specify the conditions for granting, maintaining, reducing and extending certification/registration, and the conditions under which certification/registration may be suspended or withdrawn, partially or in total, for all or part of the organization's scope of certification/registration. In particular, the certification/registration body shall require the organization to notify it promptly of any intended changes to the EMS or other changes which may affect conformity.

4.1.5.2 The certification/registration body shall require the organization to have a documented EMS which conforms to applicable EMS standards or other normative documents.

4.1.5.3 The certification/registration body shall have procedures to

- a) grant, maintain, withdraw and, if applicable, suspend certification/registration;
- b) extend or reduce the scope of certification/registration;
- c) conduct re-assessment in the event of changes significantly affecting the activity and operation of the organization (such as change of ownership, changes in personnel or equipment), or if analysis of a complaint or any other information indicates that the certified/registered organization no longer complies with the requirements of the certification/registration body.

4.1.5.4 The certification/registration body shall have documented procedures which shall be made available on request for

- a) the initial assessment of an organization's EMS, in accordance with the provisions of ISO 14010 and ISO 14011 and other relevant documents;
- b) surveillance and re-assessment of an organization's EMS, in accordance with ISO 14010 and ISO 14011 on a periodic basis for continuing conformity with relevant requirements and for verifying and recording that an organization takes corrective action on a timely basis to correct all nonconformities;

- c) identifying and recording nonconformities and the need for corrective action by organizations on a timely basis for such items as incorrect references to the certification/registration or misleading use of certification/registration information.

4.1.6 Internal audits and management reviews

4.1.6.1 The certification/registration body shall conduct periodic internal audits covering all procedures in a planned and systematic manner, to verify that the quality system is implemented and is effective. The certification/registration body shall ensure that

- a) personnel responsible for the area audited are informed of the outcome of the audit;
- b) corrective action is taken in a timely and appropriate manner;
- c) the results of the audit are recorded.

4.1.6.2 The body's management with executive responsibility shall review its quality system at defined intervals sufficient to ensure its continuing suitability and effectiveness in satisfying the requirements of this Guide and the stated quality policy and objectives. Records of such reviews shall be maintained.

4.1.7 Documentation

4.1.7.1 The certification/registration body shall document, update at regular intervals, and make available (through publications, electronic media or other means), on request, the following:

- a) information about the authority under which the certification/registration body operates;
- b) a documented statement of its certification/registration system including its rules and procedures for granting, maintaining, extending, reducing, suspending and withdrawing certification/registration;
- c) information about the assessment and certification/registration process;
- d) a description of the means by which the certification/registration body obtains financial support, and general information on the fees charged to applicants and certified/registered organizations;
- e) a description of the rights and duties of applicants and certified/registered organizations, including requirements, restrictions or limitations on the use of the certification/registration body's logo and on the ways of referring to the certification/registration granted;
- f) information on procedures for handling complaints, appeals and disputes;
- g) a directory of certified/registered organizations, including their locations, date of certification/registration and the certification/registration number or similar code, and describing the scope of certification/registration granted to each.

4.1.7.2 The certification/registration body shall establish and maintain procedures to control all documents and data that relate to its certification/registration functions. These documents shall be reviewed and approved for adequacy by appropriately authorized and competent personnel prior to issuing any documents following initial development or any subsequent amendment or change being made. A listing of all appropriate documents with the respective issue and/or amendment status identified shall be maintained. The distribution of all such documents shall be controlled to ensure that the appropriate documentation is made available to personnel of the certification/registration body or organization, when required to perform any function relating to the activities of an applicant or certified/registered organization.

4.1.8 Records

4.1.8.1 The certification/registration body shall maintain a record system to suit its particular circumstances and to comply with existing regulations. The records shall demonstrate that the certification/registration procedures have been effectively fulfilled, particularly with respect to application forms, assessment reports, and other documents relating to granting, maintaining, extending, reducing, suspending or withdrawing certification/registration. The records shall be identified, managed and disposed of in such a way as to ensure the integrity of the process and confidentiality of the information. The records shall be kept for a period of time so that continued confidence may be demonstrated for at least one full certification/registration cycle, or as required by law.

4.1.8.2 The certification/registration body shall have a policy and procedures for retaining records for a period consistent with its contractual, legal or other obligations. The certification/registration body shall have a policy and procedures concerning access to these records consistent with 4.1.9.

4.1.9 Confidentiality

4.1.9.1 The certification/registration body shall have adequate arrangements, consistent with applicable laws, to safeguard confidentiality of the information obtained in the course of its certification/registration activities at all levels of its structure, including committees and external bodies or individuals acting on its behalf.

4.1.9.2 Except as required in this Guide, information about a particular organization shall not be disclosed to a third party without the written consent of the organization. Where the law requires information to be disclosed to a third party, the organization shall be informed beforehand of the information provided, as permitted by the law.

4.2 Certification/registration body personnel

4.2.1 General

4.2.1.1 The personnel of the certification/registration body involved in certification/registration shall be competent for the functions they perform.

4.2.1.2 Information on the relevant qualifications, training and experience of each member of the personnel involved in the certification/registration process shall be maintained by the certification/registration body. Records of training and experience shall be kept up-to-date.

4.2.1.3 Clearly documented instructions shall be available to the personnel describing their duties and responsibilities. These instructions shall be maintained up-to-date.

4.2.2 Qualification criteria for auditors and technical experts

4.2.2.1 In order to ensure that assessments are carried out effectively and uniformly, the minimum relevant criteria for competence shall be defined by the certification/registration body.

4.2.2.2 Auditors shall meet the requirements of the appropriate international documentation. For the assessment of an EMS, the relevant guidelines for auditing are those defined in ISO 14010 and ISO 14011, and the relevant criteria for auditors are those defined in ISO 14012.

4.2.2.3 Technical experts are not required to comply with the requirements for auditors covered in ISO 14012. Guidance on their personal attributes may be obtained from ISO 14012:1996, clause 7.

4.2.3 Selection procedure

4.2.3.1 Selection of auditors and technical experts in general

The certification/registration body shall have a procedure for the following:

- a) selecting auditors and, if applicable, technical experts, on the basis of their competence, training, qualifications and experience;
- b) initially assessing the conduct of auditors and technical experts during assessments, and subsequently monitoring the performance of auditors and technical experts.

4.2.3.2 Assignment for a specific assessment

When selecting the audit team to be appointed for a specific assessment, the certification/registration body shall ensure that the skills brought to each assignment are appropriate. The team shall

- a) have appropriate knowledge of the applicable legal regulations, certification/registration procedures and certification/registration requirements;

- b) have a thorough knowledge of the relevant assessment method and assessment documents;
- c) have appropriate technical knowledge of the specific activities for which certification/registration is sought and, where relevant, of associated procedures and their potential to cause environmental impacts (technical experts who are not auditors may fulfil this function);
- d) have a degree of understanding sufficient to make a reliable assessment of the competence of the organization to manage the environmental aspects of its activities, products or services in its scope of certification/registration;
- e) be able to communicate effectively, both in writing and orally, in the required languages;
- f) be free from any interest that might cause team members to act in other than an impartial or non-discriminatory manner. The audit team members shall inform the certification/registration body, prior to the assessment, about any existing, former or envisaged link between themselves or their employer(s) and the organization to be assessed.

4.2.4 Contracting of assessment personnel

The certification/registration body shall require the personnel involved in the assessment to sign a contract or other document by which they commit themselves to comply with the rules defined by the certification/registration body, including those relating to confidentiality and those relating to independence from commercial and other interests, and any prior and/or present link with the organizations to be assessed. The certification/registration body shall ensure that, and document how, any subcontracted assessment personnel satisfy all the requirements for assessment personnel outlined in this Guide.

4.2.5 Assessment personnel records

4.2.5.1 The certification/registration body shall possess and maintain up-to-date records on assessment personnel, consisting of the following:

- a) name and address;
- b) affiliation and position held in the organizational structure;
- c) educational qualifications and professional status;
- d) experience and training in each field of competence of the certification/registration body;
- e) date of most recent updating of records;
- f) performance appraisal.

4.2.5.2 The certification/registration body shall ensure, and verify, that any subcontracted body maintains records, which satisfy the requirements of this Guide, of assessment personnel who are subcontracted to the certification/registration body.

4.2.6 Procedures for audit teams

Audit teams shall be provided with up-to-date assessment instructions and all relevant information on certification/registration arrangements and procedures.

4.3 Changes in the certification/registration requirements

The certification/registration body shall give due notice of any changes it intends to make in its requirements for certification/registration. It shall take account of views expressed by the interested parties before deciding on the precise form and effective date of the changes. Following a decision on, and publication of, the changed requirements, it shall verify that each certified/registered organization carries out any necessary adjustments to its procedures within such time as, in the opinion of the certification/registration body, is reasonable.

4.4 Appeals, complaints and disputes

4.4.1 Appeals, complaints and disputes brought before the certification/registration body by organizations or other parties shall be subject to the procedures of the certification/registration body.

4.4.2 The certification/registration body shall

- a) keep a record of all appeals, complaints and disputes, and remedial actions relative to certification/registration;
- b) take appropriate corrective and preventive action;
- c) document the actions taken and assess their effectiveness.

5 Requirements for certification/registration

5.1 Application for certification/registration

5.1.1 Information on the procedure

5.1.1.1 A detailed description of the assessment and certification/registration procedure, the documents containing the requirements for certification/registration, and documents describing the rights and duties of certified/registered organizations shall be maintained up-to-date as specified in 4.1.7.1 and shall be provided to applicants and certified/registered organizations.

5.1.1.2 The certification/registration body shall require that an organization

- a) always complies with the relevant provisions of the certification/registration programme;
- b) makes all necessary arrangements for the conduct of the assessment, including provision for examining documentation and the access to all areas, records (including internal EMS audit reports) and personnel for the purposes of assessment, surveillance, re-assessment and resolution of complaints;
- c) only claims that it is certified/registered with respect to those activities for which it has been granted certification/registration;
- d) does not use its certification/registration in such a manner as to bring the certification/registration body into disrepute, and does not make any statement regarding its certification/registration which the certification/registration body may consider misleading or unauthorized;
- e) discontinues use of all advertising matter that contains any reference to its certification/registration in cases of suspension or withdrawal of its certification/registration (however determined), and returns any certification/registration documents as required by the certification/registration body;
- f) uses certification/registration only to indicate that the EMS is in conformity with specified standards or other normative documents, and does not use its certification/registration to imply that a product or service is approved by the certification/registration body;
- g) ensures that no certification/registration document, mark or report, or any part thereof, is used in a misleading manner;
- h) complies with the requirements of the certification/registration body when making reference to its certification/registration in communication media such as documents, brochures or advertising.

5.1.1.3 When the desired scope of certification/registration is related to a specific programme, any necessary explanation shall be provided to the applicant.

5.1.1.4 If requested, additional application information shall be provided to the applicant.

5.1.2 The application

5.1.2.1 The certification/registration body shall require an official application form, duly completed and signed by a duly authorized representative of the applicant, in which or attached to which

- a) the scope of the desired certification/registration is defined;
- b) the applicant agrees to comply with the requirements for certification/registration and to supply any information needed for its evaluation.

5.1.2.2 At least the following information shall be provided by the applicant prior to the on-site assessment:

- a) the general features of the applicant, such as corporate entity, name, addresses, legal status and, where relevant, human and technical resources;
- b) general information concerning the EMS and the activities it covers;
- c) a description of the systems to be certified/registered and the standards or other normative documents applicable to each;
- d) a copy of the documentation of the core elements of the EMS.

The information gathered from the application documentation and the review of the EMS documentation may be used for the preparation of the on-site assessment and shall be treated with appropriate confidentiality.

5.2 Preparation for assessment

5.2.1 Before proceeding with the assessment, the certification/registration body shall conduct, and maintain records of, a review of the request for certification/registration to ensure that

- a) the requirements for certification/registration are clearly defined, documented and understood;
- b) any difference in understanding between the certification/registration body and the applicant is resolved;
- c) the certification/registration body has the capability to perform the certification/registration service with respect to the scope of the certification/registration sought, the location of the applicant's operations, and any special requirements such as the language used by the applicant.

5.2.2 The certification/registration body shall prepare a plan for its assessment activities to allow for the necessary arrangements to be made.

5.2.3 The certification/registration body shall nominate a qualified audit team to evaluate all material collected from the applicant and to conduct the audit on its behalf. Experts in the areas to be assessed may be attached to the certification/registration body's team as advisers.

5.2.4 The organization shall be informed of the names of the members of the audit team who will carry out the assessment, with sufficient notice to appeal against the appointment of any particular auditors or experts.

5.2.5 The audit team shall be formally appointed and provided with the appropriate working documents. The plan for and the date of the audit shall be agreed with the organization. The mandate given to the audit team shall be clearly defined and made known to the organization, and shall require the audit team to examine the structure, policies and procedures of the organization, and confirm that these meet all the requirements relevant to the scope of certification/registration, and that the procedures are implemented and are such as to give confidence in the EMS of the organization.

5.3 Assessment

5.3.1 The audit team shall assess the EMS of the organization covered by the defined scope against all applicable certification/registration requirements. The scope of the certification/registration shall refer to specific activity(ies) performed by the organization seeking certification/registration at defined site(s) under clearly identified management.

5.3.2 The audit of an EMS shall be undertaken in two stages as follows.

- a) Stage 1 shall provide a focus for planning the audit by gaining an understanding of the EMS in the context of possible significant environmental aspects of the applicant and of the organization's state of preparedness for audit. This stage shall be based on, but not limited to, document review. The certification/registration body may decide to perform this stage at the applicant's location in order to evaluate better the appropriateness of the EMS in light of

possible significant environmental aspects. This step shall be performed to: plan and allocate resources for further document review where required; provide an opportunity for immediate feedback of information to the client organization; collect necessary information regarding the process and location(s) of the organization; and agree with the organization on the details of the audit (stage 2).

b) Stage 2 shall take place at the location of the organization, and is the audit performed to evaluate the implementation of the organization's EMS.

5.4 Assessment report

5.4.1 The certification/registration body may adopt reporting procedures that suit its needs but, as a minimum, these procedures shall ensure that

- a) a meeting takes place between the audit team and the organization's management prior to leaving the premises, at which the audit team provides a written or oral indication regarding the conformity of the organization's EMS with the particular certification/registration requirements, and provides an opportunity for the organization to ask questions about the findings and their basis;
- b) the audit team provides the certification/registration body with a report of its findings as to the conformity of the organization's EMS with all of the certification/registration requirements;
- c) a report on the outcome of the assessment is promptly brought to the organization's attention by the certification/registration body, identifying any nonconformity to be discharged in order to comply with all of the certification/registration requirements;
- d) the certification/registration body shall invite the organization to comment on the report and to describe the specific actions taken, or planned to be taken within a defined time, to remedy any nonconformity with the certification/registration requirements identified during the assessment, and shall inform the organization of the need for full or partial re-assessment or whether a written declaration to be confirmed during surveillance will be considered adequate;
- e) the report shall contain as a minimum
 - 1) the date(s) of the audit(s),
 - 2) the name(s) of the person(s) responsible for the report,
 - 3) the identification of the entities audited (e.g. names and addresses of facilities and identification of the organizational elements audited),
 - 4) the assessed scope of certification/registration or reference thereto, including reference to the standard or other normative document applied,
 - 5) comments on the conformity of the organization's EMS with the certification/registration requirements, with a clear statement of nonconformity and, where applicable, any useful comparison with the results of previous assessments of the organization,
 - 6) an explanation of any differences from the information presented to the organization at the closing meeting.

5.4.2 If the report authorized by the certification/registration body differs from the report referred to in 5.4.1 c) and e), it shall be submitted to the organization with an explanation of any differences from the previous report.

The report shall take into consideration

- a) the qualification, experience and authority of the staff encountered;
- b) the adequacy of the internal structure and procedures adopted by the applicant body to give confidence in the EMS;
- c) the actions taken to correct identified nonconformities including, where applicable, those identified at previous assessments.

5.5 Decision on certification/registration

5.5.1 The decision whether or not to certify/register an organization's EMS shall be taken by the certification/registration body on the basis of the information gathered during the certification/registration process and any other relevant information. Those who make the certification/registration decision shall not have participated in the audit.

The entity which takes the decision on granting the certificate shall normally not overturn a negative recommendation by the audit team. If such a situation does occur, the basis for this decision shall be documented and justified.

5.5.2 The certification/registration body shall not delegate authority for granting, maintaining, extending, reducing, suspending or withdrawing certification/registration to an outside person or body.

5.5.3 The certification/registration body shall provide to each of its organizations whose EMS is certified/registered, certification/registration documents such as a letter or a certificate signed by an officer who has been assigned such responsibility. These documents shall identify, for the organization and each of its sites covered by the certification/registration, the following:

- a) name and address;
- b) scope of the certification/registration granted, including
 - 1) the EMS standards and/or other normative documents and supplementary documents to which EMS are certified/registered,
 - 2) the organization's activities with respect to the product, process or service categories;
- c) the effective date of certification/registration and the term for which the certification/registration is valid.

5.5.4 Any application for amendment to the scope of a certification/registration that has already been granted shall be processed by the certification/registration body. The certification/registration body shall decide what, if any, assessment procedure is appropriate to determine whether or not the amendment should be granted and shall act accordingly.

5.6 Surveillance and re-assessment procedures

5.6.1 The certification/registration body shall carry out periodic surveillance and re-assessment at sufficiently close intervals to verify that its organizations whose EMS are certified/registered continue to comply with the certification/registration requirements.

NOTE In most cases it is unlikely that a period greater than 1 year for periodic surveillance and 3 years for re-assessment would satisfy the requirements of this clause.

5.6.2 Surveillance and re-assessment procedures shall be consistent with those concerning the assessment of the organization's EMS as described in this Guide.

5.7 Use of certificates and logos

5.7.1 The certification/registration body shall exercise proper control over ownership, use and display of its EMS certification/registration mark and logos.

5.7.2 If the certification/registration body confers the right to use a symbol or logo to indicate certification/registration of an EMS, the organization may use the specified symbol or logo only as authorized in

writing by the certification/registration body. This symbol or logo shall not be used on a product, or in a way that may be interpreted as denoting product conformity.

5.7.3 The certification/registration body shall take suitable action to deal with incorrect references to the certification/registration system or misleading use of certificates and logos found in advertisements, catalogues, etc.

NOTE Such action could include corrective action, withdrawal of certificate, publication of the transgression and, if necessary, other legal action.

5.8 Access to records of communications from external parties to organizations

The certification/registration body shall require each organization whose EMS is certified/registered to make available to the certification/registration body, when requested, the records of all communications and action taken in relation to the requirements of the EMS standards or other normative documents.

Bibliography

- [1] ISO 14001:1996, *Environmental management systems — Specification with guidance for use*.
- [2] ISO/IEC Guide 62:1996, *General requirements for bodies operating assessment and certification/registration of quality systems*.



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International Accreditation Forum, Inc.**IAF Guidance Document****IAF Guidance
on the Application of ISO/IEC
Guide 66****General Requirements for Bodies Operating
Assessment and Certification / Registration of
Environmental Management Systems (EMS)****Issue 2****(FG66_2)**

Accreditation reduces risk for business and its customers by assuring them that accredited bodies are competent to carry out the work they undertake. Accreditation bodies which are members of the International Accreditation Forum, Inc. (IAF) are required to operate at the highest standard and to require the bodies they accredit to comply with appropriate international standards and IAF Guidance to the application of those standards.

Accreditations granted by accreditation body members of the IAF Mutual Recognition Arrangement (MLA), based on regular surveillance to assure the equivalence of their accreditation programmes, allows companies with an accredited conformity assessment certificate in one part of the world to have that certificate recognised everywhere else in the world.

Therefore certificates in the fields of management systems, products, services, personnel and other similar programs of conformity assessment issued by bodies accredited by members of the IAF MLA are relied upon in international trade.

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Issue 2

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0.1. Introduction to IAF Guidance

0.1.1. ISO/IEC Guide 66:1999 is an International Guide which sets out criteria for bodies operating assessment and certification / registration of Environmental Management Systems (EMS). If such bodies are to be accredited in a worldwide harmonised manner as complying with ISO/IEC Guide 66 some Guidance to the Guide is necessary. These guidance notes provide it. One aim is to enable accreditation bodies to harmonise their application of the standards against which they are bound to assess certification bodies. This is an important step towards mutual recognition of accreditation. It is hoped that this Guidance will also be useful to certification bodies themselves and to those organizations whose decisions are guided by their certificates.

0.1.2. For convenience, the headings from ISO/IEC Guide 66 are first printed in bold; Guidance where it is offered is, for ease of reference, identified with the letter "G". The requirements against which conformity is determined are found in ISO/IEC Guide 66. This IAF Guidance does not create further requirements.

0.1.3. This Guidance will form the basis of mutual recognition agreements between accreditation bodies, and is considered necessary for the consistent application of ISO/IEC Guide 66. Members of the IAF Multilateral Agreement (MLA), and applicants for membership in that Agreement, will assess each others' implementation of ISO/IEC Guide 66, and all of this Guidance is expected to be adopted by accreditation bodies as part of their general rules of operation.

0.1.4. The term "shall" is used throughout this document to indicate those provisions which, reflecting the requirements of ISO/IEC Guide 66, are mandatory. The term "should" is used to indicate guidance which, although not mandatory, is provided by IAF as a recognised means of meeting the requirements. Certification/registration bodies whose systems do not follow the IAF Guidance in any respect will only be eligible for accreditation if they can demonstrate to the accreditation body that their solutions meet the relevant clause of ISO/IEC Guide 66 in an equivalent way.

0.1.5. In a number of places the guidance material does not restrict itself to details of what the accreditation body expects of the certification / registration body, but also concerns itself with what is expected of the organization having the EMS to be certified/registered. This is not because there is a direct link between the accreditation body and such organizations, but as a means of setting out the heart of what the accreditation body expects the certification / registration body to be able to do. Only by highlighting some of the responsibilities ISO 14001 places on the organization seeking certification / registration has it been possible to illustrate the steps the accreditation body expects the certification / registration body to take, and, hence, the competencies it must have.

0.1.6. These guidelines are not intended to establish, interpret, subtract from or add to the requirements of any EMS standards to which an organization might seek certification / registration. The requirements for them are in the EMS standard (e.g. ISO 14001). These Guidelines are primarily written for the use of accreditation bodies when accrediting certification / registration bodies to operate in the field of EMS certification / registration. Nevertheless, these Guidelines may be of assistance to organizations seeking certification / registration in so far as they indicate what certification / registration bodies will be looking for when establishing the conformity of their EMS with the standard.

0.1.7. An accreditation body shall at all times maintain its impartiality as required by clause 2.1. of ISO/IEC Guide 61. Nevertheless, it shall be prepared to discuss this guidance and its interpretation with an applicant body, and, where appropriate, to respond to enquiries.

0.1.8. IAF has prepared this document as guidance on the application of ISO/IEC Guide 66. IAF has also published guidance on the application of ISO/IEC Guides 61, 62 and 65.

IAF GUIDANCE ON THE APPLICATION OF ISO/IEC GUIDE 66

General Requirements for Bodies Operating Assessment and Certification/ Registration of Environmental Management Systems (EMS)

1. Scope
2. Normative References
3. Definitions

IAF Guidance to Section 3. (G.3.1.1.)

G.3.1.1. The following definitions apply to the IAF Guidance in this document:

Accredited Certificate: A certificate issued by a certification / registration body in accordance with the conditions of its accreditation and bearing an accreditation mark or statement.

Assessment: All activities related to the certification / registration of an organization to determine whether the organization meets all the requirements of the relevant clauses of the specified standard necessary for granting certification / registration, and whether they are properly implemented, including documentation review, audit, preparation and consideration of the audit report and other relevant activities necessary to provide sufficient information to allow a decision to be made as to whether certification / registration shall be granted.

Logo: A symbol used by a body as a form of identification, usually stylised. A logo may also be a mark.

Mark: A legally registered trade mark or otherwise protected symbol which is issued under the rules of an accreditation body or of a certification / registration body indicating that adequate confidence in the systems operated by a body or that relevant products or individuals conform to the requirements of a specified standard.

Nonconformity: The absence of, or the failure to implement and maintain, one or more environmental management system requirements, or a situation which would, on the basis of objective evidence, raise significant doubt as to the capability of the EMS to achieve the policy and objectives of the organization.

The certification / registration body is free to define different grades of deficiency and areas for improvement (e.g. Major and Minor Nonconformities, Observations etc). However, all deficiencies which equate to the above definition of nonconformity should be dealt with as laid down in guidances G.5.5.4. and G.5.6.1.

Reassessment: Repeat of assessment (see above) taking account of guidance G.5.6.13. (Note: for reassessment the stage 1 and 2 audit can normally be combined into a single visit).

4. Requirements for certification / registration bodies

4.1. Certification / Registration body

4.1.1. General Provisions

IAF Guidance to Clause 4.1.1. (G4.1.1. to G4.1.6.)

G4.1.1. Certification/registration bodies accredited in the field of EMS certification / registration should issue certificates that take into account this Guidance.

G4.1.2. The provision in Clause 4.1.1.1. of ISO/IEC Guide 66 means that certification / registration bodies shall not practice any form of discrimination such as hidden discrimination by speeding up or delaying applications.

G4.1.3. Clause 4.1.1.2.b. of ISO/IEC Guide 66 requires certification / registration bodies to make their services available to all applicants. They may, however, provide a certification / registration service which excludes areas of activity where the certification / registration body is not qualified to certify/register, or has elected not to provide its service to any organization in a particular category.

For example, a certification / registration body may, in so far as the law permits, limit its service to applicants operating in a defined geographic region, or it may limit its service to organizations operating within the technical sector, or a part of a sector, in which the certification / registration body has its accredited scope.

G4.1.4. Where under accreditation, a certification / registration body takes advantage of the provision in Clause 4.1.1.3. of ISO/IEC Guide 66 and certifies/registers an organization against a standard or other normative document other than ISO 14001, that other standard or normative document shall be publicly available.

G4.1.5. The provision "if an explanation is required" in clause 4.1.1.3. of ISO/IEC Guide 66 should be applied by limiting such documents to those recognized by the accreditation body. The term "and any supplementary documentation required under the system" used in clauses 3.2. and 3.3. of ISO/IEC Guide 66 should mean documentation recognized by the accreditation body which provides additional or supplementary guidance as to the application of the relevant standard or Guide. In exceptional cases the certification / registration body itself may issue supplementary documentation, subject to the requirements of clause 4.1.1.3. of ISO/IEC Guide 66.

G.4.1.6. Legal and Regulatory Compliance in Clause 4.1.1.5. of ISO/IEC Guide 66 means

- (a) An organization with a certified/registered EMS has a management system that should achieve continuing compliance with regulatory requirements applicable to the environmental aspects and associated impacts of its activities, products and services. The certification / registration body confirms that a system capable of achieving the required compliance is fully implemented.
- (b) Procedures should be developed by the certification / registration body detailing action to be taken by the certification / registration body in the event that a non-compliance, or indication of a non-compliance, with a relevant regulatory requirement is discovered during the activities of the certification / registration body. These procedures should include a requirement that any non-compliances discovered are communicated (not necessarily in writing) to the organization audited. It is important that the organization is advised of these procedures in advance.
- (c) Certification / registration bodies should be aware that environmental regulatory requirements applicable to an organization may cover the area outside and inside the site boundaries. The regulatory controls may stem from various sources; certification / registration bodies should know which need to be considered.

4.1.2. Structure

IAF Guidance to Clause 4.1.2. (G.4.1.7. to G.4.1.30.)

G.4.1.7. The senior executive, staff and/or personnel mentioned in clause 4.1.2.c) and 4.1.2.m) of ISO/IEC Guide 66 need not necessarily be full-time personnel, but their other employment shall not be such as to compromise their impartiality.

G.4.1.8. Accreditation shall only be granted to a body which is a legal entity as referenced in clause 4.1.2.d) of ISO/IEC Guide 66 and will be confined to declared scopes, activities and locations. If the certification / registration activities are carried out by a legal entity which is part of a larger organization, the links with other parts of the larger organization shall be clearly defined and should demonstrate that no conflict of interest exists as defined in guidance notes G.4.1.21. and G.4.1.23. Relevant information on activities performed by the other parts of the larger organization shall be given by the certification / registration body to the accreditation body.

G.4.1.9. Demonstration that a certification / registration body is a legal entity, as required under clause 4.1.2.d) of ISO/IEC Guide 66, means that if an applicant certification / registration body is a division within a larger legal entity, accreditation shall only be granted in the name of the larger legal entity. In such a situation, relevant functions of the legal entity may be subject to audit by the accreditation body in order to pursue specific audit trails and/or review records relating to the certification / registration body. The part of the legal entity that forms the actual certification / registration body may trade under a distinctive name, which should appear on the accreditation certificate.

G.4.1.10. For the purposes of clause 4.1.2.d) of ISO/IEC Guide 66, certification / registration bodies which are part of government, or are government departments, will be deemed to be legal entities on the basis of their governmental status. Such bodies' status and structure shall be formally documented and the body shall comply with all the requirements of ISO/IEC Guide 66.

G.4.1.11. Impartiality, as required by clause 4.1.2.a) of ISO/IEC Guide 66 can only be safeguarded by a structure, as required by clause 4.1.2.e) of ISO/IEC Guide 66, that enables "the participation of all parties significantly concerned in the development of policies and principles regarding the content and functioning of the certification / registration system".

G.4.1.12. The structure required in clause 4.1.2.e) of ISO/IEC Guide 66 for the safeguarding of impartiality shall be separate from the management established to meet the requirements of clause 4.1.2.c) of ISO/IEC Guide 66, unless the entire management function is performed by a committee or group that is constituted to enable participation of all parties as required in clause 4.1.2.e) of ISO/IEC Guide 66.

G.4.1.13. Clause 4.1.2.e) of ISO/IEC Guide 66 is intended to counteract any tendency on the part of the owners of a certification / registration body to allow commercial or other considerations to prevent the consistent technically objective provision of its service. This is particularly necessary when the finance to set up a certification / registration body has been provided by a particular interest which predominates in the shareholding and/or the board of directors.

G.4.1.14. Clause 4.1.2.e) of ISO/IEC Guide 66 requires that the documented structure of the certification / registration body has built into it provision for the participation of all the significantly concerned parties. This should normally be through some kind of committee. This structure shall be formally established at the highest level within the organization either in the documentation that establishes the certification / registration body's legal status or by some other means that prevents it being changed in a manner that compromises the safeguarding of impartiality. Any change in this structure should take into account advice from the committee, or equivalent, referred to in Clause 4.1.2.e) of ISO/IEC Guide 66.

G.4.1.15. Application of clause 4.1.2.e) of ISO/IEC Guide 66 requires judgement whether all parties significantly concerned in the system are able to participate. What is essential is that all identifiable major interests should be given the opportunity to participate, and that a balance of interests, where no single interest predominates, is achieved. Where one sector (e.g. Government, industry etc) provides more than one individual to represent separate aspects of the sector's interests, the fact that they come from the one sector deems them to constitute a single interest. The members should normally be chosen at least from among representatives of the following groups: government, industry, consumers, NGO's. For practical reasons there may be a need to restrict the number of persons.

G.4.1.16. On request of the committee or equivalent referred to in clause 4.1.2.e) of ISO/IEC Guide 66, the management responsible for the various functions described in clause 4.1.2.c) of ISO/IEC Guide 66 should provide all the necessary information, including the reasons for all significant decisions and actions, and the selection of persons responsible for particular activities, in respect of certification / registration, to the committee or equivalent referred to in clause 4.1.2.e) of ISO/IEC Guide 66, to enable it to ensure proper and impartial certification / registration. If the advice of this committee or equivalent is not respected in any matter by the management, the committee or equivalent shall take appropriate measures, which may include informing the accreditation body.

G.4.1.17. The requirement for financial stability referred to in Clause 4.1.2.i) requires the certification / registration body to demonstrate that it has a reasonable expectation of being able to continue to provide the service in accordance with its contractual obligations. Certification / registration bodies are responsible for providing the accreditation body with sufficient evidence to demonstrate viability, e.g. management reports or minutes, annual reports, financial audit reports, financial plans. Accreditation bodies should not attempt any direct audit of the financial accounts of certification / registration bodies.

G.4.1.18. If the decision to issue or withdraw certification / registration in accordance with clause 4.1.2.n) of ISO/IEC Guide 66 is taken by a committee comprising, among others, representatives from one or more certified organizations, the operational procedures of the certification / registration body should ensure that these representatives do not have a significant influence on decision making. This can e.g. be assured by the distribution of voting rights or some other equivalent means.

G.4.1.19. Application of clause 4.1.2.o) of ISO/IEC Guide 66 requires that if the certification / registration body and an applicant or certified/registered organization are both part of government, they should not report directly to a person or group having operational responsibility for both. The certification / registration body shall, in view of the impartiality requirement, be able to demonstrate how it deals with such a case.

G4.1.20. Clause 4.1.2.o) of ISO/IEC Guide 66 addresses two separate requirements. Firstly, the certification / registration body shall not under any circumstances provide the services identified in sub-paragraphs 1), 2) and 3) of that clause. Secondly, although there is no specific restriction on the services or activities a related body may provide, these shall not affect the confidentiality, objectivity or impartiality of the certification / registration body.

G4.1.21. Consultancy, as referred to in clause 4.1.2.o) of ISO/IEC Guide 66, is considered to be participation in an active creative manner in the development of the EMS to be assessed by, for example:

- (a) preparing or producing manuals, handbooks or procedures;
- (b) participating in the decision making process regarding management system matters;
- (c) giving specific advice towards the development and implementation of management systems for eventual certification / registration.

Note: Management systems as referred to in guidance G4.1.21. include all aspects of such systems, including financial.

G4.1.22. For the purposes of clause 4.1.2.o) of ISO/IEC Guide 66, impartiality and independence of the certification / registration body should be assured at three levels:

- (a) Strategic and policy;
- (b) Decisions on certification / registration;
- (c) Auditing.

The guidance to clause 4.1.2.o) of ISO/IEC Guide 66 is intended to provide for impartiality and independence at all three levels.

G4.1.23. For the purposes of clause 4.1.2.o) of ISO/IEC Guide 66, Certification / registration bodies may carry out the following duties without them being considered as consultancy or necessarily creating a conflict of interests. However, all potential conflicts of interests should be dealt with in accordance with guidance G4.1.28.:

- (a) certification / registration including information meetings, planning meetings, examination of documents, auditing (not internal auditing) and follow up of nonconformities;
- (b) arranging and participating as a lecturer in training courses, provided that where these courses relate to environmental management, related management systems or auditing they should confine themselves to the provision of generic information and advice which is freely available in the public domain, i.e. they should not provide company specific advice which contravenes guidance G4.1.21.c);
- (c) making available or publishing on request information on the basis for the certification / registration body's interpretation of the requirements of the assessment standards;

- (d) activities prior to audit aimed solely at determining readiness for assessment; since the EMS stage 1 audit includes an evaluation of readiness for further assessment activity, certification / registration bodies should exercise extra vigilance to assure that any additional pre-assessment activities do not result in the provision of recommendations or advice that would contravene guidance G4.1.21. The certification / registration body should be able to confirm that such activities do not contravene these provisions and that they are not used to justify a reduction in the eventual assessment duration;
- (e) performing second and third party audits according to other standards or regulations than those being part of the scope of accreditation;
- (f) adding value during assessments and surveillance visits, e.g., by identifying opportunities for improvement, as they become evident, during the audit without recommending specific solutions.

G4.1.24. Consultancy by a related body and certification / registration should never be marketed together and nothing should be stated in marketing material or presentation, written or oral, to give the impression that the two activities are linked. It is the duty of the certification / registration body to ensure that none of its clients is given the impression that the use of both services (certification / registration and consultancy), would bring any business advantage to the client so that the certification / registration remains, and is seen to remain, impartial.

G4.1.25. Nothing should be said by a certification / registration body that would suggest that certification / registration would be simpler, easier or less expensive if any specified consultancy or training services were used.

G4.1.26. A related body is one which is linked to the certification / registration body by common ownership or directors, contractual arrangement, common elements in the name, informal understanding or other means such that the related body has a vested interest in the outcome of an assessment or has a potential ability to influence the outcome of an assessment.

G4.1.27. The certification / registration body should analyse and document the relationship with such related bodies to determine the possibilities for conflict of interest with provision of certification / registration, and identify those bodies and activities that could, if not subject to appropriate controls, affect confidentiality, objectivity or impartiality.

G.4.1.28. Certification / registration bodies shall demonstrate how they manage their certification / registration business and any other activities so as to eliminate actual conflict of interest and minimise any identified risk to impartiality. The demonstration shall cover all potential sources of conflict of interest, whether they arise from within the certification / registration body or from the activities of related bodies. Accreditation bodies will expect certification / registration bodies to open up these processes for audit. This may include, to the extent practicable and justified, pursuit of audit trails to review records of both the certification / registration body and its related body for the activity under consideration. In considering the extent of such audit trails, account should be taken of the certification / registration body's history of impartial certification. If evidence of failure to maintain impartiality is found, there may be a need to extend the audit trail back into the related bodies to provide assurance that control over potential conflicts of interest has been re-established.

G.4.1.29. The requirements of clause 4.1.2.e) and m) and clause 4.2.3.f) of ISO/IEC Guide 66 mean that people who have provided consultancy, including those acting in a managerial capacity, should not be employed to conduct an audit as part of the certification / registration process if they have been involved in any consultancy activities towards the organization in question, or any company related to that organization, within the last two years. Situations such as an employer's involvement or previous involvement with the organization being assessed may present individuals involved in any part of the certification / registration process with a conflict of interest. The certification / registration body has a responsibility to identify and evaluate such situations and to assign responsibilities and tasks so as to ensure that impartiality is not compromised.

G.4.1.30. The policies and procedures referred to in clause 4.1.2.p) of ISO/IEC Guide 66 should ensure that all disputes and complaints are dealt with in a constructive and timely manner. Where operation of such procedures has not resulted in the acceptable resolution of the matter or where the proposed procedure is unacceptable to the complainant or other parties involved, the certification / registration body's procedures shall provide for an appeals process. This appeals procedure should include provision for the following:

- (a) the opportunity for the appellant to formally present its case;
- (b) provision of an independent element or other means to ensure the impartiality of the appeals process;
- (c) provision to the appellant of a written statement of the appeal findings including the reasons for the decisions reached.

The certification / registration body shall ensure that all interested parties are made aware, as and when appropriate, of the existence of the appeals process and the procedures to be followed.

4.1.3. Subcontracting

IAF Guidance to Clause 4.1.3. (G4.1.31. to G4.1.35.)

G4.1.31. For the purposes of clause 4.1.3.b) of ISO/IEC Guide 66, the certification / registration body should require all assessment sub-contractors or external assessors/auditors to give undertakings regarding the marketing of any consultancy services equivalent to those set out in guidance notes G4.1.24. and G4.1.25.

G4.1.32. For the purposes of clause 4.1.3.a) of ISO/IEC Guide 66, the certification / registration body should be responsible for ensuring that neither related bodies, nor sub-contractors, nor external assessors/auditors operate in breach of the undertakings that they have given. It should also be responsible for implementing appropriate corrective action in the event that such a breach is identified.

G4.1.33. A certification / registration body may issue certificates on the basis of an assessment carried out by another body provided that the agreement with the subcontracted body requires it to comply with the all relevant requirements of ISO/IEC Guide 66 and, in particular, the requirements of clause 4.2. of ISO/IEC Guide 66. Assessments carried out by subcontracted bodies shall give the same confidence as assessments carried out by the certification / registration body itself. Evaluation of the audit report and the decision on certification / registration shall be made only by the certification / registration body itself, and not by any other certification / registration body. Where joint assessments are undertaken, each certification / registration body shall satisfy itself that the whole of the assessment has been satisfactorily undertaken by competent assessors/auditors.

G4.1.34. Where a certification / registration body issues certificates in accordance with guidance G4.1.33. it shall have procedures that ensure conformity with all relevant clauses of this document by subcontracted bodies.

G4.1.35. The requirement in clause 4.1.3.c) of ISO/IEC Guide 66 does not mean that the consent of the organisation under assessment is required in case of subcontracting of administrative activities such as typing.

4.1.4. Quality System

IAF Guidance to Clause 4.1.4. (G4.1.36. to G4.1.37.)

G4.1.36. The requirement in Clause 4.1.4.2. for a certification / registration body to designate a person with direct access to its highest executive level does not preclude the chief executive from assuming this role and responsibility for a) and b).

G4.1.37. The description required by clause 4.1.4.3.e) of ISO/IEC Guide 66 should include an indication of which party or parties each person or member of a committee or group is representing.

4.1.5. Conditions for the granting, maintaining, extending, reducing, suspending, and withdrawing of certification / registration

IAF Guidance to Clause 4.1.5. (G.4.1.38. to G.4.1.39.)

G.4.1.38. Certification / registration shall not be granted until there is sufficient evidence to demonstrate that the arrangements for management review and internal audit have been implemented, are effective and will be maintained.

G.4.1.39. The certification / registration body should define the consequences of suspension and of withdrawal. Suspension of certification / registration need not be published by a certification / registration body. However, withdrawal of certification / registration shall result in, as a minimum, an amendment to the directory reference in Clause 4.1.7.1.g) of ISO/IEC Guide 66. But also note the requirements in Clause 5.1.1.2.e) of ISO/IEC Guide 66.

4.1.6. Internal audits and management reviews

IAF Guidance to Clause 4.1.6. (G.4.1.40. to G.4.1.42.)

G.4.1.40. For the purposes of clause 4.1.6. of ISO/IEC Guide 66, the certification / registration body should be independent from the body or bodies (including any individuals) which provide the internal audit of the organization's EMS subject to certification / registration.

G.4.1.41. Clause 4.1.6. of ISO/IEC Guide 66 does not mention a specific period in which at least one complete internal audit of the certification / registration body's quality system and one management review of the certification / registration body's quality system should take place. Complete internal audits followed by management reviews of the certification / registration body's quality system should be carried out at least once each year. The accreditation body may specify a shorter period depending on the degree of conformity with the requirements of ISO/IEC Guide 66 as found in internal audits and reviews as well as in reports to the accreditation body.

G.4.1.42. The records of internal audits and management reviews should be made available to the accreditation body on request.

4.1.7. Documentation

IAF Guidance to Clause 4.1.7. (G.4.1.43.)

G.4.1.43. The description of the means by which the body obtains financial support referred to in clause 4.1.7.1.d) of ISO/IEC Guide 66 should be sufficient to show whether or not the body can retain its impartiality.

4.1.8. Records**4.1.9. Confidentiality**IAF Guidance to Clause 4.1.9. (G4.1.44. to G4.1.45.)

G4.1.44. The requirement as to confidentiality includes anyone who might gain access to information which the certification / registration body should keep confidential. Subcontracted personnel shall be required to keep all such information confidential, particularly from fellow employees and from their other employers.

G4.1.45. The “written consent” mentioned in clause 4.1.9.2. of ISO/IEC Guide 66 only applies to confidential information.

4.2. Certification / registration body personnel**4.2.1. General**IAF Guidance to Clause 4.2.1. (G4.2.1. to G4.2.3.)

G4.2.1. Clause 4.1.2.j) of ISO/IEC Guide 66 means that across the whole of its range of activities the certification / registration body shall be able to conduct assessments using resources under its own control which meet the requirements of ISO 14010, 14011 & 14012.

G4.2.2. The term “resources under its own control” can include individual assessors/auditors who work for the certification / registration body on a contract basis, or other external resources. The certification / registration body shall be in a position to manage, control and be responsible for the performance of all its resources and maintain comprehensive records controlling the suitability of all the staff it uses in particular areas, whether they are employees, employed on contract or provided by external bodies.

G4.2.3. Certification / registration bodies shall have personnel competent to:

- (a) select and verify the competence of assessors/auditors;
- (b) brief assessors/auditors and arrange any necessary training;
- (c) assess applications and conduct contract reviews;
- (d) implement assessment, surveillance and reassessment procedures;
- (e) decide on the granting, maintaining, withdrawing, suspending, extending, or reducing of certifications / registrations;
- (f) set up and operate an appeals, complaints and disputes procedure.

4.2.2. Qualification criteria for auditors and technical experts**4.2.3. Selection procedure****4.2.3.1. Selection of auditors and technical experts in general**IAF Guidance to Clause 4.2.3.1. (G.4.2.4.)

G.4.2.4. Clause 4.2.3.1.b) of ISO/IEC Guide 66 requires the certification / registration body to assess and monitor the conduct and performance of assessors/auditors and technical experts. Such assessment and monitoring should include witnessing the activities of the assessors/auditors and technical experts on-site.

4.2.3.2. Assignment for a specific assessmentIAF Guidance to Clause 4.2.3.2. (G.4.2.5. to G.4.2.6.)

G.4.2.5. It is a condition of accreditation that accredited certificates are not issued until adequate resources can be deployed to conduct audits meeting the requirements of ISO/IEC Guide 66 and of this document. The certification / registration body's procedures shall ensure that staff employed to assess organizations are competent in the field in which they are operating. Staff responsible for managing audits shall be identified and their competencies documented.

G.4.2.6. In certain instances, particularly where there are critical requirements and special procedures, the background knowledge of the audit team may be supplemented by briefing, specific training or technical experts in attendance. The certification / registration body may attach non-auditor experts to their audit teams. If a certification / registration body uses technical experts, its systems shall include details of how technical experts are selected and how their technical knowledge is assured on a continuing basis. The certification / registration body may rely on outside help, for example, from industry or professional institutions.

4.2.4. Contracting of assessment personnel**4.2.5. Assessment personnel records****4.2.6. Procedures for audit teams**IAF Guidance to Clause 4.2.6. (G.4.2.7. to G.4.2.16.)**G.4.2.7. Competence of Personnel – Management Functions****G.4.2.8. General –**

The emphasis in this guidance is placed on the competence of the certification / registration body to direct and manage the certification / registration process. The essential elements of competence required to perform EMS certification / registration are to select, provide and manage those individuals whose collective competence is appropriate to the activities to be audited and the related environmental issues.

G.4.2.9. Competence analysis

- (a) The certification / registration body shall have systems which ensure knowledge of the technological and legal developments relevant to EMS in the technical area(s) in which it operates.
- (b) The certification / registration body should have an effective system for the analysis of the competencies in environmental management which it needs to have available, with respect to all the technical areas in which it operates.
- (c) The certification / registration body should be able to demonstrate that it has performed a competence analysis (assessment of skills in response to evaluated needs) of the requirements of each relevant technical area prior to undertaking the contract review for each client. In particular, the certification / registration body should be able to demonstrate that it has the competence to complete the following activities:
 - identify the typical environmental aspects and associated impacts of the areas of activity of the technical area;
 - define the competencies needed in the certification / registration body to certify/register in relation to the identified technical areas, environmental aspects and associated impacts.

G.4.2.10. Contract review

The certification / registration body should be able to demonstrate that it has the competence to complete the following activities for each organization whose EMS it certifies/registers:

- (a) define the areas of activity of the organization;
- (b) confirm that the typical environmental aspects and associated impacts, arising from the complete range of the organization's activities, correspond to those identified in the guidance above;
- (c) confirm the availability of the required competencies.

Additionally it should have procedures by which it determines the length of time (see Annex 1) needed to cover all the relevant elements of the audit (stages 1 & 2) (see audit methodology below), taking into account, where relevant, the factors below

- (d) the results and reports of internal site and central EMS audits
- (e) the results of management review

- (f) maturity of the management system
- (g) any existing knowledge of the organization
- (h) the size of the organization
- (i) the complexity of the organization
- (j) any shift working
- (k) variations in working practices
- (l) repetitiveness of functions
- (m) variations in activities undertaken
- (n) the significance and extent of the aspects and associated impacts
- (o) potential interaction with sensitive environment(s)
- (p) differing legal requirements
- (q) the views of interested parties.

G.4.2.11. Training and selection of audit teams

The certification / registration body shall have criteria, consistent with ISO 14012, for the training and selection of audit teams that ensure appropriate competent levels of

- (a) understanding of the EMS standard
- (b) understanding of environmental issues
- (c) technical knowledge of the activity to be audited
- (d) knowledge of regulatory requirements relevant to the EMS
- (e) management system audit competencies
- (f) environmental management system knowledge.

G.4.2.12. Management of the decision taking process

The management function shall have the competence and procedures in place to manage the process of decision taking regarding the issuing/withdrawal of EMS certificates.

G.4.2.13. Competence of Personnel - Audit Teams

The following apply to certification assessments and reassessments.

For surveillance activities only those requirements which are relevant to the scheduled surveillance activity apply.

G.4.2.14. The following apply to each member of the audit team:

All members of the audit team should at least be familiar with all of the following:

- (a) the EMS standard
- (b) the concepts of management systems in general
- (c) issues related to various environmental media (such as air, water etc.)
- (d) auditing principles.

G.4.2.15. The following apply to the audit team as a whole:

- (a) In each of the following areas at least one audit team member should satisfy the certification / registration body's criteria for taking responsibility within the team for
 - leading the team and managing the audit process,
 - knowledge of legislative, regulatory and legal requirements in the environmental field,
 - management systems and auditing methods,
 - environmental impacts and aspects, including techniques for their mitigation and control,
 - current technical knowledge of the specific sector;
- (b) the audit team should collectively have experience, training and up to date knowledge of the following
 - techniques to reduce harmful environmental impacts and the application of these techniques in practice
 - performance of analysis of environmental aspects and their associated impacts;
- (c) the audit team should be competent to trace evidence of failures in the organization's EMS back to the appropriate elements of the EMS;
- (d) an audit team may consist of one person provided that the person complies with all the requirements above for an audit team.

G.4.2.16. Use of Technical Experts:

Technical experts with specific knowledge regarding the process and environmental issues and legislation affecting the organization, but who do not satisfy all of the above criteria, may be part of the audit team. Technical experts should not function independently.

4.3. Changes in the certification / registration requirements

4.4. Appeals, complaints and disputes

5. Requirements for certification / registration**5.1. Application for certification / registration****5.1.1. Information on the procedure****5.1.2. The application****5.2. Preparation for assessment**IAF Guidance to Clause 5.2. (G.5.2.1. to G.5.2.2.)

G.5.2.1. *Note:* See guidance on Contract Review G.4.2.10.

G.5.2.2. Guidance for audit stage 1 is included under clause 5.3. Assessment of ISO/IEC Guide 66 below.

5.3. AssessmentIAF Guidance to Clause 5.3. (G.5.3.1. to G.5.3.24.)**G.5.3.1. Scope of Certification / registration**

The intent of the following guidance is to provide sufficient flexibility to allow organizations with differing natures to define the coverage of their EMS certificate in a way which reflects their business needs and differing operational situations. Nevertheless, it is intended that this guidance should preclude an organization omitting elements of its operation which should be properly included in its EMS from the scope of its certification / registration.

G.5.3.2. The following factors should be used to determine the scope of the certificate.

G.5.3.3. In order to qualify for certification / registration of an organization's EMS

(a) Management of the activities covered by the EMS should:

- be able to demonstrate responsibility for all environmental aspects and associated impacts relevant to the EMS;
- have authority to determine how environmental policy is implemented and maintained in terms of setting its own objectives and targets, and programmes to meet them;
- have authority to allocate appropriate financial and human resources to environmental control and improvement. This may be within budgets or other constraints. Additional resources for environmental improvements may require the authority of more senior management.

- (b) The boundaries to the responsibilities for inputs and outputs to and from the organization should be defined.
- (c) Interfaces with services or activities that are not completely within the scope of the EMS (e.g. a common site effluent treatment plant), should nevertheless be addressed within the EMS subject to certification / registration (e.g. they should be included in the identification and evaluation etc. of environmental aspects).
- (d) Additionally, account should be taken of the scope of the organization's environmental licences when determining the coverage of the certification / registration.

G.5.3.4. Activities

The activities subject to certification / registration should be clearly identified.

G.5.3.5. Site

- (a) This is typically defined as:

all land on which the activities under the control of an organization at a given location are carried out, including any connected or associated storage of raw materials, by-products, intermediate products, end products and waste material, and any equipment or infrastructure involved in the activities, whether or not fixed. Alternatively, where required by law, definitions laid down in national or local licensing regimes shall apply.

Other definitions may also be used subject to justification.

- (b) Temporary sites, such as construction sites, are covered under the EMS of the organization which has management control over them irrespective of where the sites are located, and may be subject to assessment on a sample basis as part of the certification / registration process to provide evidence of the operation and effectiveness of the system.
- (c) Where it is not practicable to define a location (e.g. for services), the coverage of the certification / registration should take into account the organization's headquarters activities as well as delivery of its services. Where relevant, in special cases, the certification / registration body may decide that the certification / registration audit will be carried out only where the organization delivers its services. In such cases the interfaces with its headquarters should be audited.

G.5.3.6. Multi-Site

This guidance addresses the situation where an organization has activities under the control of a single environmental management system which operates across a number of geographical locations.

Certificates/registrations can be issued covering multiple sites provided that each site included in the scope of the certificate/registration has been either

- a) individually audited by the certification body or
- b) is included in a sample based approach (see below).

G.5.3.7. Sample based approach

G.5.3.8. Certification / registration bodies wishing to use a sample based approach to the assessment of sites with similar activities need to maintain procedures which include the full range of issues below in the building of their sampling programme.

G.5.3.9. Prior to undertaking its first assessment based on sampling the certification / registration body shall provide to the accreditation body the methodology and procedures which it employs and provide demonstrable evidence of how these take account of the issues below to manage multi-site assessment.

G.5.3.10. The certification / registration body's procedures should ensure that the initial contract review identifies, to the greatest extent possible, the difference between sites such that an adequate level of sampling is determined in accordance with provisions c) to e) of G.5.3.13.

G.5.3.11. In the event that application of the certification / registration body's procedure results in a smaller sample than would result from the application of the guidance set out below, the certification / registration body shall record the reasons justifying this and demonstrate that it is operating in accordance with its approved procedure.

G.5.3.12. The minimum number of sites to be visited per audit is:

Initial audit: the size of the sample should be the square root of the number of remote sites ($y=\sqrt{x}$), rounded to the upper whole number.

Surveillance visit: the size of the annual sample should be the square root of the number of remote sites with 0.6 as a coefficient ($y=0.6\sqrt{x}$), rounded to the upper whole number.

Reassessment: the size of the sample should be the same as for an initial audit. Nevertheless, where the EMS has proved to be effective over a period of three years, the size of the sample could be reduced by a factor 0.8, i.e.: ($y=0.8\sqrt{x}$) rounded to the upper whole number.

G.5.3.13. Where an organization has a number of sites with similar activities covered by a single EMS, a certificate may be issued to the organization to cover all such sites provided that:

- (a) all sites are operating under the same EMS, which is centrally administered and audited and subject to central management review, and

- (b) all sites have been audited in accordance with the internal audit procedure(s), and
- (c) a representative sample of sites have been audited by the certification / registration body, taking into account the factors below
 - the results and reports of internal site and central EMS audits
 - the results of management review
 - maturity of the management system
 - any existing knowledge of the organization
 - variations in the size of the sites
 - complexity of the EMS
 - complexity of the sites
 - any shift working
 - variations in working practices
 - repetitiveness of functions
 - variations in activities undertaken
 - the spread of the organization's personnel over the sites
 - the significance and extent of the aspects and associated impacts
 - potential interaction with sensitive environment
 - differing legal requirements
 - the views of interested parties, and
- (d) the sample should be partly selective, based on c), above and partly non-selective and should result in a range of different sites being selected, without excluding the random element of site selection, and
- (e) the surveillance programme should include visits to the organization's head office, be designed in the light of the above factors and should, within a reasonable time, cover all the sites of the organization in accordance with the certification / registration body's sampling method, and
- (f) in the case of a nonconformity being observed either at the head office, or at a single site, of an organization with an EMS certificate/registration covering multiple sites, the corrective action procedure should apply to all applicable sites covered by the certificate/registration.

- (g) The Audit (stage 1) described in guidance G.5.3.17. below should address the organization's head office activities to ensure that a single EMS applies across all sites and delivers central management at the operational level. The audit (stage 1) should address all the issues outlined in a) to f) above.

G.5.3.14. Audit Methodology

G.5.3.15. A certification / registration body should perform the stage 1 audit of an organization's EMS at the organization's site, unless it can justify an alternative approach. Adaptation of the certification / registration process to the needs of very small organizations may provide justification in particular circumstances. However, in all cases the assessment shall meet the requirements below for audit stage 1 and 2.

G.5.3.16. The key objectives of each stage of the audit, together with the minimum coverage, are described below.

G.5.3.17. Audit (stage 1) (Note: see IAF guidance notes on Consultancy - G.4.1.7. to G.4.1.30.above).

- (a) The Certification / registration body needs to establish, by review of the available evidence, that the requirements of the standard are met. However, evidence may take many forms and some cases need not be 'documented'. This does not alter the need to respect the requirements for documentation contained in the standard.
- (b) The objectives of the audit (stage 1) are to provide a focus for planning the audit (stage 2) by gaining an understanding of the EMS in the context of the organization's environmental aspects and associated impacts, policy and objectives, and, in particular, of the organization's state of preparedness for audit, by reviewing the extent to which:
 - the EMS includes an adequate process for identification of the organization's environmental aspects and subsequent determination of their significance;
 - for the relevant activities of the organization, environmental licences are in place;
 - the EMS is designed to achieve the organization's environmental policy;
 - the EMS implementation programme justifies proceeding to the audit (stage 2);
 - the internal audit conforms to the requirements of the EMS standard;
 - management reviews are being conducted and cover the continuing suitability, adequacy and effectiveness of the EMS;
 - the EMS documents and responds to relevant communication from external interested parties;

- additional documentation has to be reviewed and/or what knowledge has to be obtained in advance.
- (c) The certification / registration body and the organization shall agree when and where the document review is conducted. In every case the document review should be completed prior to the commencement of audit (stage 2).
- (d) The certification / registration body should obtain, at least, the following information:
- EMS documentation including procedures, (and, preferably, a cross reference list linking the documentation to the related requirements of the standard);
 - a description of the organization and its on-site processes;
 - an indication of environmental aspects and their associated impacts and the determination of significant environmental aspects;
 - the means by which the concept of continual improvement is realised;
 - an overview of the applicable regulations (including licences/permits), and any agreements with Authorities;
 - internal audit programmes and reports.
- (e) The certification / registration body should make the organization aware that the following additional information may be needed for the audit (stage 1) and may be required for detailed inspection during the audit (stage 2):
- licence/permit requirements;
 - records (including any records of incidents, breaches of regulation or legislation and relevant correspondence with Authorities) on which the organization based its assessment of compliance with regulatory requirements;
 - details of any internally identified nonconformities together with details of relevant corrective and preventive action taken in the previous 12 months (or since commencement of the EMS implementation if this is less than 12 months);
 - records of management reviews;
 - records of any EMS related communications received and any actions taken in response to them.
- (f) When the audit (stage 1), including document review, is not conducted by a single person the certification / registration body should be able to demonstrate how the activities of the various team members are co-ordinated.

G.5.3.18. Audit (stage 2)

- (a) On the basis of findings of the audit (stage 1) the certification / registration body shall draft an audit plan for the conduct of the audit (stage 2).
- (b) The objectives of the audit (stage 2) are:
- to confirm that the organization adheres to its own policies, objectives and procedures;
 - to confirm that the EMS conforms with all the requirements of the EMS standard and is achieving the organization's policy objectives.
- (c) To do this, the audit (stage 2) should address the implementation of all elements of the standard (except those fully and successfully audited in stage 1) and in particular focus on the organization's
- identification of environmental aspects and subsequent determination of their significance;
 - procedures to ensure compliance with legal and other requirements;
 - objectives and targets derived from the evaluation process;
 - operational control;
 - performance monitoring, measuring, reporting and reviewing against the objectives and targets;
 - identification and evaluation of nonconformities and completion of corrective/preventive actions;
 - internal auditing and management review ;
 - management responsibility for the environmental policy;
 - links between policy, environmental aspects and their associated environmental impacts, objectives and targets, responsibilities, programmes, procedures, performance data, internal audit and review.

G.5.3.19. Specific elements of the certification / registration body's audit**G.5.3.20. Assessment of the Internal Audit**

- (a) The extent of the audit (stage 2) may be influenced by the degree to which reliance can be placed on the organization's internal audit. At the audit (stage 1) the certification / registration body should determine, through detailed analysis, the reliance it can place on the results of the internal audit. Records of the internal audits should be sufficiently comprehensive to provide data that can be validated by the certification / registration body to confirm the effectiveness of the audit process. The certification / registration body should be able to demonstrate to the accreditation body the basis for determining the extent of its own audit (stage 2).

- (b) It should do this, in particular, by seeking objective evidence of:
- competence, experience, training and independence of auditors (e.g. including any reference to ISO 14012 and/or to programmes for the registration of audit personnel);
 - auditing procedure and methodology, in particular the extent of the audit (e.g. including any reference to ISO 14011);
 - references and standards (e.g. ISO 10011 and ISO 14010, 14011 & 14012);
 - resources available for the audit;
 - organization of the audit (e.g. including any reference to ISO 14010 & 14011);
 - checks and verifications performed;
 - audit findings, including reports and records;
 - management of audit follow-up;
 - timeliness and effectiveness of corrective action.
- (c) Internal audit programmes should take into account the environmental importance of the various components of the organization's activities.
- (d) The certification / registration body should confirm, on a sample basis, the overall reliability of the internal audit.

G.5.3.21. Recording and evaluation of environmental aspects and control of those deemed to be significant

- (a) In order to provide confidence that organizations are consistent in establishing and maintaining procedures for the identification, examination and evaluation of environmental aspects and their associated impacts, certification / registration bodies' procedures should reflect the following factors:
- it is for the organization to define the criteria by which environmental aspects and their associated impacts are identified as significant, and to develop (a) procedure(s) for doing this;
 - it is for the certification / registration body to assess that the procedure(s) by which the organization determines which environmental aspects and their associated impacts are significant is sound and adhered to;
 - the certification / registration body should identify to the organization for its action any inconsistencies between the organization's policy, objectives and targets and its procedure(s) or the results of their application.

- (b) The certification / registration body should establish whether the procedures employed in the analysis of significance are sound and properly implemented. It shall verify that an environmental aspect or associated impact which is identified as being significant is managed within the system. Depending on the situation, this may entail assessment of combinations of the following:
- investigation and development of opportunities for further improvement;
 - programmes for planned improvement;
 - controls to maintain performance.
- (c) Significant environmental aspects and their associated impacts are not necessarily confined to a single geographical location. They may also include other aspects of an organization's activities, products or services that it can control and over which it can be expected to have an influence. In particular, these may include any activities of suppliers, customers or related organizations which create additional environmental aspects for the organization.

G.5.3.22. Recording and evaluation of continual improvement and prevention of pollution

In order to provide confidence that organizations have in place processes for achieving continual improvement and prevention of pollution, certification / registration bodies' procedures should reflect the following factors:

- (a) it is for the organization to define the means by which its policy commitment to continual improvement and prevention of pollution is achieved, and to develop (a) process(es) for doing this and for measuring progress in this regard;
- (b) it is for the certification / registration body to assess that the organization's processes are sound and adhered to;
- (c) the certification / registration body should identify to the organization for its action any inconsistencies between the organization's policy, objectives and targets and its processes or the result of their application.

G.5.3.23. EMS Documentation

The documentation required by the EMS standard should describe the EMS and make clear the relationship to any other related management system in operation in the organization or having an influence on the EMS subject to certification. It is acceptable to combine the documentation for environmental and other management systems (such as for quality or health and safety) as long as the components of the EMS can be clearly identified together with the appropriate interfaces to the other systems.

G.5.3.24. Combining Management Audits

The audit can be combined with audits of other management systems. This combination is possible provided it can be demonstrated that the audit satisfies all requirements for certification / registration of the EMS. The audit plan should identify the roles of each member of the audit team and the criteria each member is to audit. All the elements of an EMS should appear clearly, and be readily identifiable, in the audit reports. The quality of the audit should not be adversely affected by the combination of the audits.

5.4. Assessment reportIAF Guidance to Clause 5.4. (G.5.4.1.)

G.5.4.1. An assessor/auditor shall explain the audit findings and/or clarify the requirements of the assessment standard during the audit and/or at the closing meeting, but shall not give prescriptive advice or consultancy as part of an assessment.

5.5. Decision on certification / registrationIAF Guidance to Clause 5.5. (G.5.5.1. to G.5.5.7.)

G.5.5.1. The information gathered during the certification / registration process should be sufficient:

- (a) for the certification / registration body to be able to take an informed decision on certification / registration (or recertification / registration following reassessment);
- (b) for traceability to be available in the event, for example, of an appeal or for planning for the next audit (possibly by a different team);
- (c) to ensure continuity.

In addition to the requirements for reporting in ISO/IEC Guide 66 clause 5.4.1.e.), this information should cover:

- (d) the degree of reliance that can be placed on the internal audit;
- (e) a summary of the most important observations, positive as well as negative, regarding the implementation and effectiveness of the EMS;
- (f) the conclusions reached by the audit team.

G.5.5.2. Reporting by audit teams to the certification / registration body

In order to provide a basis for the certification / registration decision, the certification / registration body will need (a) clear report(s) from the audit team which provide(s) sufficient information to make the decision. To achieve this the report(s) should satisfy the requirements of ISO 14011, in particular clause 5.4.2., plus provide additional information related to the organization in question. (See also clause 4.1.8. of ISO/IEC Guide 66).

- (a) Reports from the audit team to the certification / registration body are required as a minimum at the end of audit stages 1 and 2. In combination with information held on file these report(s) should at least contain:
 - an account of the audit (stages 1 and 2) including a summary of the document review and the audit (stage 2) covering, in particular, audit days used (including office/site investigation, audit (stage 1), audit (stage 2) and reporting);
 - clarification of nonconformities;
 - audit enquiries which have been followed, rationale for their selection, and the methodology employed;
 - recommendation by the audit team to the certification / registration body;
- (b) Surveillance reports should contain, in particular, information on clearing of nonconformities revealed previously;
- (b) Reassessment reports should as a minimum cover, in totality, the requirement of a) above.

G.5.5.3. The entity, which may be an individual, which takes the decision on granting/withdrawing a certification / registration within the certification / registration body, should include a level of knowledge and experience sufficient to evaluate the audit processes and associated recommendations made by the audit team.

G.5.5.4. Certification / registration shall not be granted until all nonconformities as defined in guidance G.3.1.1. have been corrected and the correction verified by the certification / registration body (by site visit or other appropriate form of verification).

G.5.5.5. All certification / registration documents shall identify the term for which the certification / registration is valid. It is recommended that this term be compatible with the arrangements for reassessment, but this linkage is not a requirement. For Guidance on the transfer of accredited certification / registration see Annex 2.

G.5.5.6. For a certification / registration document to be regarded as accredited, it shall be issued by a certification / registration body in accordance with the conditions of its accreditation and unambiguously identify the accreditation body and the issuing certification / registration body.

G.5.5.7. Where a certification / registration body holds more than one accreditation covering the scope of the certification / registration, the accredited certification / registration documents shall identify at least one of the accreditation bodies.

5.6. Surveillance and reassessment procedures

IAF Guidance to Clause 5.6. (G.5.6.1. to G.5.6.14.)

G.5.6.1. Certification / registration bodies shall have clear procedures laying down the circumstances and conditions in which certifications/registrations will be maintained. If on surveillance or reassessment, nonconformities, as defined in guidance G.3.1.1., are found to exist, such nonconformities shall be effectively corrected within a time agreed by the certification / registration body. If correction is not made within the time agreed certification / registration shall be reduced, suspended or withdrawn. The time allowed to implement corrective action should be consistent with the severity of the nonconformity.

G.5.6.2. Surveillance undertaken by the certification / registration body shall give assurance that its certified/registered organizations continue to comply with the requirements of the standard to which they are certified/registered. The certification / registration body should have the facilities and procedures to enable it to achieve this.

G.5.6.3. Clause 5.6.1. of ISO/IEC Guide 66 requires a certification / registration body to conduct a surveillance and reassessment programme at sufficiently close intervals to verify that its certified/registered organizations continue to comply with the certification / registration requirements.

G.5.6.4. The purpose of surveillance is to verify that the approved EMS continues to be implemented, to consider the implications of changes to that system initiated as a result of changes in the organization's operation and to confirm continued compliance with certification / registration requirements. Surveillance of an organization's EMS shall take place on a regular basis, normally it should be undertaken at least once a year. Surveillance programs should normally include:

- (a) the system maintenance elements, which are internal audit, management review and preventive and corrective action;
- (b) communications from external interested parties as required by the EMS standard;
- (c) changes to the documented system;
- (d) areas subject to change;
- (e) selected certification / registration processes;
- (f) other selected areas as appropriate.

G.5.6.5. As a minimum, surveillance by the certification / registration body should include, on an annual basis, the following considerations:

- (a) the effectiveness of the EMS with regard to achieving the objectives of the organization's environmental policy;
- (b) an interview with management responsible for the EMS;
- (c) the functioning of procedures for receiving, documenting and responding to relevant communications from external parties as required by the EMS standard;
- (d) the functioning of procedures for the periodic evaluation and review of compliance with relevant environmental legislation and regulations;
- (e) progress of planned activities aimed at the process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy;
- (f) follow up of conclusions resulting from internal audits;
- (g) action taken on nonconformities identified during the last audit;
- (h) action taken in response to any complaints.

G.5.6.6. The certification / registration body should be able to adapt its surveillance programme to the environmental issues related to the activities of the organization and justify this programme.

G.5.6.7. The surveillance programme of the certification / registration body should be determined by the certification / registration body, taking into account the internal audit program and the reliability that can be attributed to it. Specific dates for visits may be agreed with the certified/registered organization.

G.5.6.8. Surveillance audits may be combined with audits of other management systems. The reporting should then clearly indicate the aspects relevant for each management system.

G.5.6.9. The certification / registration body is required to supervise the appropriate use of its certificate and reports.

G.5.6.10. During surveillance audits certification / registration bodies should check the records of appeals, complaints and disputes brought before the certification / registration body, and where any nonconformity or failure to meet the requirements of certification / registration is revealed, that the organization has investigated its own systems and procedures and taken appropriate corrective action.

G.5.6.11. The surveillance activities shall be subject to special provision if an organization with a certified/registered EMS makes major modifications to its system or if other changes take place which could affect the basis of its certification / registration.

G.5.6.12. Appropriately competent personnel shall independently review surveillance reports for evidence of adequacy of audit performance and reporting and as a means of review whether the original certification / registration decision needs to be reconsidered. This review need not repeat the original decision process. The review should be conducted at least annually for each certification / registration.

G.5.6.13. Reassessment is a requirement of ISO/IEC Guide 66. The purpose of reassessment is to verify overall continuing conformity of the organization's EMS to the requirements of EMS standard and that the EMS has been properly implemented and maintained.

In most cases it is unlikely that a period greater than three years for periodic reassessment of the organization's EMS would satisfy this requirement. The reassessment should also provide for a review of past implementation and continuing maintenance of the system over the period of certification / registration.

The reassessment program should take into consideration the results of the above review and should at least include a review of the EMS documents and a site audit (which may replace and/or extend a regular surveillance audit). It shall at least ensure:

- (a) the effective inter-action between all elements of the system;
- (b) the overall effectiveness of the system in its entirety in the light of changes in operations;
- (c) demonstrated commitment to maintain the effectiveness of the system.

The audit methodology for reassessment should be the same as for audit (stage 2).

G.5.6.14. If, exceptionally, the reassessment period is extended beyond three years, the certification / registration body should demonstrate that the effectiveness of the complete EMS has been evaluated on a regular basis, and should have a surveillance frequency that compensates for this in order to maintain the same level of confidence. However, periodic reassessment shall be conducted, regardless of the surveillance regime used.

5.7. Use of certificates and logos

IAF Guidance to Clause 5.7. (G.5.7.1. to G.5.7.5.)

G.5.7.1. The certification / registration body should have documented procedures for the use of its mark, and for the procedures it is to follow in case of misuse, including false claims as to certification / registration and false use of certification / registration body marks.

G.5.7.2. If a certification / registration body incorrectly claims accredited status for certificates issued before appropriate accreditation has been granted, the accreditation body may require it subsequently to withdraw them.

G.5.7.3. The provisions in clauses 5.7.1. and 5.7.2. of ISO/IEC Guide 66 referring to “certification / registration mark and logos” and “symbol or logo” are both applicable to marks, logos and symbols.

G.5.7.4. The certification / registration body should avoid use of the same mark or a similar mark to indicate different systems of conformity certification / registration (for example product certification and management system certification / registration) and should avoid confusion between the meanings of its own marks if there are more than one.

G.5.7.5. A certification / registration body should have procedures to ensure that certified/registered organizations do not allow its marks to be used in a way which may be likely to mislead or cause confusion.

5.8. Access to records of communications from external interested parties to organizations

End of main text IAF Guidance on ISO/IEC Guide 66

1. Annex 1 - EMS Auditor Time

A1.1. Introduction

This IAF guidance note provides guidance on clause 5.2.1. and 5.2.2. of ISO/IEC Guide 66. It should also be read in conjunction with the IAF Guidance G.4.2.10..

Application of this guidance

For accreditation purposes, it should be noted that nonconformity with this guidance (and/or the included table and/or diagram) in individual instances does not automatically lead to nonconformity against ISO/IEC Guide 66. However, this situation could be ground for further investigation into the completeness of the assessment. Special consideration should be given to investigating the grounds for deviation from this guidance.

If inconsistencies to this guidance are found on a more regular basis, this could form the basis for nonconformity against ISO Guide 66 on the grounds that the certification / registration body cannot give a reasonable assurance that it gives its audit teams the capability to perform a sufficiently complete audit as part of the certification / registration service.

This IAF EMS guidance note provides guidance for a certification / registration body on the development of its own procedures for determining the amount of time required for the assessment of organizations of differing sizes and complexity over a broad spectrum of activities.

Certification / registration bodies need to identify the amount of auditor time to be spent on initial assessment, surveillance and reassessment for each applicant and certified/registered organization.

This IAF EMS guidance provides a framework to be used by certification / registration bodies to determine appropriate auditor time, taking into account the specifics of the organization to be audited. Use of procedures in line with this framework at the audit-planning phase should lead to a consistent approach to the determination of appropriate auditor time. At the same time, the procedure should allow for flexibility in the light of what is found during the course of the assessment, especially during audit Stage 1.

A.1.2. Auditor time procedure

Experience has shown that next to the number of employees, the number, nature and gravity of potential environmental aspects will govern the amount of time taken for any given EMS audit. Because of the increased requirements on an environmental management system through the specific demands of an EMS (ISO 14001) policy, the certification / registration of an EMS can consume more or less time than that of a quality management system: because: -

- The certification / registration body is required to assess the soundness and consistency of the method by which the organization determined the significance of its environmental impacts.
- The certification / registration body is required to confirm that the system designed to achieve the necessary compliance - with relevant environmental legislation and with other requirements to which the organization subscribes - is capable to do so and that it is implemented.
- The certification / registration body is required to confirm that the process for achieving "prevention of pollution" is sound and adhered to.
- The increased demands arising from the audit stage 1.

The IAF guidance (ref. G.4.2.10.) to ISO/IEC Guide 66 lists the criteria, which should be considered, when establishing the amount of auditor time needed. These and other factors need to be examined during the certification / registration body's contract review process for their potential impact on the amount of auditor time to be allocated. Therefore an Auditor Time Chart/Diagram cannot be used in isolation.

Table 1 and diagram 1 sets out a typical number of audit days to be used in an initial assessment. Experience has shown that for EMS it is appropriate to base this on the number of employees of the organization and the nature, number and gravity of the environmental aspects of the typical organization in that industry sector. The auditor times should then be adjusted based on any significant factors that uniquely apply to the organization to be audited.

The additional factors that need to be considered include but are not limited to:-

Increase auditor time :-

- Complicated logistics involving more than one building or location where work is carried out.
- Staff speaking in more than one language (requiring interpreter(s) or preventing individual auditors from working independently)
- Very large site for number of employees (e.g., a timber land (forest))
- System covers highly complex processes or relatively high number of unique activities

- Design responsibility in product related aspects
- Routinely practiced night shift is part of activities to be assessed necessitating change in audit programme etc.
- Higher sensitivity of receiving environment compared to typical for industry sector
- Views of interested parties
- Indirect aspects necessitating increase in assessment time (e.g. relationship with corporate head office or local authorities)
- Additional/unusual environmental aspects for the sector
- Additional/unusual environmental license/regulator conditions for the sector
- Immature management system

Decrease auditor time: -

- Very small site for number of employees (e.g., office complex only)
- Maturity of management system
- High percentage of employees doing the same, simple tasks

This guidance is based on five primary complexity categories of the nature, number and gravity of the environmental aspects of an organization that fundamentally affect the auditor time, these are: -

- **High** – large number of environmental aspects with significant nature and gravity (typically manufacturing or processing type organizations with significant impacts in several of the environmental aspects);
- **Medium** – average number of environmental aspects with medium nature and gravity (typically manufacturing organizations with significant impacts in some of the environmental aspects);
- **Low** - small number of environmental aspects with low nature and gravity (typically organizations of an assembly type environment with few significant aspects);
- **Limited** – very limited number of environmental aspects with limited nature and gravity (typically organizations of an office type environment);
- **Special** – these require additional and unique consideration at the audit planning stage.

Table 1 and diagram 1 cover the above four top complexity categories. Table 2 provides the link between the five complexity categories above and the industry sectors that would *typically* fall into that category.

The certification / registration body should recognise that not all organizations in a specific sector will always fall in the same complexity category. The certification / registration body should allow flexibility in its contract review procedure to ensure that the specific activities of the organization are considered in determine the complexity category. For example: even though many business in the chemical sector should be classified as "high complexity", an organization which would have only a mixing free from chemical reaction or emission and/or trading operation could be classified as "medium" or even "low complexity".

Neither Table 1 nor Diagram 1 covers Special complexity and auditor times shall be developed and justified on an individual basis in these cases.

All attributes of the organization's system, processes, and products/services should be considered and a fair adjustment made for those factors that could justify more or less auditor time for an effective audit. Additive factors may be offset by subtractive factors. **In all cases where adjustments are made to the time provided in the Auditor Time table and diagram, sufficient evidence and records shall be maintained to justify the variation.**

Diagram 1 - Guidance for determination of number of Auditor Days

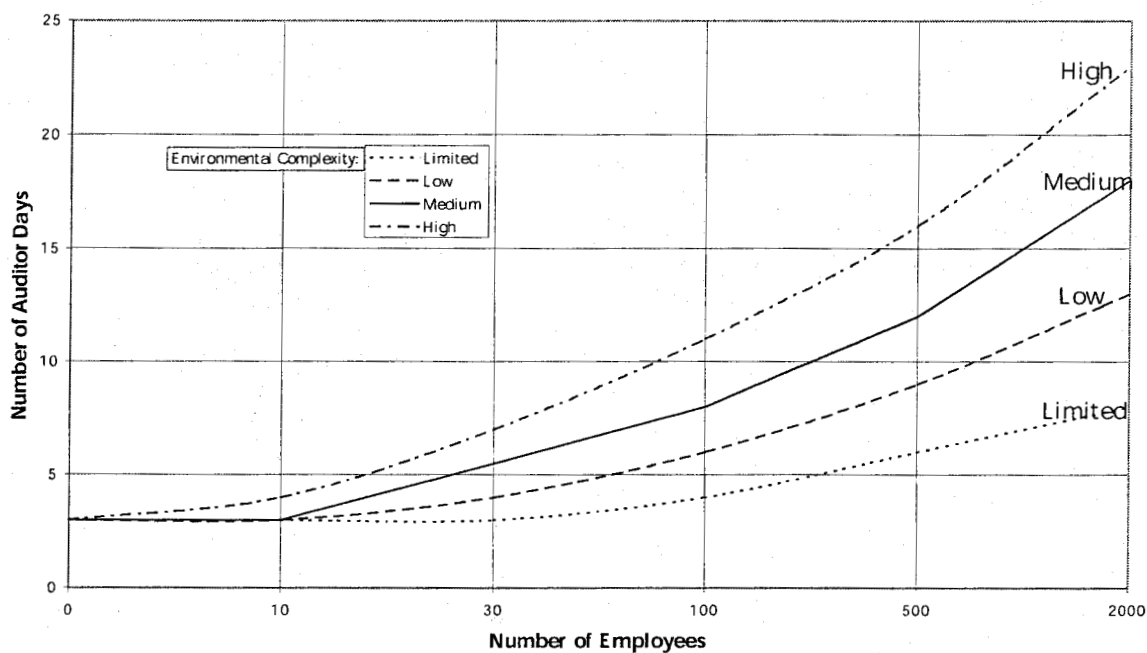


Table 1

Guide for auditor time for Initial Assessment (audit stage 1 and audit stage 2 together)

Auditor time chart for ISO 14001.

The numbers of employees in table 1 should be seen as a continuum rather than a stepped change, see diagram 1

CONTINUUM Number of employees	High complexity	Medium complexity	Low complexity	Limited complexity
10	4 ± 1	3 ± 1	3 ± 1	3 ± 1
30	7 ± 2	6 ± 2	4 ± 1	3 ± 1
100	11 ± 3	8 ± 3	6 ± 2	4 ± 1
500	16 ± 5	12 ± 3	9 ± 3	6 ± 2
2000	23 ± 7	18 ± 5	13 ± 4	8 ± 2

The certification / registration body's procedure may provide for auditor time for a number of employees exceeding 2000. Such auditor time should follow the progression in Table 1 in a consistent fashion.

Notes to table 1 and diagram 1 EMS auditor times

1. "Employees" as referenced in the table refers to all individuals whose work activities support the scope of the certification / registration as described by the environmental management system.
 - The effective number of employees includes non-permanent (seasonal, temporary, and sub-contracted) staff that will be present at the time of the audit. A certification / registration body should agree with the organization to be audited the timing of the audit which will best demonstrate the full scope of the organization. The consideration could include season, month, day/date and shift as appropriate.
 - Part-time employees should be treated as full-time-equivalent employees. This determination will depend upon the number of hours worked as compared with a full-time employee, see note 6 for calculation of the impact of shifts.

2. "Auditor time" includes the time spent by an Auditor or Audit Team in planning (including off-site document review, if appropriate); interfacing with organization, personnel, records, documentation and processes; and report writing. It is expected that the "Auditor time" involved in such planning and report writing combined should not typically reduce the total on-site "Auditor time" to less than 80% of the time shown in the Auditor Time Chart. This applies to initial, surveillance and re-assessment audits. Where additional time is required for planning and/or report writing, this will not be justification for reducing on-site Auditor time. Auditor travel time is not included in this calculation, and is additional to the Auditor time referenced in the chart. NOTE 80% is a factor based on experience of EMS audits.
3. "Auditor time" as referenced in the chart is stated in terms of "Auditor Days" spent on the assessment. An "Auditor Day" is typically a full normal working day of 8 hours. The number of Auditor Days employed may not be reduced at the initial planning stages by programming longer hours per workday.
4. For the initial Assessment cycle, Surveillance time for a given organization should be proportional to the time spent at initial assessment with the total amount of time spent annually on surveillance being about 1/3 of the time spent on the initial assessment. The planned surveillance time should be reviewed from time-to-time to account for changes in the organization, system maturity, etc., and at least at the time of re-assessment.
5. The total amount of time spent performing the re-assessment will depend upon the findings of the review as defined in paragraphs G.5.6.13. and G.5.6.14. The amount of time spent at re-assessment should be proportional to the time that would be spent at initial assessment of the same organization and should be about 2/3 of the time that would be required for initial assessment of the same organization at the time that it is to be re-assessed. Re-assessment is time spent above and beyond the routine Surveillance time, but, when re-assessment is carried out at the same time as a planned routine Surveillance visit, the re-assessment will suffice to meet the requirement for Surveillance as well. Regardless of what conclusion is made, the guidance in G.4.2.10. and G.5.6.13. apply.
6. If a significant part of the operations is carried out in shifts, the total number of employees may be calculated as follows: (number of employees not in shift work) + {(number of employees in shift work) / (number of shifts minus one)}. A condition is that there are no significant differences between the shifts with respect to the type and intensity of activities.

Table 2

Examples of linkage between business sectors and complexity categories of environmental aspects

Complexity category	Business sector
High	- mining and quarrying - oil and gas extraction - tanning of textiles and clothing - pulping part of paper manufacturing including paper recycling processing - oil refining - chemicals and pharmaceuticals - primary productions - metals - non-metallics processing and products covering ceramics and cement. - coal based electricity generation - civil construction and demolition - hazardous and non hazardous waste processing e.g. Incineration etc. - effluent and sewerage processing
Medium	- fishing/farming/forestry - textiles and clothing except for tanning - manufacturing of boards, treatment/impregnation of wood and wooden products - paper production and printing excluding pulping - non metallics processing and products covering glass, clay, lime etc. - surface and other chemically based treatment for metal fabricated products excludes primary production - surface and other chemically based treatment for general mechanical engineering - production of bare printed circuit boards for electronics industry - manufacturing of transport equipment - road, rail, air, ships - non coal based electricity generation and distribution - gas production, storage and distribution (note extraction is graded high) - water abstraction, purification and distribution including river management (note commercial effluent treatment is graded as high) - fossil fuel whole sale and retail - food and tobacco - processing - transport and distribution - by sea, air, land - commercial estate agency, estate management, industrial cleaning, hygiene cleaning, dry cleaning normally part of general business services - recycling, composting, landfill (of non hazardous waste) - technical testing and laboratories - healthcare/hospitals/veterinary - leisure services and personal services excludes hotels/restaurants

Complexity category	Business sector
Low	hotels/restaurants wood and wooden products excluding manufacturing of boards, treatment and impregnation of wood paper products excluding printing, pulping and paper making rubber and plastic injection moulding, forming and assembly - excludes manufacturing of rubber and plastic raw materials which are part of chemicals hot and cold forming and metal fabrication excluding surface treatment and other chemical based treatments and primary production general mechanical engineering assembly excluding surface treatment and other chemical based treatments wholesale and retail electrical and electronic equipment assembly excluding manufacturing of bare printed circuit boards
Limited	corporate activities and management, HQ and management of holding companies transport and distribution - management services with no actual fleet to manage telecommunications general business services except commercial estate agency, estate management, industrial cleaning, hygiene cleaning, dry cleaning education services
SPECIAL CASES	nuclear nuclear electricity generation storage of large quantities of hazardous material public administration local authorities organizations with environmental sensitive products or services

Note:

It should be recognised that not all organizations in a specific sector will always fall in the same complexity category. The certification / registration body should allow flexibility in its contract review procedure to ensure that the specific activities of the organization are considered to determine the complexity category

2. Annex 2 - Transfer of Accredited Certification / Registration

This Annex provides Guidance on clause 5.5. of ISO/IEC Guide 66. See IAF Guidance G.5.5.5. It should also be read in conjunction with ISO/IEC Guide 66, clause 5.8.

2.1. Introduction

This annex provides guidance on the transfer of ISO 14001:1996 environmental management system certificates between certification / registration bodies.

The objective of this guidance is to assure the maintenance of the integrity of accredited environmental management system certificates issued by one certification / registration body if subsequently transferred to another such body.

The guidance states minimum requirements for the transfer of certification / registration. Certification / registration bodies may implement procedures or actions which are more stringent than those contained herein provided that an organization's freedom to choose a certification / registration body is not unduly or unfairly constrained.

2.2. Definition

Transfer of Certification / Registration. The transfer of certification / registration is defined as the recognition of an existing and valid, [but see clause 2.4.1. of this Annex], ISO 14001:1996 environmental management system certificate, granted by one accredited certification / registration body, [hereinafter referred to as the "issuing certification / registration body"], by another accredited certification/registration body, [hereinafter referred to as the "accepting certification / registration body"] for the purpose of issuing its own certification / registration.

Note: Multiple certification/registration does not fall under the definition above, and is not encouraged by IAF.

2.3. Minimum Requirements

2.3.1. Accreditation. Only certificates which are covered by an accreditation of an EA, PAC, IAAC or IAF MLA Signatory should be eligible for transfer. If the existing certification is accredited by a body that belongs to a regional MLA only, the transfer shall be limited to other accreditations valid within that regional group. Organizations holding certificates that are not covered by such accreditations shall be treated as new clients.

2.3.2. Pre-Transfer Review. A competent person from the accepting certification / registration body shall carry out a review of the certification / registration of the prospective client. This review should be conducted by means of both a paper enquiry and, normally, a visit to the prospective client. The review should cover the following aspects:

- (a) Confirmation that the client's certified activities fall within the accredited scope of the accepting certification / registration body.
- (b) The reasons for seeking a transfer.
- (c) That a valid accredited certificate, in terms of authenticity, duration, scope of activities covered by the environmental management system and scope of accreditation, is held in respect of the site or sites wishing to transfer. If practical, the validity of certification / registration and the status of outstanding nonconformities should be verified with the issuing certification / registration body unless it has ceased trading.
- (d) A consideration of the last assessment/re-assessment reports, subsequent surveillance reports and any outstanding nonconformities arising therefrom. This consideration should also include any other available, relevant documentation regarding the certification process i.e. handwritten notes, checklists.
- (e) Any current engagement by the organization in legal representation with statutory bodies.
- (f) Complaints received and action taken.
- (g) The stage in the current certification / registration cycle. See clause 2.4.4. of this Annex.

2.4. Certification

2.4.1. Transfer should normally only be of a current valid accredited certificate but, in the case of a certificate issued by a certification / registration body that has ceased trading, or that has had its accreditation withdrawn, the accepting certification / registration body may, at its discretion, consider such a certificate for transfer on the basis described in this guidance.

2.4.2. Certificates which are known to have been suspended or to be under threat of suspension should not be accepted for transfer.

2.4.3. Outstanding nonconformities should be closed out, if practical, with the issuing certification / registration body, before transfer. Otherwise they should be closed out by the accepting certification / registration body.

2.4.4. If no further outstanding or potential problems are identified by the pre-transfer review a certificate, dated from the date of completion of the review, may be issued following the normal decision making process. The pattern of the previous certification / registration regime should be utilised to determine the programme of on-going surveillance and re-assessment unless, as a result of the review, the accepting certification / registration body has performed an initial or re-assessment audit.

2.4.5. Where doubt continues to exist, after the pre-transfer review, as to the adequacy of a current or previously held certification, the accepting certification / registration body should, depending upon the extent of doubt, either:

- Treat the applicant as a new client or
- Conduct an assessment concentrating on identified problem areas.

The decision as to the action required will depend upon the nature and extent of any problems found and should be explained to the organization.

End of IAF Guidance on the Application of ISO/IEC Guide 66

Further Information

For Further Information on this document or other IAF documents, contact any member of IAF or the IAF Secretariat.

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DRAFT

BSR/ISO/ASQ QE19011-2002

**Proposed US Adoption of
INTERNATIONAL STANDARD
ISO 19011:2002**

**Guidelines for quality and/or environmental
management systems auditing**

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Item Number **T1901**

BSR/ISO/ASQ QE19011-2002
DRAFT NATIONAL STANDARD
Guidelines for quality and/or environmental
management systems auditing

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Note: As used in this document, the term "International Standard" refers to the Draft National Standard adoption of this and other International Standards. **This Draft is a verbatim copy of the final published International Standard.**

ASQ will consider requests for change and information on the submittal of such requests regarding this Standard. All requests should be in writing to the attention of the Standards administrator at the address below.

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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.

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

ISO 19011 was prepared jointly by Technical Committee ISO/TC 176, *Quality management and quality assurance*, Subcommittee SC 3, *Supporting technologies*, and Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 2, *Environmental auditing and related environmental investigations*.

This first edition of ISO 19011 cancels and replaces ISO 10011-1:1990, ISO 10011-2:1991, ISO 10011-3:1991, ISO 14010:1996, ISO 14011:1996 and ISO 14012:1996.

Introduction

The ISO 9000 and ISO 14000 series of International Standards emphasize the importance of audits as a management tool for monitoring and verifying the effective implementation of an organization's quality and/or environmental policy. Audits are also an essential part of conformity assessment activities such as external certification/registration and of supply chain evaluation and surveillance.

This International Standard provides guidance on the management of audit programmes, the conduct of internal or external audits of quality and/or environmental management systems, as well as on the competence and evaluation of auditors. It is intended to apply to a broad range of potential users, including auditors, organizations implementing quality and/or environmental management systems, organizations needing to conduct audits of quality and/or environmental management systems for contractual reasons, and organizations involved in auditor certification or training, in certification/registration of management systems, in accreditation or in standardization in the area of conformity assessment.

The guidance in this International Standard is intended to be flexible. As indicated at various points in the text, the use of these guidelines can differ according to the size, nature and complexity of the organizations to be audited, as well as the objectives and scopes of the audits to be conducted. Throughout this International Standard, supplementary guidance or examples on specific topics are provided in the form of practical help in boxed text. In some instances, this is intended to support the use of this International Standard in small organizations.

Clause 4 describes the principles of auditing. These principles help the user to appreciate the essential nature of auditing and they are a necessary prelude to clauses 5, 6 and 7.

Clause 5 provides guidance on managing audit programmes and covers such issues as assigning responsibility for managing audit programmes, establishing the audit programme objectives, coordinating auditing activities and providing sufficient audit team resources.

Clause 6 provides guidance on conducting audits of quality and/or environmental management systems, including the selection of audit teams.

Clause 7 provides guidance on the competence needed by an auditor and describes a process for evaluating auditors.

Where quality and environmental management systems are implemented together, it is at the discretion of the user of this International Standard as to whether the quality management system and environmental management system audits are conducted separately or together.

Although this International Standard is applicable to the auditing of quality and/or environmental management systems, the user can consider adapting or extending the guidance provided herein to apply to other types of audits, including other management system audits.

This International Standard provides only guidance, however, users can apply this to develop their own audit-related requirements.

In addition, any other individual or organization with an interest in monitoring conformance to requirements, such as product specifications or laws and regulations, may find the guidance in this International Standard useful.

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Guidelines for quality and/or environmental management systems auditing

1 Scope

This International Standard provides guidance on the principles of auditing, managing audit programmes, conducting quality management system audits and environmental management system audits, as well as guidance on the competence of quality and environmental management system auditors.

It is applicable to all organizations needing to conduct internal or external audits of quality and/or environmental management systems or to manage an audit programme.

The application of this International Standard to other types of audit is possible in principle, provided that special consideration is paid to identifying the competence needed by the audit team members in such cases.

2 Normative references

The following normative documents contain provisions which, through references 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 edition of the normative documents indicated below. For undated references, the latest edition of the normative document referred to apply. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 9000:2000, *Quality management systems — Fundamentals and vocabulary*

ISO 14050:2002, *Environmental management — Vocabulary*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 9000 and ISO 14050 apply, unless superseded by the terms and definitions given below.

A term in a definition or note which is defined elsewhere in this clause is indicated by boldface followed by its entry number in parentheses. Such a boldface term may be replaced in the definition by its complete definition.

3.1 audit

systematic, independent and documented process for obtaining **audit evidence** (3.3) and evaluating it objectively to determine the extent to which the **audit criteria** (3.2) are fulfilled

NOTE 1 Internal audits, sometimes called first-party audits, are conducted by, or on behalf of, the organization itself for management review and other internal purposes, and may form the basis for an organization's self-declaration of conformity. In many cases, particularly in smaller organizations, independence can be demonstrated by the freedom from responsibility for the activity being audited.

NOTE 2 External audits include those generally termed second- and third-party audits. Second-party audits are conducted by parties having an interest in the organization, such as customers, or by other persons on their behalf. Third-party audits are conducted by external, independent auditing organizations, such as those providing registration or certification of conformity to the requirements of ISO 9001 or ISO 14001.

NOTE 3 When a quality management system and an environmental management system are audited together, this is termed a combined audit.

NOTE 4 When two or more auditing organizations cooperate to audit a single **auditee** (3.7), this is termed a joint audit.

3.2

audit criteria

set of policies, procedures or requirements

NOTE Audit criteria are used as a reference against which **audit evidence** (3.3) is compared.

3.3

audit evidence

records, statements of fact or other information, which are relevant to the **audit criteria** (3.2) and verifiable

NOTE Audit evidence may be qualitative or quantitative.

3.4

audit findings

results of the evaluation of the collected **audit evidence** (3.3) against **audit criteria** (3.2)

NOTE Audit findings can indicate either conformity or nonconformity with audit criteria or opportunities for improvement.

3.5

audit conclusion

outcome of an **audit** (3.1), provided by the **audit team** (3.9) after consideration of the audit objectives and all **audit findings** (3.4)

3.6

audit client

organization or person requesting an **audit** (3.1)

NOTE The audit client may be the **auditee** (3.7) or any other organization which has the regulatory or contractual right to request an audit.

3.7

auditee

organization being audited

3.8

auditor

person with the **competence** (3.14) to conduct an **audit** (3.1)

3.9

audit team

one or more **auditors** (3.8) conducting an **audit** (3.1), supported if needed by **technical experts** (3.10)

NOTE 1 One auditor of the audit team is appointed as the audit team leader.

NOTE 2 The audit team may include auditors-in-training.

3.10**technical expert**

person who provides specific knowledge or expertise to the **audit team** (3.9)

NOTE 1 Specific knowledge or expertise is that which relates to the organization, the process or activity to be audited, or language or culture.

NOTE 2 A technical expert does not act as an **auditor** (3.8) in the audit team.

3.11**audit programme**

set of one or more **audits** (3.1) planned for a specific time frame and directed towards a specific purpose

NOTE An audit programme includes all activities necessary for planning, organizing and conducting the audits.

3.12**audit plan**

description of the activities and arrangements for an **audit** (3.1)

3.13**audit scope**

extent and boundaries of an **audit** (3.1)

NOTE The audit scope generally includes a description of the physical locations, organizational units, activities and processes, as well as the time period covered.

3.14**competence**

demonstrated personal attributes and demonstrated ability to apply knowledge and skills

4 Principles of auditing

Auditing is characterized by reliance on a number of principles. These make the audit an effective and reliable tool in support of management policies and controls, providing information on which an organization can act to improve its performance. Adherence to these principles is a prerequisite for providing audit conclusions that are relevant and sufficient and for enabling auditors working independently from one another to reach similar conclusions in similar circumstances.

The following principles relate to auditors.

a) **Ethical conduct:** *the foundation of professionalism*

Trust, integrity, confidentiality and discretion are essential to auditing.

b) **Fair presentation:** *the obligation to report truthfully and accurately*

Audit findings, audit conclusions and audit reports reflect truthfully and accurately the audit activities. Significant obstacles encountered during the audit and unresolved diverging opinions between the audit team and the auditee are reported.

c) **Due professional care:** *the application of diligence and judgement in auditing*

Auditors exercise care in accordance with the importance of the task they perform and the confidence placed in them by audit clients and other interested parties. Having the necessary competence is an important factor.

Further principles relate to the audit, which is by definition independent and systematic.

- d) **Independence:** *the basis for the impartiality of the audit and objectivity of the audit conclusions*

Auditors are independent of the activity being audited and are free from bias and conflict of interest. Auditors maintain an objective state of mind throughout the audit process to ensure that the audit findings and conclusions will be based only on the audit evidence.

- e) **Evidence-based approach:** *the rational method for reaching reliable and reproducible audit conclusions in a systematic audit process*

Audit evidence is verifiable. It is based on samples of the information available, since an audit is conducted during a finite period of time and with finite resources. The appropriate use of sampling is closely related to the confidence that can be placed in the audit conclusions.

The guidance given in the remaining clauses of this International Standard is based on the principles set out above.

5 Managing an audit programme

5.1 General

An audit programme may include one or more audits, depending upon the size, nature and complexity of the organization to be audited. These audits may have a variety of objectives and may also include joint or combined audits (see Notes 3 and 4 to the definition of audit in 3.1).

An audit programme also includes all activities necessary for planning and organizing the types and number of audits, and for providing resources to conduct them effectively and efficiently within the specified time frames.

An organization may establish more than one audit programme.

The organization's top management should grant the authority for managing the audit programme.

Those assigned the responsibility for managing the audit programme should

- a) establish, implement, monitor, review and improve the audit programme, and
- b) identify the necessary resources and ensure they are provided.

Figure 1 illustrates the process flow for the management of an audit programme.

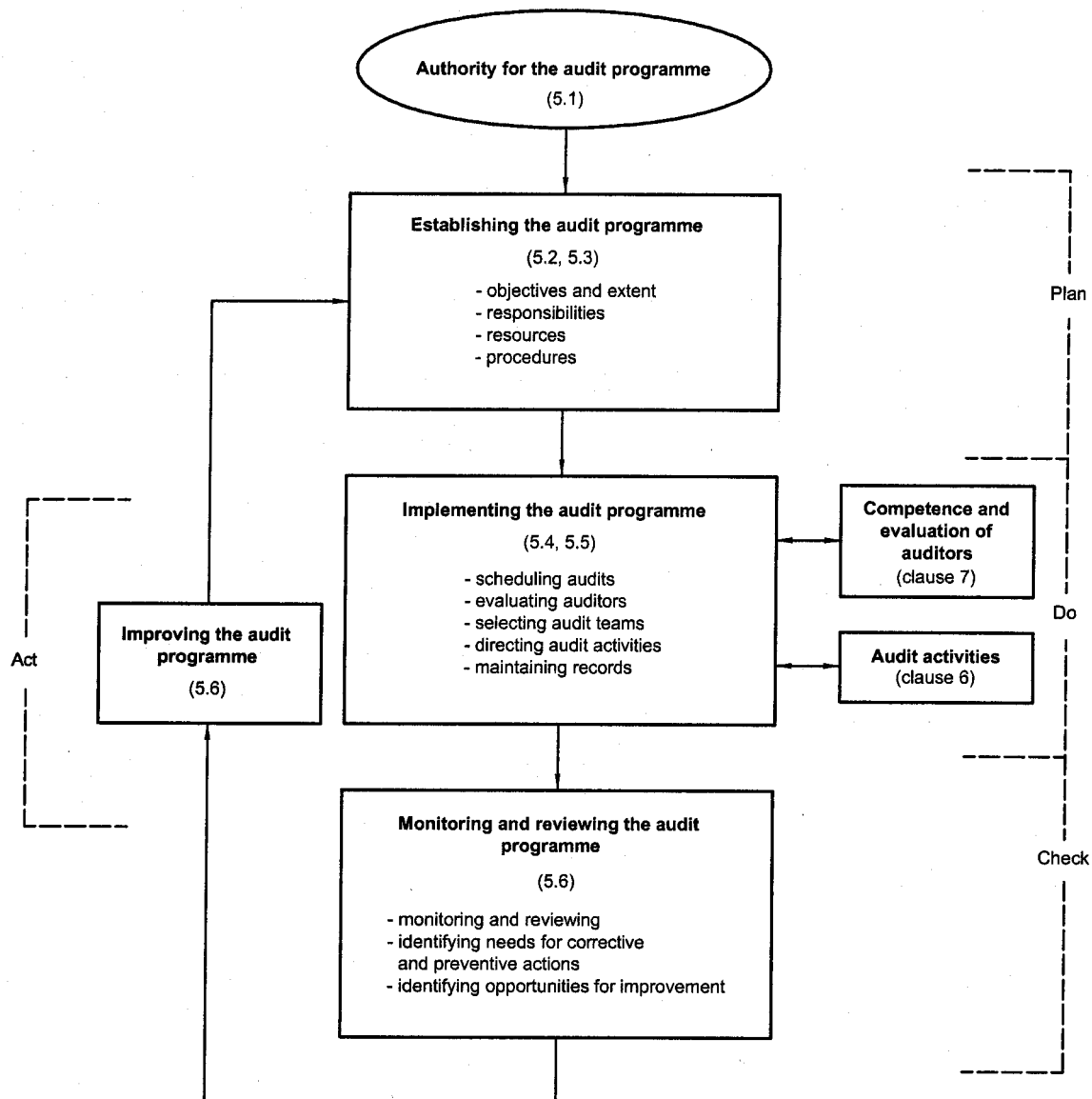


Figure 1 — Illustration of the process flow for the management of an audit programme

NOTE 1 Figure 1 also illustrates the application of the Plan-Do-Check-Act methodology in this International Standard.

NOTE 2 The numbers in this and all subsequent figures refer to the relevant clauses of this International Standard.

If an organization to be audited operates both quality management and environmental management systems, combined audits may be included in the audit programme. In such a case, special attention should be paid to the competence of the audit team.

Two or more auditing organizations may cooperate, as part of their audit programmes, to conduct a joint audit. In such a case, special attention should be paid to the division of responsibilities, the provision of any additional resources, the competence of the audit team and the appropriate procedures. Agreement on these should be reached before the audit commences.

Practical help — Examples of audit programmes

Examples of audit programmes include the following:

- a) a series of internal audits covering an organization-wide quality management system for the current year;
- b) second-party management system audits of potential suppliers of critical products to be conducted within 6 months;
- c) *certification/registration and surveillance* audits conducted by a third-party certification/registration body on an environmental management system within a time period agreed contractually between the certification body and the client.

An audit programme also includes appropriate planning, the provision of resources and the establishment of procedures to conduct audits within the programme.

5.2 Audit programme objectives and extent

5.2.1 Objectives of an audit programme

Objectives should be established for an audit programme, to direct the planning and conduct of audits.

These objectives can be based on consideration of

- a) management priorities,
- b) commercial intentions,
- c) management system requirements,
- d) statutory, regulatory and contractual requirements,
- e) need for supplier evaluation,
- f) *customer requirements*,
- g) needs of other interested parties, and
- h) risks to the organization.

Practical help — Examples of audit programme objectives

Examples of audit programme objectives include the following:

- a) to meet requirements for certification to a management system standard;
- b) to verify conformance with contractual requirements;
- c) to obtain and maintain confidence in the capability of a supplier;
- d) to contribute to the improvement of the management system.

5.2.2 Extent of an audit programme

The extent of an audit programme can vary and will be influenced by the size, nature and complexity of the organization to be audited, as well as by the following:

- a) the scope, objective and duration of each audit to be conducted;
- b) the frequency of audits to be conducted;
- c) the number, importance, complexity, similarity and locations of the activities to be audited;
- d) standards, statutory, regulatory and contractual requirements and other audit criteria;
- e) the need for accreditation or registration/certification;
- f) conclusions of previous audits or results of a previous audit programme review;
- g) any language, cultural and social issues;
- h) the concerns of interested parties;
- i) significant changes to an organization or its operations.

5.3 Audit programme responsibilities, resources and procedures

5.3.1 Audit programme responsibilities

The responsibility for managing an audit programme should be assigned to one or more individuals with a general understanding of audit principles, of the competence of auditors and the application of audit techniques. They should have management skills as well as technical and business understanding relevant to the activities to be audited.

Those assigned the responsibility for managing the audit programme should

- a) establish the objectives and extent of the audit programme,
- b) establish the responsibilities and procedures, and ensure resources are provided,
- c) ensure the implementation of the audit programme,
- d) ensure that appropriate audit programme records are maintained, and
- e) monitor, review and improve the audit programme.

5.3.2 Audit programme resources

When identifying resources for the audit programme, consideration should be given to

- a) financial resources necessary to develop, implement, manage and improve audit activities,
- b) audit techniques,
- c) processes to achieve and maintain the competence of auditors, and to improve auditor performance,
- d) the availability of auditors and technical experts having competence appropriate to the particular audit programme objectives,
- e) the extent of the audit programme, and
- f) travelling time, accommodation and other auditing needs.

5.3.3 Audit programme procedures

Audit programme procedures should address the following:

- a) planning and scheduling audits;
- b) assuring the competence of auditors and audit team leaders;
- c) selecting appropriate audit teams and assigning their roles and responsibilities;
- d) conducting audits;
- e) conducting audit follow-up, if applicable;
- f) maintaining audit programme records;
- g) monitoring the performance and effectiveness of the audit programme;
- h) reporting to top management on the overall achievements of the audit programme.

For smaller organizations, the activities above can be addressed in a single procedure.

5.4 Audit programme implementation

The implementation of an audit programme should address the following:

- a) communicating the audit programme to relevant parties;
- b) coordinating and scheduling audits and other activities relevant to the audit programme;
- c) establishing and maintaining a process for the evaluation of the auditors and their continual professional development, in accordance with respectively 7.6 and 7.5;
- d) ensuring the selection of audit teams;
- e) providing necessary resources to the audit teams;
- f) ensuring the conduct of audits according to the audit programme;
- g) ensuring the control of records of the audit activities;
- h) ensuring review and approval of audit reports, and ensuring their distribution to the audit client and other specified parties;
- i) ensuring audit follow-up, if applicable.

5.5 Audit programme records

Records should be maintained to demonstrate the implementation of the audit programme and should include the following:

- a) records related to individual audits, such as
 - audit plans,
 - audit reports,
 - nonconformity reports,

- corrective and preventive action reports, and
- audit follow-up reports, if applicable;
- b) results of audit programme review;
- c) records related to audit personnel covering subjects such as
 - auditor competence and performance evaluation,
 - audit team selection, and
 - maintenance and improvement of competence.

Records should be retained and suitably safeguarded.

5.6 Audit programme monitoring and reviewing

The implementation of the audit programme should be monitored and, at appropriate intervals, reviewed to assess whether its objectives have been met and to identify opportunities for improvement. The results should be reported to top management.

Performance indicators should be used to monitor characteristics such as

- the ability of the audit teams to implement the audit plan,
- conformity with audit programmes and schedules, and
- feedback from audit clients, auditees and auditors.

The audit programme review should consider, for example,

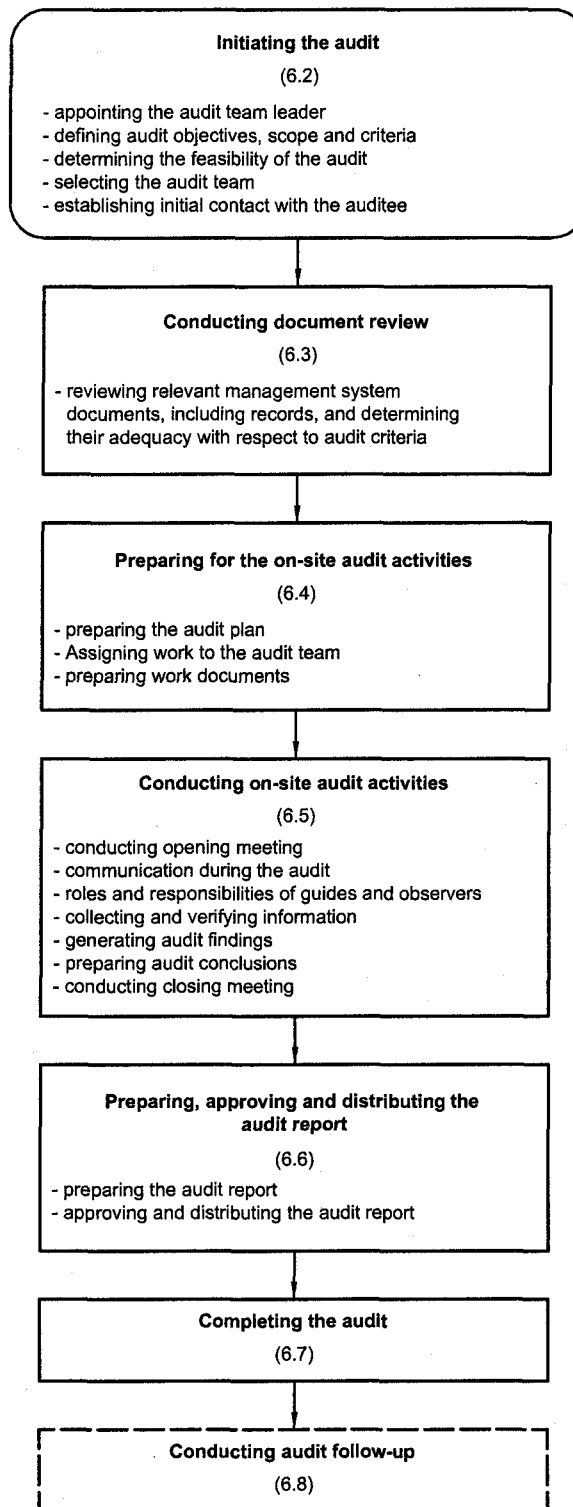
- a) results and trends from monitoring,
- b) conformity with procedures,
- c) evolving needs and expectations of interested parties,
- d) audit programme records,
- e) alternative or new auditing practices, and
- f) consistency in performance between audit teams in similar situations.

Results of audit programme reviews can lead to corrective and preventive actions and the improvement of the audit programme.

6 Audit activities

6.1 General

This clause contains guidance on planning and conducting audit activities as part of an audit programme. Figure 2 provides an overview of typical audit activities. The extent to which the provisions of this clause are applicable depends on the scope and complexity of the specific audit and the intended use of the audit conclusions.



NOTE The dotted lines indicate that any audit follow-up actions are usually not considered to be part of the audit.

Figure 2 — Overview of typical audit activities

6.2 Initiating the audit

6.2.1 Appointing the audit team leader

Those assigned the responsibility for managing the audit programme should appoint the audit team leader for the specific audit.

Where a joint audit is conducted, it is important to reach agreement among the auditing organizations before the audit commences on the specific responsibilities of each organization, particularly with regard to the authority of the team leader appointed for the audit.

6.2.2 Defining audit objectives, scope and criteria

Within the overall objectives of an audit programme, an individual audit should be based on documented objectives, scope and criteria.

The audit objectives define what is to be accomplished by the audit and may include the following:

- a) determination of the extent of conformity of the auditee's management system, or parts of it, with audit criteria;
- b) evaluation of the capability of the management system to ensure compliance with statutory, regulatory and contractual requirements;
- c) evaluation of the effectiveness of the management system in meeting its specified objectives;
- d) identification of areas for potential improvement of the management system.

The audit scope describes the extent and boundaries of the audit, such as physical locations, organizational units, activities and processes to be audited, as well as the time period covered by the audit.

The audit criteria are used as a reference against which conformity is determined and may include applicable policies, procedures, standards, laws and regulations, management system requirements, contractual requirements or industry/business sector codes of conduct.

The audit objectives should be defined by the audit client. The audit scope and criteria should be defined between the audit client and the audit team leader in accordance with audit programme procedures. Any changes to the audit objectives, scope or criteria should be agreed to by the same parties.

Where a combined audit is to be conducted, it is important that the audit team leader ensures that the audit objectives, scope and criteria are appropriate to the nature of the combined audit.

6.2.3 Determining the feasibility of the audit

The feasibility of the audit should be determined, taking into consideration such factors as the availability of

- sufficient and appropriate information for planning the audit,
- adequate cooperation from the auditee, and
- adequate time and resources.

Where the audit is not feasible, an alternative should be proposed to the audit client, in consultation with the auditee.

6.2.4 Selecting the audit team

When the audit has been declared feasible, an audit team should be selected, taking into account the competence needed to achieve the objectives of the audit. If there is only one auditor, the auditor should perform all applicable

duties of an audit team leader. Clause 7 contains guidance on determining the competence needed and describes processes for evaluating auditors.

In deciding the size and composition of the audit team, consideration should be given to the following:

- a) audit objectives, scope, criteria and estimated duration of the audit;
- b) whether the audit is a combined or joint audit;
- c) the overall competence of the audit team needed to achieve the objectives of the audit;
- d) statutory, regulatory, contractual and accreditation/certification requirements, as applicable;
- e) the need to ensure the independence of the audit team from the activities to be audited and to avoid conflict of interest;
- f) the ability of the audit team members to interact effectively with the auditee and to work together;
- g) the language of the audit, and an understanding of the auditee's particular social and cultural characteristics; these issues may be addressed either by the auditor's own skills or through the support of a technical expert.

The process of assuring the overall competence of the audit team should include the following steps:

- identification of the knowledge and skills needed to achieve the objectives of the audit;
- selection of the audit team members such that all of the necessary knowledge and skills are present in the audit team.

If not fully covered by the auditors in the audit team, the necessary knowledge and skills may be satisfied by including technical experts. Technical experts should operate under the direction of an auditor.

Auditors-in-training may be included in the audit team, but should not audit without direction or guidance.

Both the audit client and the auditee can request the replacement of particular audit team members on reasonable grounds based on the principles of auditing described in clause 4. Examples of reasonable grounds include conflict of interest situations (such as an audit team member having been a former employee of the auditee or having provided consultancy services to the auditee) and previous unethical behaviour. Such grounds should be communicated to the audit team leader and to those assigned responsibility for managing the audit programme, who should resolve the issue with the audit client and auditee before making any decisions on replacing audit team members.

6.2.5 Establishing initial contact with the auditee

The initial contact for the audit with the auditee may be informal or formal, but should be made by those assigned responsibility for managing the audit programme or the audit team leader. The purpose of the initial contact is

- a) to establish communication channels with the auditee's representative,
- b) to confirm the authority to conduct the audit,
- c) to provide information on the proposed timing and audit team composition,
- d) to request access to relevant documents, including records,
- e) to determine applicable site safety rules,
- f) to make arrangements for the audit, and
- g) to agree on the attendance of observers and the need for guides for the audit team.

6.3 Conducting document review

Prior to the on-site audit activities the auditee's documentation should be reviewed to determine the conformity of the system, as documented, with audit criteria. The documentation may include relevant management system documents and records, and previous audit reports. The review should take into account the size, nature and complexity of the organization, and the objectives and scope of the audit. In some situations, this review may be deferred until the on-site activities commence, if this is not detrimental to the effectiveness of the conduct of the audit. In other situations, a preliminary site visit may be conducted to obtain a suitable overview of available information.

If the documentation is found to be inadequate, the audit team leader should inform the audit client, those assigned responsibility for managing the audit programme, and the auditee. A decision should be made as to whether the audit should be continued or suspended until documentation concerns are resolved.

6.4 Preparing for the on-site audit activities

6.4.1 Preparing the audit plan

The audit team leader should prepare an audit plan to provide the basis for the agreement among the audit client, audit team and the auditee regarding the conduct of the audit. The plan should facilitate scheduling and coordination of the audit activities.

The amount of detail provided in the audit plan should reflect the scope and complexity of the audit. The details may differ, for example, between initial and subsequent audits and also between internal and external audits. The audit plan should be sufficiently flexible to permit changes, such as changes in the audit scope, which can become necessary as the on-site audit activities progress.

The audit plan should cover the following:

- a) the audit objectives;
- b) the audit criteria and any reference documents;
- c) the audit scope, including identification of the organizational and functional units and processes to be audited;
- d) the dates and places where the on-site audit activities are to be conducted;
- e) the expected time and duration of on-site audit activities, including meetings with the auditee's management and audit team meetings;
- f) the roles and responsibilities of the audit team members and accompanying persons;
- g) the allocation of appropriate resources to critical areas of the audit.

The audit plan should also cover the following, as appropriate:

- h) identification of the auditee's representative for the audit;
- i) the working and reporting language of the audit where this is different from the language of the auditor and/or the auditee;
- j) the audit report topics;
- k) logistic arrangements (travel, on-site facilities, etc.);
- l) matters related to confidentiality;
- m) any audit follow-up actions.

The plan should be reviewed and accepted by the audit client, and presented to the auditee, before the on-site audit activities begin.

Any objections by the auditee should be resolved between the audit team leader, the auditee and the audit client. Any revised audit plan should be agreed among the parties concerned before continuing the audit.

6.4.2 Assigning work to the audit team

The audit team leader, in consultation with the audit team, should assign to each team member responsibility for auditing specific processes, functions, sites, areas or activities. Such assignments should take into account the need for the independence and competence of auditors and the effective use of resources, as well as different roles and responsibilities of auditors, auditors-in-training and technical experts. Changes to the work assignments may be made as the audit progresses to ensure the achievement of the audit objectives.

6.4.3 Preparing work documents

The audit team members should review the information relevant to their audit assignments and prepare work documents as necessary for reference and for recording audit proceedings. Such work documents may include

- checklists and audit sampling plans, and
- forms for recording information, such as supporting evidence, audit findings and records of meetings.

The use of checklists and forms should not restrict the extent of audit activities, which can change as a result of information collected during the audit.

Work documents, including records resulting from their use, should be retained at least until audit completion. Retention of documents after audit completion is described in 6.7. Those documents involving confidential or proprietary information should be suitably safeguarded at all times by the audit team members.

6.5 Conducting on-site audit activities

6.5.1 Conducting the opening meeting

An opening meeting should be held with the auditee's management or, where appropriate, those responsible for the functions or processes to be audited. The purpose of an opening meeting is

- a) to confirm the audit plan,
- b) to provide a short summary of how the audit activities will be undertaken,
- c) to confirm communication channels, and
- d) to provide an opportunity for the auditee to ask questions.

Practical help — Opening the meeting

In many instances, for example internal audits in a small organization, the opening meeting may simply consist of communicating that an audit is being conducted and explaining the nature of the audit.

For other audit situations, the meeting should be formal and records of the attendance should be kept. The meeting should be chaired by the audit team leader, and the following items should be considered, as appropriate:

- a) introduction of the participants, including an outline of their roles;
- b) confirmation of the audit objectives, scope and criteria;
- c) confirmation of the audit timetable and other relevant arrangements with the auditee, such as the date and time for the closing meeting, any interim meetings between the audit team and the auditee's management, and any late changes;
- d) methods and procedures to be used to conduct the audit, including advising the auditee that the audit evidence will only be based on a sample of the information available and that therefore there is an element of uncertainty in auditing;
- e) confirmation of formal communication channels between the audit team and the auditee;
- f) confirmation of the language to be used during the audit;
- g) confirmation that, during the audit, the auditee will be kept informed of audit progress;
- h) confirmation that the resources and facilities needed by the audit team are available;
- i) confirmation of matters relating to confidentiality;
- j) confirmation of relevant work safety, emergency and security procedures for the audit team;
- k) confirmation of the availability, roles and identities of any guides;
- l) the method of reporting, including any grading of nonconformities;
- m) information about conditions under which the audit may be terminated;
- n) information about any appeal system on the conduct or conclusions of the audit.

6.5.2 Communication during the audit

Depending upon the scope and complexity of the audit, it can be necessary to make formal arrangements for communication within the audit team and with the auditee during the audit.

The audit team should confer periodically to exchange information, assess audit progress, and to reassign work between the audit team members as needed.

During the audit, the audit team leader should periodically communicate the progress of the audit and any concerns to the auditee and audit client, as appropriate. Evidence collected during the audit that suggests an immediate and significant risk (e.g. safety, environmental or quality) should be reported without delay to the auditee and, as appropriate, to the audit client. Any concern about an issue outside the audit scope should be noted and reported to the audit team leader, for possible communication to the audit client and auditee.

Where the available audit evidence indicates that the audit objectives are unattainable, the audit team leader should report the reasons to the audit client and the auditee to determine appropriate action. Such action may include reconfirmation or modification of the audit plan, changes to the audit objectives or audit scope, or termination of the audit.

Any need for changes to the audit scope which can become apparent as on-site auditing activities progress should be reviewed with and approved by the audit client and, as appropriate, the auditee.

6.5.3 Roles and responsibilities of guides and observers

Guides and observers may accompany the audit team but are not a part of it. They should not influence or interfere with the conduct of the audit.

When guides are appointed by the auditee, they should assist the audit team and act on the request of the audit team leader. Their responsibilities may include the following:

- a) establishing contacts and timing for interviews;
- b) arranging visits to specific parts of the site or organization;
- c) ensuring that rules concerning site safety and security procedures are known and respected by the audit team members;
- d) witnessing the audit on behalf of the auditee;
- e) providing clarification or assisting in collecting information.

6.5.4 Collecting and verifying information

During the audit, information relevant to the audit objectives, scope and criteria, including information relating to interfaces between functions, activities and processes, should be collected by appropriate sampling and should be verified. Only information that is verifiable may be audit evidence. Audit evidence should be recorded.

The audit evidence is based on samples of the available information. Therefore there is an element of uncertainty in auditing, and those acting upon the audit conclusions should be aware of this uncertainty.

Figure 3 provides an overview of the process, from collecting information to reaching audit conclusions.

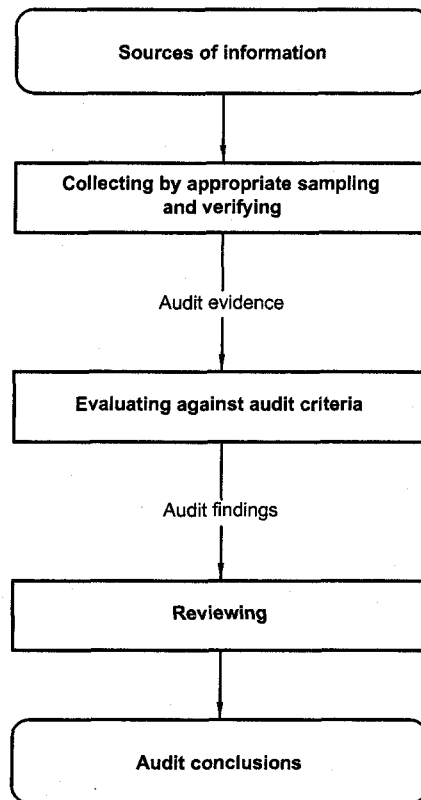


Figure 3 — Overview of the process from collecting information to reaching audit conclusions

Methods to collect information include

- interviews,
- observation of activities, and
- review of documents.

Practical help — Sources of information

The sources of information chosen may vary according to the scope and complexity of the audit and may include the following:

- a) interviews with employees and other persons;
- b) observations of activities and the surrounding work environment and conditions;
- c) documents, such as policy, objectives, plans, procedures, standards, instructions, licences and permits, specifications, drawings, contracts and orders;
- d) records, such as inspection records, minutes of meetings, audit reports, records of monitoring programmes and the results of measurements;
- e) data summaries, analyses and performance indicators;
- f) information on the auditee's sampling programmes and on procedures for the control of sampling and measurement processes;
- g) reports from other sources, for example, customer feedback, other relevant information from external parties and supplier ratings;
- h) computerized databases and web sites.

Practical help — Conducting interviews

Interviews are one of the important means of collecting information and should be carried out in a manner adapted to the situation and the person interviewed. However, the auditor should consider the following:

- a) interviews should be held with persons from appropriate levels and functions performing activities or tasks within the scope of the audit;
- b) interviews should be conducted during the normal working hours and, where practical, at the normal workplace of the person being interviewed;
- c) every attempt should be made to put the person being interviewed at ease prior to and during the interview;
- d) the reason for the interview and any note taking should be explained;
- e) interviews can be initiated by asking the persons to describe their work;
- f) questions that bias the answers (i.e. leading questions) should be avoided;
- g) the results from the interview should be summarized and reviewed with the interviewed person;
- h) the interviewed persons should be thanked for their participation and cooperation.

6.5.5 Generating audit findings

Audit evidence should be evaluated against the audit criteria to generate the audit findings. Audit findings can indicate either conformity or nonconformity with audit criteria. When specified by the audit objectives, audit findings can identify an opportunity for improvement.

The audit team should meet as needed to review the audit findings at appropriate stages during the audit.

Conformity with audit criteria should be summarized to indicate locations, functions or processes that were audited. If included in the audit plan, individual audit findings of conformity and their supporting evidence should also be recorded.

Nonconformities and their supporting audit evidence should be recorded. Nonconformities may be graded. They should be reviewed with the auditee to obtain acknowledgement that the audit evidence is accurate, and that the nonconformities are understood. Every attempt should be made to resolve any diverging opinions concerning the audit evidence and/or findings, and unresolved points should be recorded.

6.5.6 Preparing audit conclusions

The audit team should confer prior to the closing meeting

- a) to review the audit findings, and any other appropriate information collected during the audit, against the audit objectives,
- b) to agree on the audit conclusions, taking into account the uncertainty inherent in the audit process,
- c) to prepare recommendations, if specified by the audit objectives, and
- d) to discuss audit follow-up, if included in the audit plan.

Practical help — Audit conclusions

Audit conclusions can address issues such as

- a) the extent of conformity of the management system with the audit criteria,
- b) the effective implementation, maintenance and improvement of the management system, and
- c) the capability of the management review process to ensure the continuing suitability, adequacy, effectiveness and improvement of the management system.

If specified by the audit objectives, audit conclusions can lead to recommendations regarding improvements, business relationships, certification/registration or future auditing activities.

6.5.7 Conducting the closing meeting

A closing meeting, chaired by the audit team leader, should be held to present the audit findings and conclusions in such a manner that they are understood and acknowledged by the auditee, and to agree, if appropriate, on the timeframe for the auditee to present a corrective and preventive action plan. Participants in the closing meeting should include the auditee, and may also include the audit client and other parties. If necessary, the audit team leader should advise the auditee of situations encountered during the audit that may decrease the reliance that can be placed on the audit conclusions.

In many instances, for example internal audits in a small organization, the closing meeting may consist of just communicating the audit findings and conclusions.

For other audit situations, the meeting should be formal and minutes, including records of attendance, should be kept.

Any diverging opinions regarding the audit findings and/or conclusions between the audit team and the auditee should be discussed and if possible resolved. If not resolved, all opinions should be recorded.

If specified by the audit objectives, recommendations for improvements should be presented. It should be emphasized that recommendations are not binding.

6.6 Preparing, approving and distributing the audit report

6.6.1 Preparing the audit report

The audit team leader should be responsible for the preparation and contents of the audit report.

The audit report should provide a complete, accurate, concise and clear record of the audit, and should include or refer to the following:

- a) the audit objectives;
- b) the audit scope, particularly identification of the organizational and functional units or processes audited and the time period covered;
- c) identification of the audit client;
- d) identification of audit team leader and members;
- e) the dates and places where the on-site audit activities were conducted;
- f) the audit criteria;
- g) the audit findings;
- h) the audit conclusions.

The audit report may also include or refer to the following, as appropriate:

- i) the audit plan;
- j) a list of auditee representatives;
- k) a summary of the audit process, including the uncertainty and/or any obstacles encountered that could decrease the reliability of the audit conclusions;
- l) confirmation that the audit objectives have been accomplished within the audit scope in accordance with the audit plan;
- m) any areas not covered, although within the audit scope;
- n) any unresolved diverging opinions between the audit team and the auditee;
- o) recommendations for improvement, if specified in the audit objectives;
- p) agreed follow-up action plans, if any;
- q) a statement of the confidential nature of the contents;
- r) the distribution list for the audit report.

6.6.2 Approving and distributing the audit report

The audit report should be issued within the agreed time period. If this is not possible, the reasons for the delay should be communicated to the audit client and a new issue date should be agreed.

The audit report should be dated, reviewed and approved in accordance with audit programme procedures.

The approved audit report should then be distributed to recipients designated by the audit client.

The audit report is the property of the audit client. The audit team members and all report recipients should respect and maintain the confidentiality of the report.

6.7 Completing the audit

The audit is completed when all activities described in the audit plan have been carried out and the approved audit report has been distributed.

Documents pertaining to the audit should be retained or destroyed by agreement between the participating parties and in accordance with audit programme procedures and applicable statutory, regulatory and contractual requirements.

Unless required by law, the audit team and those responsible for managing the audit programme should not disclose the contents of documents, any other information obtained during the audit, or the audit report, to any other party without the explicit approval of the audit client and, where appropriate, the approval of the auditee. If disclosure of the contents of an audit document is required, the audit client and auditee should be informed as soon as possible.

6.8 Conducting audit follow-up

The conclusions of the audit may indicate the need for corrective, preventive or improvement actions, as applicable. Such actions are usually decided and undertaken by the auditee within an agreed timeframe and are not considered to be part of the audit. The auditee should keep the audit client informed of the status of these actions.

The completion and effectiveness of corrective action should be verified. This verification may be part of a subsequent audit.

The audit programme may specify follow-up by members of the audit team, which adds value by using their expertise. In such cases, care should be taken to maintain independence in subsequent audit activities.

7 Competence and evaluation of auditors

7.1 General

Confidence and reliance in the audit process depends on the competence of those conducting the audit. This competence is based on the demonstration of

- the personal attributes described in 7.2, and
- the ability to apply the knowledge and skills described in 7.3 gained through the education, work experience, auditor training and audit experience described in 7.4.

This concept of competence of auditors is illustrated in Figure 4. Some of the knowledge and skills described in 7.3 are common to auditors of quality and environmental management systems, and some are specific to auditors of the individual disciplines.

Auditors develop, maintain and improve their competence through continual professional development and regular participation in audits (see 7.5).

A process for evaluating auditors and audit team leaders is described in 7.6.

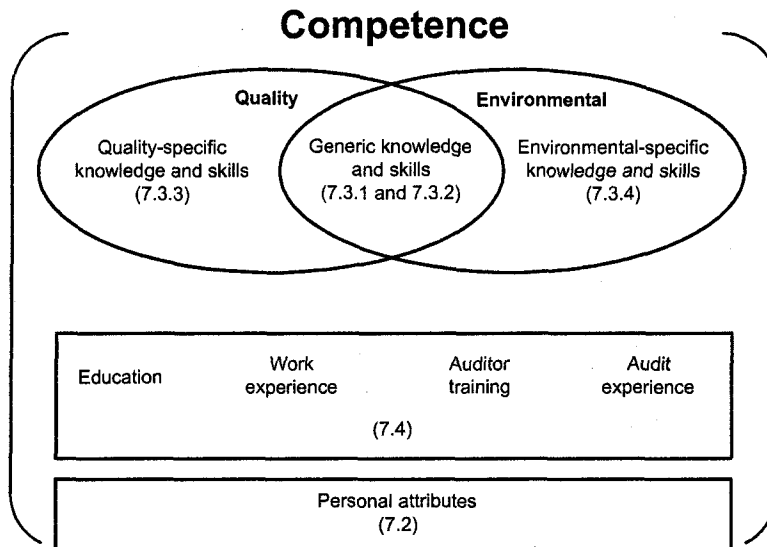


Figure 4 — Concept of competence

7.2 Personal attributes

Auditors should possess personal attributes to enable them to act in accordance with the principles of auditing described in clause 4.

An auditor should be:

- a) ethical, i.e. fair, truthful, sincere, honest and discreet;
- b) open-minded, i.e. willing to consider alternative ideas or points of view;
- c) diplomatic, i.e. tactful in dealing with people;
- d) observant, i.e. actively aware of physical surroundings and activities;
- e) perceptive, i.e. instinctively aware of and able to understand situations;
- f) versatile, i.e. adjusts readily to different situations;
- g) tenacious, i.e. persistent, focused on achieving objectives;
- h) decisive, i.e. reaches timely conclusions based on logical reasoning and analysis; and
- i) self-reliant, i.e. acts and functions independently while interacting effectively with others.

7.3 Knowledge and skills

7.3.1 Generic knowledge and skills of quality management system and environmental management system auditors

Auditors should have knowledge and skills in the following areas.

- a) Audit principles, procedures and techniques: to enable the auditor to apply those appropriate to different audits and ensure that audits are conducted in a consistent and systematic manner. An auditor should be able
- to apply audit principles, procedures and techniques,
 - to plan and organize the work effectively,
 - to conduct the audit within the agreed time schedule,
 - to prioritize and focus on matters of significance,
 - to collect information through effective interviewing, listening, observing and reviewing documents, records and data,
 - to understand the appropriateness and consequences of using sampling techniques for auditing,
 - to verify the accuracy of collected information,
 - to confirm the sufficiency and appropriateness of audit evidence to support audit findings and conclusions,
 - to assess those factors that can affect the reliability of the audit findings and conclusions,
 - to use work documents to record audit activities,
 - to prepare audit reports,
 - to maintain the confidentiality and security of information, and
 - to communicate effectively, either through personal linguistic skills or through an interpreter.
- b) Management system and reference documents: to enable the auditor to comprehend the scope of the audit and apply audit criteria. Knowledge and skills in this area should cover
- the application of management systems to different organizations,
 - interaction between the components of the management system,
 - quality or environmental management system standards, applicable procedures or other management system documents used as audit criteria,
 - recognizing differences between and priority of the reference documents,
 - application of the reference documents to different audit situations, and
 - information systems and technology for, authorization, security, distribution and control of documents, data and records.
- c) Organizational situations: to enable the auditor to comprehend the organization's operational context. Knowledge and skills in this area should cover
- organizational size, structure, functions and relationships,
 - general business processes and related terminology, and
 - cultural and social customs of the auditee.

- d) Applicable laws, regulations and other requirements relevant to the discipline: to enable the auditor to work within, and be aware of, the requirements that apply to the organization being audited. Knowledge and skills in this area should cover

- local, regional and national codes, laws and regulations,
- contracts and agreements,
- international treaties and conventions, and
- other requirements to which the organization subscribes.

7.3.2 Generic knowledge and skills of audit team leaders

Audit team leaders should have additional knowledge and skills in audit leadership to facilitate the efficient and effective conduct of the audit. An audit team leader should be able

- to plan the audit and make effective use of resources during the audit,
- to represent the audit team in communications with the audit client and auditee,
- to organize and direct audit team members,
- to provide direction and guidance to auditors-in-training,
- to lead the audit team to reach the audit conclusions,
- to prevent and resolve conflicts, and
- to prepare and complete the audit report.

7.3.3 Specific knowledge and skills of quality management system auditors

Quality management system auditors should have knowledge and skills in the following areas.

- a) Quality-related methods and techniques: to enable the auditor to examine quality management systems and to generate appropriate audit findings and conclusions. Knowledge and skills in this area should cover
- quality terminology,
 - quality management principles and their application, and
 - quality management tools and their application (for example statistical process control, failure mode and effect analysis, etc.).
- b) Processes and products, including services: to enable the auditor to comprehend the technological context in which the audit is being conducted. Knowledge and skills in this area should cover
- sector-specific terminology,
 - technical characteristics of processes and products, including services, and
 - sector-specific processes and practices.

7.3.4 Specific knowledge and skills of environmental management system auditors

Environmental management system auditors should have knowledge and skills in the following areas.

- a) Environmental management methods and techniques: to enable the auditor to examine environmental management systems and to generate appropriate audit findings and conclusions. Knowledge and skills in this area should cover
 - environmental terminology,
 - environmental management principles and their application, and
 - environmental management tools (such as environmental aspect/impact evaluation, life cycle assessment, environmental performance evaluation, etc.).
- b) Environmental science and technology: to enable the auditor to comprehend the fundamental relationships between human activities and the environment. Knowledge and skills in this area should cover
 - the impact of human activities on the environment,
 - interaction of ecosystems,
 - environmental media (e.g. air, water, land),
 - management of natural resources (e.g. fossil fuels, water, flora and fauna), and
 - general methods of environmental protection.
- c) Technical and environmental aspects of operations: to enable the auditor to comprehend the interaction of the auditee's activities, products, services and operations with the environment. Knowledge and skills in this area should cover
 - sector-specific terminology,
 - environmental aspects and impacts,
 - methods for evaluating the significance of environmental aspects,
 - critical characteristics of operational processes, products and services,
 - monitoring and measurement techniques, and
 - technologies for the prevention of pollution.

7.4 Education, work experience, auditor training and audit experience

7.4.1 Auditors

Auditors should have the following education, work experience, auditor training and audit experience.

- a) They should have completed an education sufficient to acquire the knowledge and skills described in 7.3.
- b) They should have work experience that contributes to the development of the knowledge and skills described in 7.3.3 and 7.3.4. This work experience should be in a technical, managerial or professional position involving the exercise of judgement, problem solving, and communication with other managerial or professional personnel, peers, customers and/or other interested parties.

Part of the work experience should be in a position where the activities undertaken contribute to the development of knowledge and skills in

- the quality management field for quality management system auditors, and
- the environmental management field for environmental management system auditors.

- c) They should have completed auditor training that contributes to the development of the knowledge and skills described in 7.3.1 as well as in 7.3.3 and 7.3.4. This training may be provided by the person's own organization or by an external organization.
- d) They should have audit experience in the activities described in clause 6. This experience should have been gained under the direction and guidance of an auditor who is competent as an audit team leader in the same discipline.

NOTE The extent of direction and guidance (here and in 7.4.2, 7.4.3 and Table1) needed during an audit is at the discretion of those assigned the responsibility for managing the audit programme and the audit team leader. The provision of direction and guidance does not imply constant supervision and does not require someone to be assigned solely to the task.

7.4.2 Audit team leaders

An audit team leader should have acquired additional audit experience to develop the knowledge and skills described in 7.3.2. This additional experience should have been gained while acting in the role of an audit team leader under the direction and guidance of another auditor who is competent as an audit team leader.

7.4.3 Auditors who audit both quality and environmental management systems

Quality management system or environmental management system auditors who wish to become auditors in the second discipline

- a) should have the training and work experience needed to acquire the knowledge and skills for the second discipline, and
- b) should have conducted audits covering the management system in the second discipline under the direction and guidance of an auditor who is competent as an audit team leader in the second discipline.

An audit team leader in one discipline should meet the above recommendations to become an audit team leader in the second discipline.

7.4.4 Levels of education, work experience, auditor training and audit experience

Organizations should establish the levels of the education, work experience, auditor training and audit experience an auditor needs to gain the knowledge and skills appropriate to the audit programme by applying Steps 1 and 2 of the evaluation process described in 7.6.2.

Experience has shown that the levels given in Table 1 are appropriate for auditors conducting certification or similar audits. Depending on the audit programme, higher or lower levels may be appropriate.

Table 1 — Example of levels of education, work experience, auditor training and audit experience for auditors conducting certification or similar audits

Parameter	Auditor	Auditor in both disciplines	Audit team leader
Education	Secondary education (see Note 1)	Same as for auditor	Same as for auditor
Total work experience	5 years (see Note 2)	Same as for auditor	Same as for auditor
Work experience in quality or environmental management field	At least 2 years of the total 5 years	2 years in the second discipline (see Note 3)	Same as for auditor
Auditor training	40 h of audit training	24 h of training in the second discipline (see Note 4)	Same as for auditor
Audit experience	Four complete audits for a total of at least 20 days of audit experience as an auditor-in-training under the direction and guidance of an auditor competent as an audit team leader (see Note 5). The audits should be completed within the last three consecutive years	Three complete audits for a total of at least 15 days of audit experience in the second discipline under the direction and guidance of an auditor competent as an audit team leader in the second discipline (see Note 5). The audits should be completed within the last two consecutive years	Three complete audits for a total of at least 15 days of audit experience acting in the role of an audit team leader under the direction and guidance of an auditor competent as an audit team leader (see Note 5). The audits should be completed within the last two consecutive years
NOTE 1 Secondary education is that part of the national educational system that comes after the primary or elementary stage, but that is completed prior to entrance to a university or similar educational institution. NOTE 2 The number of years of work experience may be reduced by 1 year if the person has completed appropriate post-secondary education. NOTE 3 The work experience in the second discipline may be concurrent with the work experience in the first discipline. NOTE 4 The training in the second discipline is to acquire knowledge of the relevant standards, laws, regulations, principles, methods and techniques. NOTE 5 A complete audit is an audit covering all of the steps described in 6.3 to 6.6. The overall audit experience should cover the entire management system standard.			

7.5 Maintenance and improvement of competence

7.5.1 Continual professional development

Continual professional development is concerned with the maintenance and improvement of knowledge, skills and personal attributes. This can be achieved through means such as additional work experience, training, private study, coaching, attendance at meetings, seminars and conferences or other relevant activities. Auditors should demonstrate their continual professional development.

The continual professional development activities should take into account changes in the needs of the individual and the organization, the practice of auditing, standards and other requirements.

7.5.2 Maintenance of auditing ability

Auditors should maintain and demonstrate their auditing ability through regular participation in audits of quality and/or environmental management systems.

7.6 Auditor evaluation

7.6.1 General

The evaluation of auditors and audit team leaders should be planned, implemented and recorded in accordance with audit programme procedures to provide an outcome that is objective, consistent, fair and reliable. The evaluation process should identify training and other skill enhancement needs.

The evaluation of auditors occurs at the following different stages:

- the initial evaluation of persons who wish to become auditors;
- the evaluation of the auditors as part of the audit team selection process described in 6.2.4;
- the continual evaluation of auditor performance to identify needs for maintenance and improvement of knowledge and skills.

Figure 5 illustrates the relationship between these stages of evaluation.

The process steps described in 7.6.2 may be used in each of these stages of evaluation.

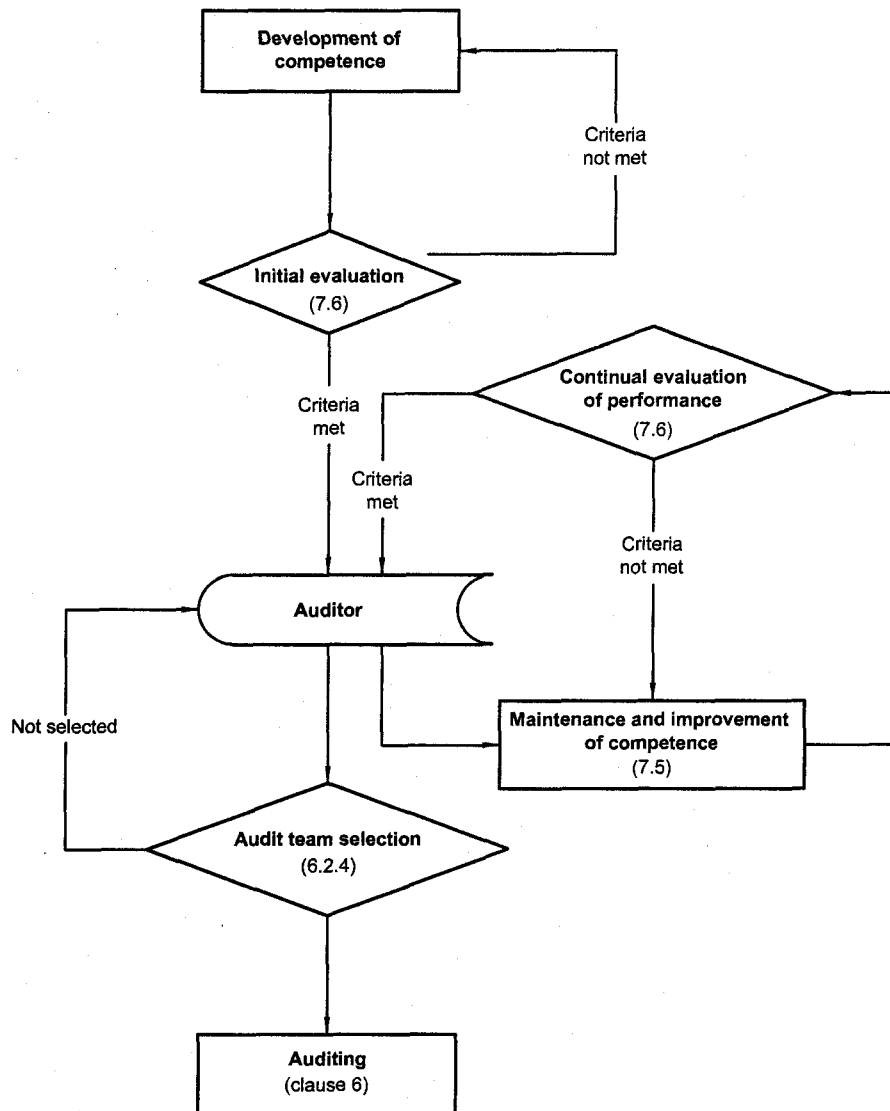


Figure 5 — Relationship between the stages of evaluation

7.6.2 Evaluation process

The evaluation process involves four main steps.

Step 1 — Identify the personal attributes, and the knowledge and skills to meet the needs of the audit programme

In deciding the appropriate knowledge and skills, the following should be considered:

- the size, nature and complexity of the organization to be audited;
- the objectives and extent of the audit programme;

- certification/registration and accreditation requirements;
- the role of the audit process in the management of the organization to be audited;
- the level of confidence required in the audit programme;
- the complexity of the management system to be audited.

Step 2 — Set the evaluation criteria

The criteria may be quantitative (such as the years of work experience and education, number of audits conducted, hours of audit training) or qualitative (such as having demonstrated personal attributes, knowledge or the performance of the skills, in training or in the workplace).

Step 3 — Select the appropriate evaluation method

Evaluation should be undertaken by a person or a panel using one or more of the methods selected from those in Table 2. In using Table 2, the following should be noted:

- the methods outlined represent a range of options and may not apply in all situations;
- the various methods outlined can differ in their reliability;
- typically, a combination of methods should be used to ensure an outcome that is objective, consistent, fair and reliable.

Step 4 — Conduct the evaluation

In this step the information collected about the person is compared against the criteria set in Step 2. Where a person does not meet the criteria, additional training, work and/or audit experience are required, following which there should be a re-evaluation.

An example of how the steps of the evaluation process might be applied and documented for a hypothetical internal audit programme is illustrated in Table 3.

Table 2 — Evaluation methods

Evaluation method	Objectives	Examples
Review of records	To verify the background of the auditor	Analysis of records of education, training, employment and audit experience
Positive and negative feedback	To provide information about how the performance of the auditor is perceived	Surveys, questionnaires, personal references, testimonials, complaints, performance evaluation, peer review
Interview	To evaluate personal attributes and communication skills, to verify information and test knowledge and to acquire additional information	Face-to-face and telephone interviews
Observation	To evaluate personal attributes and the ability to apply knowledge and skills	Role playing, witnessed audits, on-the-job performance
Testing	To evaluate personal attributes and knowledge and skills and their application	Oral and written exams, psychometric testing
Post-audit review	To provide information where direct observation may not be possible or appropriate	Review of the audit report and discussion with the audit client, auditee, colleagues and with the auditor

Table 3 — Application of the evaluation process for an auditor in a hypothetical internal audit programme

Areas of competence	Step 1 Personal attributes, and knowledge and skills	Step 2 Evaluation criteria	Step 3 Evaluation methods
Personal attributes	Ethical, open-minded, diplomatic, observant, perceptive, versatile, tenacious, decisive, self-reliant.	Satisfactory performance in the workplace.	Performance evaluation
Generic knowledge and skills			
Audit principles, procedures and techniques	Ability to conduct an audit according to in-house procedures, communicating with known workplace colleagues.	Completed an internal auditor training course. Performed three audits as a member of an internal audit team.	Review of training records Observation Peer review
Management system and reference documents	Ability to apply the relevant parts of the Management System Manual and related procedures.	Read and understood the procedures in the Management System Manual relevant to the audit objectives, scope and criteria.	Review of training records Testing Interview
Organizational situations	Ability to operate effectively within the organization's culture and organizational and reporting structure.	Worked for the organization for at least one year in a supervisory role	Review of employment records
Applicable laws, regulations and other requirements	Ability to identify and understand the application of the relevant laws and regulations related to the processes, products and/or discharges to the environment.	Completed a training course on the laws relevant to the activities and processes to be audited.	Review of training records
Quality-specific knowledge and skills			
Quality-related methods and techniques	Ability to describe the in-house quality control methods. Ability to differentiate between requirements for in-process and final testing.	Completed training in the application of quality control methods. Demonstrated work place use of in-process and final testing procedures.	Review of training records Observation
Processes and products, including services	Ability to identify the products, their manufacturing process, specifications and end-use.	Worked in the production planning as process planning clerk. Worked in the service department.	Review of employment records
Environmental-specific knowledge and skills			
Environmental management methods and techniques	Ability to understand methods for evaluating environmental performance.	Completed training in environmental performance evaluation.	Review of training records
Environmental science and technology	Ability to understand how the pollution prevention and control methods used by the organization address the organization's significant environmental aspects.	Six months of work experience in pollution prevention and control in a similar manufacturing environment.	Review of employment records
Technical and environmental aspects of operations	Ability to recognize the organization's environmental aspects and their impacts (e.g. materials, their reactions with one another and potential impact on the environment in the event of spillage or release). Ability to assess the emergency response procedures applicable to environmental incidents.	Completed an in-house training course on materials storage, mixing, use, disposal and their environmental impacts. Completed training in the Emergency Response Plan and experience as a member of the emergency response team.	Review of training records, course content and results Review of training and employment records

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