
Indoor air —

Part 40:

Indoor air quality management system

Air intérieur —

Partie 40: Système de management de la qualité de l'air intérieur

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Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Context of the organization	5
4.1 Understanding the organization and its context.....	5
4.2 Understanding the needs and expectations of interested parties.....	5
4.3 Determining the scope of the indoor air quality management system.....	5
4.4 Indoor air quality management system.....	5
5 Leadership	5
5.1 Leadership and commitment.....	5
5.1.1 General.....	5
5.1.2 Management representatives.....	6
5.2 Policy.....	6
5.3 Roles, responsibilities and authorities.....	7
5.4 Legal requirements and other requirements.....	7
6 Planning	7
6.1 Actions to address risks and opportunities.....	7
6.2 Indoor air quality objectives and planning to achieve them.....	8
6.3 Indoor air quality aspects.....	8
6.3.1 General.....	8
7 Support	9
7.1 Resources.....	9
7.2 Competence.....	9
7.3 Awareness.....	9
7.4 Communication.....	10
7.5 Documented information.....	10
7.5.1 General.....	10
7.5.2 Creating and updating.....	10
7.5.3 Control of documented information.....	11
7.5.4 Control of records.....	11
7.5.5 Indoor air quality management manual.....	11
7.6 Infrastructure and maintenance.....	12
8 Operation	12
8.1 Operational planning and control.....	12
8.2 Planning indoor air quality.....	12
8.3 Purchases.....	13
8.3.1 Evaluation of suppliers.....	13
8.3.2 Information on purchases.....	13
8.3.3 Verification of purchases.....	13
8.4 Operational control.....	13
9 Performance evaluation	13
9.1 Monitoring, measurement, analysis and evaluation.....	13
9.2 Internal audit.....	14
9.3 Management review.....	15
10 Improvement	15
10.1 Nonconformity and corrective action.....	15
10.2 Continual improvement.....	16
Annex A (informative) Identifying and assessing indoor air quality aspects	17

Annex B (informative) Identifying and assessing indoor air quality aspects: Descriptive system flowchart	22
Bibliography	23

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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.

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

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

This document was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

A list of all parts in the ISO 16000 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

When not in the home urban populations spend most of the time indoors working in commercial buildings, enjoy leisure time in hotels or shopping malls, or maybe using services in hospitals and transportation centers among other types of facilities. There are many scientific studies showing that special characteristics of indoor air pollution make enclosed spaces quite different from the outdoors in terms of the quality of the air. There is a lot of knowledge about indoor air pollution, however, there is a general lack of practical application of most of this information in the everyday life of the general public, this document aims to help the managers of indoor built environments to apply protocols and maintenance programs intended to enhance indoor air quality.

This document will help facility managers to apply protocols and maintenance processes designed to enhance indoor air quality in their indoor spaces.

Controlling the quality of the indoor air can have enormous social benefits in terms of comfort and health of the population, therefore enhancing productivity and minimizing absenteeism in commercial premises as well as minimising nosocomial infections in hospital environments.

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Indoor air —

Part 40: Indoor air quality management system

1 Scope

This document specifies requirements for an indoor air quality management system.

It is applicable to any organization that wishes to:

- a) establish a system for the management of the quality of indoor air;
- b) implement, maintain and continually improve the indoor air quality management system;
- c) ensure conformity to the indoor air quality management system;
- d) demonstrate conformity to this document.

It is applicable to the indoor environments of all kinds of facilities, installations and buildings, except those that are exclusively dedicated to industrial and/or agriculture activities.

It is applicable to all types of indoor environments occupied by all kinds of persons, including regular users, clients, workers, etc.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1 organization

person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its *objectives* (3.8)

Note 1 to entry: The concept of organization includes, but is not limited to sole-trader, company, corporation, firm, enterprise, authority, partnership, charity or institution, or part or combination thereof, whether incorporated or not, public or private.

Note 2 to entry: For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.2
interested party
stakeholder

person or *organization* (3.1) that can affect, be affected by, or perceive itself to be affected by a decision or activity

3.3
requirement
need or expectation that is stated, generally implied or obligatory

Note 1 to entry: "Generally implied" means that it is custom or common practice for the organization and interested parties that the need or expectation under consideration is implied.

Note 2 to entry: A specified requirement is one that is stated, e.g. in documented information.

3.4
management system
set of interrelated or interacting elements of an *organization* (3.1) to establish *policies* (3.7) and *objectives* (3.8) and *processes* (3.12) to achieve those objectives

Note 1 to entry: A management system can address a single discipline or several disciplines.

Note 2 to entry: The system elements include the organization's structure, roles and responsibilities, planning and operation.

Note 3 to entry: The scope of a management system can include the whole of the organization, specific and identified functions of the organization, specific and identified sections of the organization, or one or more functions across a group of organizations.

3.5
management
person or group of people who directs and controls an *organization* (3.1) at the highest level

Note 1 to entry: Management has the power to delegate authority and provide resources within the organization.

Note 2 to entry: If the scope of the *management system* (3.4) covers only part of an organization, then management refers to those who direct and control that part of the organization.

3.6
effectiveness
extent to which planned activities are realized and planned results achieved

3.7
policy
intentions and direction of an *organization* (3.1), as formally expressed by its *management* (3.5)

3.8
objective
result to be achieved

Note 1 to entry: An objective can be strategic, tactical, or operational.

Note 2 to entry: Objectives can relate to different disciplines (such as financial, health and safety, and environmental goals) and can apply at different levels [such as strategic, organization-wide, project, product and *process* (3.12)].

Note 3 to entry: An objective can be expressed in other ways, e.g. as an intended outcome, a purpose, an operational criterion, another objective, or by the use of other words with similar meaning (e.g. aim, goal, or target).

Note 4 to entry: In the context of indoor air quality management system, indoor air quality objectives are set by the organization, consistent with its policy, to achieve specific results.

3.9**risk**

effect of uncertainty

Note 1 to entry: An effect is a deviation from the expected — positive or negative.

Note 2 to entry: Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of, an event, its consequence, or likelihood.

Note 3 to entry: Risk is often characterized by reference to potential “events” (as defined in ISO Guide 73) and “consequences” (as defined in ISO Guide 73), or a combination of these.

Note 4 to entry: Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated “likelihood” (as defined in ISO Guide 73) of occurrence.

3.10**competence**

ability to apply knowledge and skills to achieve intended results

3.11**documented information**

information required to be controlled and maintained by an *organization* (3.1) and the medium on which it is contained

Note 1 to entry: Documented information can be in any format and media, and from any source.

Note 2 to entry: Documented information can refer to:

- the *management system* (3.4), including related *processes* (3.12);
- information created in order for the organization to operate (documentation);
- evidence results achieved (records).

3.12**process**

set of interrelated or interacting activities which transforms inputs into outputs

3.13**performance**

measurable result

Note 1 to entry: Performance can relate either to quantitative or qualitative findings.

Note 2 to entry: Performance can relate to managing activities, *processes* (3.12), products (including services), systems or *organizations* (3.1).

3.14**outsource**

make an arrangement where an external *organization* (3.1) performs part of an organization’s function or *process* (3.12)

Note 1 to entry: An external organization is outside the scope of the *management system* (3.4), although the outsourced function or process is within the scope.

3.15**monitoring**

determining the status of a system, a *process* (3.12) or an activity

Note 1 to entry: To determine the status, there can be a need to check, supervise or critically observe.

3.16**measurement**

process (3.12) to determine a value

3.17
audit

systematic, independent and documented *process* (3.12) for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled

Note 1 to entry: An audit can be an internal audit (first party) or an external audit (second party or third party), and it can be a combined audit (combining two or more disciplines).

Note 2 to entry: An internal audit is conducted by the organization itself, or by an external party on its behalf.

Note 3 to entry: "Audit evidence" and "audit criteria" are defined in ISO 19011.

3.18
conformity

fulfilment of a *requirement* (3.3)

3.19
non conformity

non-fulfilment of a *requirement* (3.3)

3.20
corrective action

action to eliminate the cause(s) of a *nonconformity* (3.19) and to prevent recurrence

3.21
continual improvement

recurring activity to enhance *performance* (3.13)

3.22
indoor environment

environment delimited by the envelope of the enclosures for any use except those dedicated exclusively to industrial and/or agricultural activities

[SOURCE: UNE 171330-1:2008]

3.23
indoor air quality aspect

elements of the site and its surroundings, activities and/or services of an organization that can interact with indoor quality

[SOURCE: UNE 171330-1:2008]

3.24
indoor air quality

quality of air inside a building, described in terms of odour, physical parameters, chemical and biological pollutants

Note 1 to entry: Indoor air quality is directly related to the ventilation rate, air distribution patterns and pollution sources.

Note 2 to entry: Indoor air quality is important in ensuring human health, olfactory comfort and perceived comfort.

Note 3 to entry: Adapted from ISO 16813:2006, 3.21. The definition has been simplified to refer to a building in general, versus only non-industrial buildings, and the non-essential but relevant characteristics are now referenced in notes.

4 Context of the organization

4.1 Understanding the organization and its context

The organization shall determine external and internal issues that are relevant to its purpose and that affect its ability to achieve the intended outcome(s) of its indoor air quality management system.

4.2 Understanding the needs and expectations of interested parties

The organization shall determine:

- a) the interested parties that are relevant to the indoor air quality management system;
- b) the relevant requirements of these interested parties.

4.3 Determining the scope of the indoor air quality management system

The organization shall determine the boundaries and applicability of the indoor air quality management system to establish its scope.

When determining this scope, the organization shall consider:

- a) the external and internal issues referred to in [4.1](#);
- b) the requirements referred to in [4.2](#).

The scope shall be available as documented information.

4.4 Indoor air quality management system

The organization shall establish, document, implement, maintain and continually improve an indoor air quality management system, including the processes needed and their interactions, in accordance with the requirements of this document. It shall determine how it will fulfil these requirements.

When an organization chooses to outsource any activity affecting conformity to these requirements, the organization shall ensure control over such activities. The responsibilities and necessary controls in such outsourced activities should be identified in the management system.

NOTE 1 An outsourced indoor air quality activity is one that the organization needs for its indoor air management system and that it chooses to have performed by an external party.

NOTE 2 Ensuring control of outsourced activities does not absolve the organization of the responsibility to conform to all requirements, including statutory and regulatory requirements.

5 Leadership

5.1 Leadership and commitment

5.1.1 General

Management shall demonstrate leadership and commitment with respect to the indoor air quality management system by:

- a) ensuring that the indoor air quality policies and indoor air quality objectives are established and are compatible with the strategic direction of the organization;
- b) ensuring the integration of the indoor air quality management system requirements into the organization's business processes;

- c) ensuring that the resources needed for the indoor air quality management system are available;
- d) communicating the importance of an effective indoor air quality management system and of conforming to the indoor air quality management system requirements;
- e) ensuring that the indoor air quality management system achieves its intended outcome(s);
- f) directing and supporting persons to contribute to the effectiveness of the indoor air quality management system;
- g) promoting continual improvement;
- h) supporting other relevant managerial roles to demonstrate their leadership as it applies to their areas of responsibility;
- i) carrying out management reviews.

NOTE Reference to “business” in this document can be interpreted broadly to mean those activities that are core to the purposes of the organization’s existence.

5.1.2 Management representatives

5.1.2.1 The organization should define roles, responsibilities and authority. These should be documented and communicated within the organization, to facilitate the effective management of indoor air quality.

The organization shall establish the appropriate communication channels for:

- a) internal communication between its various levels and functions;
- b) receiving, documenting and responding to communications from external stakeholders (see 7.4).

It shall ensure that the effectiveness of the indoor air quality management system is communicated.

5.1.2.2 As part of measuring the performance of the indoor air quality management system, the organization may periodically monitor the perception of users regarding the fulfilment of their indoor air quality expectations, as well as the management of the organization’s related activities. If a decision is taken to conduct periodic monitoring, the organization shall determine and document the methods for obtaining and using this information.

5.1.2.3 Management shall appoint a member of the organization’s management who, irrespective of other responsibilities, shall have the responsibility and authority to ensure:

- a) the indoor air quality management system is established, implemented and maintained in accordance with the requirements of this document;
- b) reports are made to management on the performance of the management system review, including recommendations for improvement;
- c) ensure the promotion of awareness of management activities on indoor air quality at all levels of the organization.

NOTE The responsibility of the management representative can include liaison with external parties on matters relating to the indoor air quality management system.

5.2 Policy

5.2.1 Management shall establish an indoor air quality policy that:

- a) is appropriate to the purpose of the organization;

- b) provides a framework for setting indoor air quality objectives;
- c) take into account applicable legal requirements and other requirements to which the organization subscribes;
- d) includes a commitment to continual improvement of the indoor air quality management system.

5.2.2 The policy of indoor air quality management shall:

- a) be available as documented information;
- b) be implemented, maintained and reviewed for continuing suitability;
- c) be communicated within the organization;
- d) be available to interested parties, as appropriate.

5.3 Roles, responsibilities and authorities

Management shall ensure that the responsibilities and authorities for relevant roles are assigned and communicated within the organization.

Management shall assign the responsibility and authority for:

- a) ensuring that the indoor air quality management system conforms to the requirements of this document;
- b) reporting on the performance of the indoor air quality management system to management.

5.4 Legal requirements and other requirements

Management shall ensure that there is a procedure established, implemented and maintained:

- a) to identify and access the applicable legal requirements and other requirements to which the organization subscribes related to indoor air quality;
- b) to determine how these requirements apply to proceedings relating to indoor air quality and the indoor air quality management system.

The organization shall keep this information updated. It shall communicate relevant information on legal requirements and other requirements to its staff and stakeholders.

6 Planning

6.1 Actions to address risks and opportunities

6.1.1 When planning for the indoor air quality management system, the organization shall consider the issues referred to in [4.1](#) and the requirements referred to in [4.2](#) and determine the risks and opportunities that need to be addressed to:

- a) give assurance that the indoor air quality management system can achieve its intended outcome(s);
- b) prevent, or reduce, undesired effects;
- c) achieve continual improvement.

6.1.2 The organization shall plan:

- a) actions to address these risks and opportunities;

b) how to:

- 1) integrate and implement the actions into its indoor air quality management system processes;
- 2) evaluate the effectiveness of these actions.

6.2 Indoor air quality objectives and planning to achieve them

6.2.1 The organization shall establish indoor air quality objectives at relevant functions and levels.

The indoor air quality objectives shall:

- a) be consistent with the indoor air quality policy;
- b) be measurable (if practicable);
- c) take into account applicable legal requirements and other requirements to which the organization subscribes;
- d) be monitored;
- e) be communicated;
- f) be updated as appropriate.

The organization shall also consider its technological, financial and operational requirements, and the expectations of its users.

The organization shall retain documented information on the indoor air quality objectives.

6.2.2 When planning how to achieve its indoor air quality objectives, the organization shall determine:

- a) what will be done, including establishing, documenting, implementing and maintaining processes;
- b) what resources will be required;
- c) who will be responsible, including the allocation of responsibility and authority for achieving objectives at relevant functions and levels of the organization;
- d) when it will be completed, including the means and timetable for achieving the objectives;
- e) how the results will be evaluated, including reviewing them periodically to ensure that they remain relevant to and consistent with the objectives of indoor air quality.

6.3 Indoor air quality aspects

6.3.1 General

The organization shall establish, implement and maintain a procedure to identify, determine the risk level and, if necessary, assess indoor air quality aspects.

The organization shall ensure that the results of these assessments are considered and, where appropriate, provide input for:

- a) the objectives for managing indoor air quality;
- b) the management processes of indoor air quality;
- c) determining the requirements for changes and remodelling of facilities;
- d) identifying appropriate resources;

- e) identifying training needs;
- f) developing operational controls.

The organization shall document this information and keep it updated.

NOTE See [Annex A](#) and [Annex B](#) for guidance on identifying and assessing aspects.

Indoor air quality aspects to be considered may include, but are not limited to:

- a) the location of the building;
- b) the uses, activities and building layout;
- c) construction materials;
- d) building installations: air conditioning, water, sanitation, fuel tanks, vertical transportation and communication between plants, electricity and telecommunications, parking areas and special purpose rooms, etc;
- e) building maintenance;
- f) the renovation and remediation of the building.

Complaints from occupants and, if available, epidemiological data (for example, rate of absenteeism) shall be recorded and addressed, as applicable.

7 Support

7.1 Resources

The organization shall determine and provide the resources needed for the establishment, implementation, maintenance and continual improvement of the indoor air quality management system.

7.2 Competence

The organization shall:

- a) determine the necessary competence of person(s) doing work under its control that affects its indoor air quality performance;
- b) ensure that these persons are competent on the basis of appropriate education, training, or experience;
- c) where applicable, take actions, such as training, to acquire the necessary competence, and evaluate the effectiveness of the actions taken;
- d) ensure that person(s) are aware of the importance of conformity to the policies, objectives and processes of the indoor air quality management system;
- e) retain appropriate documented information as evidence of competence, including records of education, training, skills and experience.

NOTE Applicable actions can include, for example, the provision of training to, the mentoring of, or the re-assignment of currently employed persons; or the hiring or contracting of competent persons.

7.3 Awareness

Persons doing work under the organization's control shall be aware of:

- a) the indoor air quality policy;

- b) their contribution to the effectiveness of the indoor air quality management system, including the benefits of improved indoor air quality performance;
- c) the implications of not conforming with the indoor air quality management system requirements.

7.4 Communication

The organization shall determine the internal and external communications relevant to the indoor air quality management system, including:

- a) on what it will communicate;
- b) when to communicate;
- c) with whom to communicate;
- d) how to communicate.

7.5 Documented information

7.5.1 General

The organization's indoor air quality management system shall include:

- a) documented information required by this document, including:
 - 1) a manual of indoor air quality management (see [7.5.5](#));
 - 2) the policy, objectives and processes for indoor air quality;
 - 3) the procedure and records;
- d) documented information, including records, determined by the organization as being necessary for the effectiveness of the indoor air quality management system, i.e. that will ensure the effective planning, operation and control of its activities in the field of indoor air quality.

NOTE 1 The extent of documented information for an indoor air quality management system can differ from one organization to another due to:

- the size of organization and its type of activities, processes, products and services;
- the complexity of processes and their interactions;
- the competence of persons.

NOTE 2 Diagrams, drawings, technical memorandums, technical specifications of the facilities, etc., are considered a key factor in ensuring indoor air quality, as such information can help to locate potential sources of pollutants and to define appropriate sampling strategies.

7.5.2 Creating and updating

When creating and updating documented information the organization shall ensure appropriate:

- a) identification and description (e.g. a title, date, author, or, reference number);
- b) format (e.g. language, software version, graphics) and media (e.g. paper, electronic);
- c) review and approval for suitability and adequacy.

7.5.3 Control of documented information

7.5.3.1 Documented information required by the indoor air quality management system and by this document shall be controlled to ensure:

- a) it is available and suitable for use, where and when it is needed;
- b) it is adequately protected (e.g. from loss of confidentiality, improper use, or loss of integrity).

Records are a special type of document and shall be controlled in accordance with the requirements of [4.2](#) and [7.5.4](#).

7.5.3.2 For the control of documented information, the organization shall address the following activities, as applicable:

- a) establish, implement and maintain a procedure to define the control needed;
- b) distribution, access, retrieval and use:
 - 1) review and approve documents for adequacy prior to issue;
 - 2) review, update and re-approve documents as necessary;
- c) storage and preservation, including preservation of legibility:
 - 1) ensure that documents remain legible and readily identifiable;
- d) control of changes (e.g. version control):
 - 1) ensure that changes are identified as well as the current revision status of documents;
 - 2) ensure relevant versions on applicable documents are available at points of use;
- e) retention and disposition:
 - 1) prevent the unintended use of obsolete documents and apply suitable identification if they are retained for any reason.

Documented information of external origin determined by the organization to be necessary for the planning and operation of the indoor air quality management system shall be identified, as appropriate, and controlled.

NOTE Access can imply a decision regarding the permission to view the documented information only, or the permission and authority to view and change the documented information.

7.5.4 Control of records

The organization shall establish and maintain records necessary to demonstrate conformity to the requirements of this document and the results achieved.

The organization shall establish, implement and maintain a procedure to define the controls needed for the identification, storage, protection, retrieval, retention time and disposition of records.

Records shall remain legible, readily identifiable and retrievable. The documentation and records in electronic and digital form should be tamper-proof. Regular backups should be performed.

7.5.5 Indoor air quality management manual

The organization shall establish, implement and maintain a manual for managing indoor air quality, including:

- a) the scope of the management system of the organization;

- b) the facilities to which the management system is applicable;
- c) a description of the actions and activities relating to indoor air quality that take place in the organization applicable to the management system;
- d) the procedures established for or referring to the management system;
- e) processes of reviewing and improving.

7.6 Infrastructure and maintenance

The organization shall determine, provide and maintain the infrastructure needed to achieve conformity to the requirements for indoor air quality. The infrastructure may include, but is not limited to:

- a) air-conditioning and ventilation facilities;
- b) water facilities;
- c) sanitary facilities;
- d) air leakage.

This infrastructure shall be properly maintained, including cleaning, disinfecting, sanitary treatments and pest control, in such a way that indoor air quality is not compromised.

Records shall be retained to provide evidence of these activities.

8 Operation

8.1 Operational planning and control

The organization shall plan, implement and control the processes needed to meet requirements, and to implement the actions determined in [6.1](#), by:

- a) establishing criteria for the processes;
- b) implementing control of the processes in accordance with the criteria;
- c) keeping documented information to the extent necessary to have confidence that the processes have been carried out as planned.

The organization shall control planned changes and review the consequences of unintended changes, taking action to mitigate any adverse effects, as necessary.

The organization shall ensure that outsourced processes are controlled.

8.2 Planning indoor air quality

The organization shall plan and develop activities and processes necessary to control indoor air quality. The planning shall consider, at least, the following:

- a) processes for preventing indoor air quality problems during the renovation of facilities;
- b) inspection and maintenance processes, including technical actions;
- c) cleaning and disinfection processes;
- d) processes of action against incidents that may affect indoor air quality (e.g. emergencies such as flooding, fires);
- e) sampling processes for parameters to control indoor air quality;

f) analytical and data control processes.

8.3 Purchases

8.3.1 Evaluation of suppliers

The organization shall ensure that outsourcing and/or products acquired that may affect indoor air quality fulfil specified purchase requirements.

The organization shall evaluate and select suppliers based on their ability to supply products and/or services according to the requirements of the organization. Criteria should be established for the selection, evaluation and re-evaluation of suppliers. Records shall be retained of the results of evaluations and any necessary actions arising from them.

8.3.2 Information on purchases

The purchasing information shall describe the work to be subcontracted or the product to be purchased, including, where appropriate:

- a) the requirements for approval of the purchase;
- b) the requirements for qualifications of the subcontractors.

The organization shall ensure the adequacy of specified purchase requirements prior to their communication to the supplier.

8.3.3 Verification of purchases

The organization shall establish and implement inspections, or other activities necessary, for ensuring that the outsourced activity or purchased product or service fulfil specified requirements.

8.4 Operational control

The organization shall plan and carry out those operations and activities related to indoor air quality under controlled conditions. These controlled conditions should include:

- a) the availability of work instructions for carrying out planned processes (see [7.5](#));
- b) the use of appropriate equipment and materials;
- c) the implementation of appropriate monitoring and measurement (see [8.2](#));
- d) the implementation of processes to check the conformity of indoor air quality.

9 Performance evaluation

9.1 Monitoring, measurement, analysis and evaluation

9.1.1 The organization shall determine:

- what needs to be monitored and measured;
- the methods for monitoring, measurement, analysis and evaluation, as applicable, to ensure valid results;
- when the monitoring and measuring shall be performed;
- when the results from monitoring and measurement shall be analysed and evaluated.

The organization shall retain appropriate documented information as evidence of the results.

The organization shall evaluate the indoor air quality performance and the effectiveness of the indoor air quality management system.

9.1.2 The organization shall establish, document, implement and maintain procedures and methods, in accordance with [Clause 6](#), to monitor and measure the parameters of indoor air quality to:

- a) demonstrate conformity to the requirements of indoor air quality;
- b) ensure conformity to the indoor quality management system;
- c) continually improve the effectiveness of the indoor quality management system.

The organization shall establish, implement and maintain a procedure for periodically evaluating compliance with applicable legal requirements and other requirements to which the organization subscribes.

Records should be retained of the results of periodic evaluations.

9.2 Internal audit

9.2.1 The organization shall conduct internal audits at planned intervals to provide information on whether the indoor air quality management system:

- a) conforms to:
 - 1) the organization's own requirements for its indoor air quality management system;
 - 2) the requirements of this document;
- b) is effectively implemented and maintained.

9.2.2 The organization shall:

- a) plan, establish, implement and maintain an audit programme(s) including the frequency, methods, responsibilities, planning requirements and reporting, which shall take into consideration the importance of the processes concerned, including management activities of indoor air quality and areas to be audited, and the results of previous audits;
- b) define the audit criteria and scope for each audit, as well as the frequency and methodology;
- c) select auditors and conduct audits to ensure objectivity and impartiality of the audit process; auditors should not audit their own work;
- d) ensure that the results of the audits are reported to relevant managers;
- e) retain documented information as evidence of the implementation of the audit programme(s) and the audit results.

The management responsible for the area being audited shall ensure that any necessary corrections and corrective actions are undertaken without undue delay to eliminate detected nonconformities and their causes. Follow-up activities shall include the verification of the actions taken and the reporting of verification results (see [8.3](#)).

9.3 Management review

9.3.1 Management shall review the organization's indoor air quality management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness.

The management review shall include consideration of:

- a) the status of actions from previous management reviews, including the degree of fulfilment of the organization's objectives;
- b) changes in external and internal issues that are relevant to the indoor air quality management system;
- c) information on the indoor air quality performance, including trends in:
 - 1) nonconformities and corrective actions;
 - 2) monitoring and measurement results;
 - 3) audit results;
- d) opportunities for continual improvement and the need for changes in the indoor air quality management system, policies and indoor air quality objectives;
- e) the results of the evaluations of compliance with legal requirements and other requirements to which the organization subscribes;
- f) communication with users, including customer complaints;
- g) the performance of activities in the field of indoor air quality.

9.3.2 The outputs of the management review shall include decisions related to continual improvement opportunities and any need for changes to the indoor air quality management system, including:

- a) policies, objectives, processes and other elements consistent with the commitment to continual improvement;
- b) improvements in accordance with user expectations;
- c) resource requirements.

10 Improvement

10.1 Nonconformity and corrective action

10.1.1 When a nonconformity occurs, the organization shall:

- a) react to the nonconformity and, as applicable:
 - take action to control and correct it;
 - deal with the consequences;
- b) evaluate the need for action to eliminate the cause(s) of the nonconformity, in order that it does not recur or occur elsewhere, by:
 - reviewing the nonconformity;
 - determining the causes of the nonconformity;
 - determining if similar nonconformities exist, or can potentially occur;

- c) implement any action needed;
- d) review the effectiveness of any corrective actions taken;
- e) make changes to the indoor air quality management system, if necessary.

Corrective actions shall be appropriate to the effects of the nonconformities encountered.

10.1.2 The organization shall retain documented information as evidence of:

- the nature of the nonconformities and any subsequent actions taken;
- the results of any corrective action.

10.2 Continual improvement

The organization shall continually improve the suitability, adequacy and effectiveness of the indoor air quality management system.

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Annex A (informative)

Identifying and assessing indoor air quality aspects

A.1 General

Identifying, determining risk level and assessing indoor air quality aspects in a building is the first step to establishing a management system.

A possible course of action for such processes could be performed according to the following phases:

- make an inventory: this is simply a list of aspects that can have an impact on the indoor air quality;
- determine risk level: the specific characteristics of each building are considered to determine whether the aspects listed in the inventory have a relevant influence on the indoor air quality.

The decision to consider the potential risk of an indoor air quality aspect as relevant or not could be made based on a likelihood/consequences risk matrix, see example below. At least those indoor air quality aspects showing an average to extreme level of risk should be considered as relevant.

RISK MATRIX		CONSEQUENCES				
		Insignificant	Minor	Moderate	High	Extreme
LIKELIHOOD	Rare	Low	Low	Low	Low	Low
	Unlikely	Low	Low	Low	Average	Average
	Possible	Low	Low	Average	Average	Average
	Likely	Low	Average	Average	High	High
	Almost certain	Low	Average	Average	High	Extreme

EXAMPLE In a building with a car park area outside, the likelihood of presence of carbon monoxide, particle and other exhaust fumes is almost certain. Since the car park area is not connected to the occupied areas, the effect on the indoor air quality should be insignificant. The level of risk should be low, meaning no further actions are required. If the car park area was inside the building, the effect on indoor air quality can be minor or high, depending on the building layout/structure. Therefore, average to extreme risk can be expected, which requires a deeper assessment in terms of quality measurements is necessary.

- carry out an assessment: all indoor air quality aspects considered relevant (at least, risk average to extreme) should be assessed and, if necessary, appropriate control measures should be implemented and documented.

The assessment may imply

- measurement of related pollutants (for example, carbon monoxide to assess the situation related to a parking, or formaldehyde if new furnishing made of chipboard panels is present, etc.);
- documentary review (for example revision of records of legionella control if cooling towers are available in the building, revision of records of maintenance programmes, etc);
- visual inspections (for example presence of fungi growing, or others);
- review of complaints and epidemiological data (location of complaints, frequency, type, etc.).

The typical aspects that could normally be considered as having an impact on indoor air quality in most buildings are:

- a) building location;
- b) uses, activities and building layout;
- c) building materials; furnishings and electrical consumer goods;
- d) building installations:
 - 1) air-conditioning;
 - 2) water facilities;
 - 3) sanitary facilities;
 - 4) fuel tanks;
 - 5) lifts and escalators.
- e) parking areas;
- f) special uses rooms (storage, mechanical, vending, cafeterias, etc.);
- g) building maintenance; including maintenance and cleaning products;
- h) building remodelling.

A.2 Location of the building

The location of the building may have an effect on the indoor air quality in several ways.

For example, when the building's ventilation relies on outdoor fresh air, the outdoor air quality is a main influence on the final indoor air quality the building can achieve. Bad outdoor air quality can be enhanced by means of filtration and purification systems. The characteristics of the area, urban or rural, will define the types of outdoor pollutants, e.g. artificial (such as NO_x or particles) in urban zones or mainly biological (e.g. natural soil, sea particles, fungi, pollen, insects) in rural areas.

Climate conditions, especially humidity, temperature, wind conditions, macro and microclimate affect indoor air quality. For example, moist surfaces due to condensation can lead to mould growth.

Previous uses of the site can affect the air quality, especially in lower levels or if fresh air intakes are close to polluted soils.

Geological characteristics can also have an impact, especially for the presence of radon or thoron.

A.3 Activities, uses and building layout

The activities that take place inside a building should be taken into account as potential sources of pollution. For example, shopping malls, restaurants, cafeterias, laboratories, hospitals, buildings with restoration works are a typical source of odours and combustion products.

All potential polluting activities shall be listed as relevant aspects and controlled, normally keeping the areas under negative pressure.

It is important to consider the different sources of pollutants that result from daily activities (e.g. cooking, candle burning, fireplaces).

Historical and current data of activities inside the building under study should be collected and analysed, if available.