

Winds of change

ISO 14001

MEC-E3002 - Methods in Early Product Development

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1. Abstract

ISO 14001 is a standard called: “Environmental management systems. Requirements with guidance for use” (SFS, 2015). It is published by ISO, which stands for International Organization for Standardization (ISO 11, (n.d.)) The aim of the standard is to give foundations for environmental management to an organization while still considering the economical side of management. The standard is a framework, and therefore it is made to be applicable to organizations of any size and from every field (SFS 1, (n.d.)) A certificate for effective implementation of the standard is possible to be obtained through an auditioning process. In the audition a third-party inspector verifies that the organization is performing according to the management system. ISO 14001 is part of standard series called ISO 14000 family.

The standards environmental management system consists of different actions which an organization is obliged to perform to fulfill the requirements of the standard. These actions are, for example (SFS 1, (n.d.)):

- Identification of the environmental impacts caused by the organization
- Assessment of environmental risks and precautions for them
- Monitoring of the environmental impact of the organization
- Aim for continuous improvement

ISO states that when followed, the standard is stated to have serious improvement in an organization’s performance. The advantages of applying this standard are for example (ISO 10, (n.d.)):

- Improved employee engagement
- Improved efficiency of the use of resources, which leads to a competitive benefit
- Possible new businesses through solving environmental problems
- Improves the reputation of the organization

Currently there are over 300 000 organizations that are certified of applying the ISO 14001 standard (ISO 9, (n.d.)).

The purpose of this document is to give an overview of the standard, its requirements and implications.

2. About standards

Standards are jointly agreed ways of working (ISO 1. (n.d.)) In this context standard is a formal document which describes the accepted and *best* way of performing certain action, process or documentation. It may also define certain dimensioning which shall be commonly used to ensure compatibility. Standards may also define certain functional requirements such as minimum lifetime. Standards ensure product safety, reliability and define required quality (ISO 2. (n.d.))

Standards are created and managed under standardization committees, one of which ISO, International organization for standardization is. ISO has been formed by national standardization committees of which there can be one member per country (ISO 2015), such as DIN in Germany, ANSI in USA and SFS in Finland (ISO 3. (n.d.)). Individual companies can participate standardization activities through their national committee which they represent in technical committees or working groups which define new or update old standards. (ISO 4. (n.d.)) For example the Finnish standardization committee SFS is participant in 317 different technical committees ranging from *graphical characters (ISO/IEC JTC 1/SC 2)* to *space systems and operations (ISO/TC 20/SC 14)* and *Copper and copper alloys (ISO/TC 26.)* (ISO 5. (n.d.))

Standards are defined by groups of experts who formulate procedurally the definitions until joint agreement on the subject is achieved (ISO 1. (n.d.)) The documents which may eventually become published regulatory documents accepted by industries and governments go through an extensive process of closed review loops in preparatory stage as a working draft and during the process the documents may be made publicly available for commenting in enquiry stage. The document needs to be eventually be accepted by supermajority of members of the standardization committee who get to vote for the acceptance which leads to publication. These phases are presented on Figure 1 which shows the pipeline for a standard development (ISO 2019.)

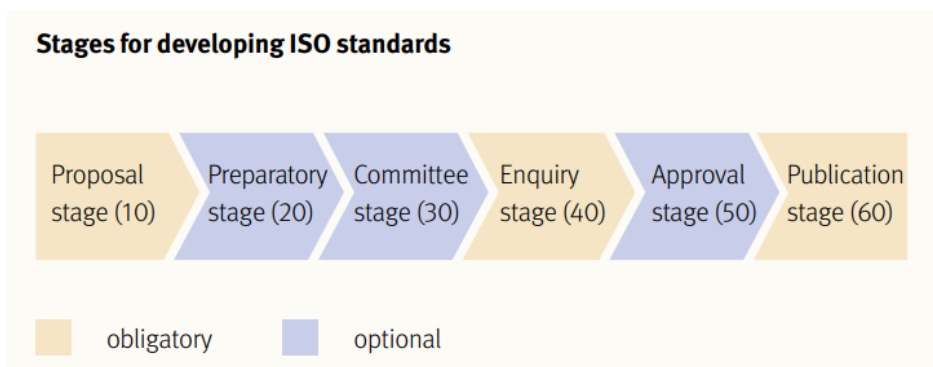


Figure 1: Stages of developing ISO standards (ISO 2019)

3. Background of ISO 14001

The family of ISO 14000 standards consists of standards that supports the ISO 14001. For example. ISO 14004, and 14005 provides support for the creation and ramp up of the environmental management system. There are standards for different tools linked to measure environmental impacts of different actions. Examples of these are standards about measuring products life cycle and greenhouse gas emissions (SFS 1. (n.d.))

The first revision of ISO 14001 was published in 1996 (ISO 12. (n.d.)) The standard has a similar method of implementation as the ISO 9000 Standard Family (ISO 13, (n.d.)) and it is commonly integrated with the quality management systems created with these ISO 9000 standards (SFS 2, (n.d.)) This is made simple by the similarity of the structure in the standards and the actions required by the ISO management standards. The ISO management system standards which the 9000 and 14000 are a part of have all this kind of identical structure. This has led to a wide use of these standards and currently they are used and recognized worldwide (ISO 14, (n.d.))

Just like the other ISO management systems have evolved from quality systems to their current existence of quality management systems have the ISO 14001 gone through some changes. Some examples of these are (SFS 3. (n.d.)):

- Cohesion with other ISO management standards has been increased
- Life cycle assessment was added in 2015 as a new part of the standard
- The standard has been evolving from reacting to environmental issues to preventing and recognizing them

4. Purpose of ISO 14001

For companies to work environmentally has become very important aspect that can affect customer relations and shareholders. This motivates companies to produce sustainability reports and report on environmental performance. For companies to ensure environmental and sustainable operation for their customers and shareholders it is good idea to use third party solution like reporting and getting certified to ISO 14001. (Morris & Berthelot 2012)

According to ISO 14001 (SFS 2015) purpose of following standard is to provide a reference for conservation of the environment and a way to react on alternating environment to ensure balance in economy and society. And by following restrictions set by the standard it is possible for the company to achieve preferred results. 14001 Standard is still not supposed to add or modify any existing lawful restrictions that affect the company.

The standard (SFS 2015) claims to give better change for the company to succeed in long term and give additional chances if the standard is followed systematically. Some effects of following standard and becoming certified are listed as following:

- Preserving nature to prevent or mitigate environmental affects
- Mitigate possible negative environmental effects for the company caused by environment
- To help company to fulfill obligatory liabilities
- To effect on how products and services of the company are being designed, manufactured, distributed, consumed and disabled in the perspective of lifecycle, that can prevent environmental effects to move to different parts of the lifecycle unintentionally
- To achieve economical and functional benefits by commissioning environmentally smart changes, that strengthens that status of the company in the market area
- To express knowledge about environment for the essential partners

Being certified for the ISO 14001 is a great way for the company to signal for others that they have taken their cause for the environment to acknowledge and are willing to take cautions on behalf of sustainability of the environment. Company could of course claim anything about their environmental behavior, but by using a third-party application where an independent certification body audits the fulfillment of standardized recruitments gives the claims even more reputable voice. Nowadays with continuous worries of climate and environment this has become more and more meaningful for companies and their associates and by neglecting these worries as a company can lead to losing customers and investors, but with certification that loss can be changed to bringing more customers your way.

5. Requirements of compliance

Organisations seeking formal recognition of the 14001 standard must comply the standards requirements. These requirements follow a PDCA (PLAN DO CHECK ACT) cycle, a repetitive four step management model used for continuous process improvement. (ASQ (n.d.)) The model is presented in figure 2.

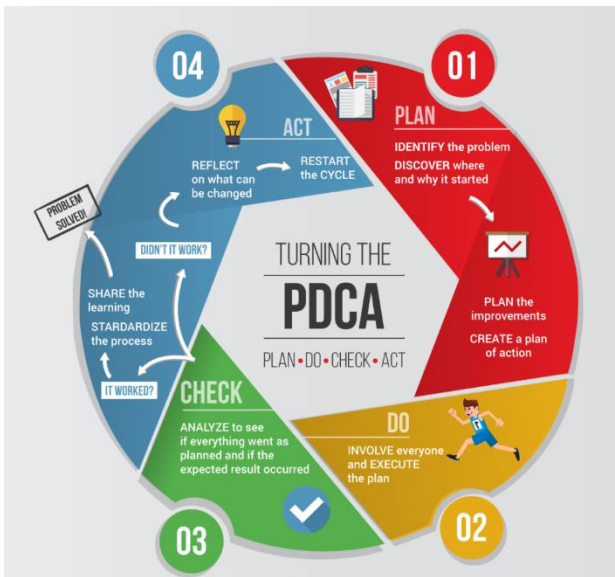


Figure 2: PDCA model (ASQ (n.d.))

The first step of the ISO 140001 standard consists of developing the environmental policy and planning the environmental management system (EMS). The second is implementing the EMS. The third is checking and reviewing and the last phase is the continuous improvement. Within these steps there are mandatory documents and reports, generated by the processes of the environmental management system. These requirements, documents and reports are aborded more in depth within the clauses of the ISO 14001 standard. (ISO 14001 (n.d.))

Starting with Clause 4, “Context of the organization”, the organization must understand its context, how it can impact the environment and the environment with the organization itself. It should also understand the needs and expectations of interested parties, such as regulators, neighbours and employees. It must also determine the scope of the environmental management system, defining its limitations and identifying what elements are included and how they interact. (McCann 2016) (Advisera Expert solutions 2018)

Clause 5, “Leadership”, states the appointment of a person responsible for the EMS’s coordination and effectiveness regarding the organizations Environmental Policy, a document displaying the organizations intent to meet legal compliance, prevent pollution and continually improve, defining its environmental goal. This document is also posted throughout the organization as a way of communicating to all employees, since it is important that every employee understand how the Policy relates to his or her job. (McCann 2016) (Advisera Expert solutions 2018)

Within Clause 6, “Planning”, it is required to identify, address and document the risks and opportunities that could affect the performance of the EMS, meaning that the organization must document all environmental aspects, internal and external, and associate them with environmental impacts and all interested parties. Then, the organization must define its objectives, derived from the goal in the Environmental Policy. These objectives should be specific, measurable, achievable, realistic, and time-based relative to all employees, supporting the environmental objectives and targets across the organization’s

levels and functions. At last, a plan of action to achieve these objectives must be developed. (McCann 2016) (Advisera Expert solutions 2018)

Clause 7, “Support”, describes the requirements to determine the resources needed for an effective EMS. The organization must also ensure the competence and awareness of their employees regarding their EMS responsibilities. Since introducing environmental practices in an organization often requires additional training, there is also the need for a procedure that defines identification of training needs, training planning, conducting and evaluation of training effectiveness as well as assigning responsibilities for this. The standard also requires organizations to keep evidence of its communication process in EMS. (McCann 2016) (Advisera Expert solutions 2018)

Clause 8, “Operation” regards the execution and control of the plan created according to clause 6. The organization must establish EMS processes and control how these operate. If the organization identifies an operation that negatively impacts the environment, it must put controls in place to ensure the impact does not happen and the environmental damage does not occur and therefore no deviation from the policy, objectives & target. Clause 8 also requires emergency preparedness and response, if such deviation occurs. The organization needs to have plans in place to respond and react to the emergency and limit the environmental damage you will cause. Also, it is necessary to ensure that the emergency plan will be followed by the employees, and this is done by testing the emergency response plans and periodically review and revise the process and plans. (McCann 2016) (Advisera Expert solutions 2018)

Within Clause 9, “Performance Evaluation”, it is required that the organization shall monitor, measure, analyse and evaluate the performance of its EMS. Measurement Equipment calibration must be verified and recorded. The standard also states that Internal Audits of the EMS should be conducted and documented at planned intervals. Finally, top management, defined in clause 5, must review the organization’s EMS and document the results. (McCann 2016) (Advisera Expert solutions 2018)

At last, Clause 10, “Improvement”, requires the organization to review non-conformities, determine its causes and evaluate corrective and preventive actions to correct them, keeping record of these activities. Finally, it should also identify opportunities for improvement of the EMS, displaying commitment to its Environmental Policy. (McCann 2016) (Advisera Expert solutions 2018)

6. Implications on design

A company which does product development and manufacturing of the developed products while complying ISO 14001 takes the products lifecycle effect in account. Effectively this means that materials used in the products are evaluated and chosen considering environmental perspective and potential risks during lifecycle are assessed. The responsibility is thus given to the product developer to choose environmentally sustainable raw materials, consider products lifetime and recyclability in the end of life (ISO 8. (n.d.))

7. How to get certified

For a company to get certified they must reach out to a formal certification body. ISO does not do certifications against their standards (ISO 6. (n.d.)) Certification process with the certification body involves audits, in which company's procedures are assessed against the standards requirements. Upon fulfilling the standards requirements, the certification body issues a certificate as proof of compliance. The certificates have definite duration and for a company to keep the certificate re-certification procedure is needed, which involves monitoring audits. (TÜV (n.d.))

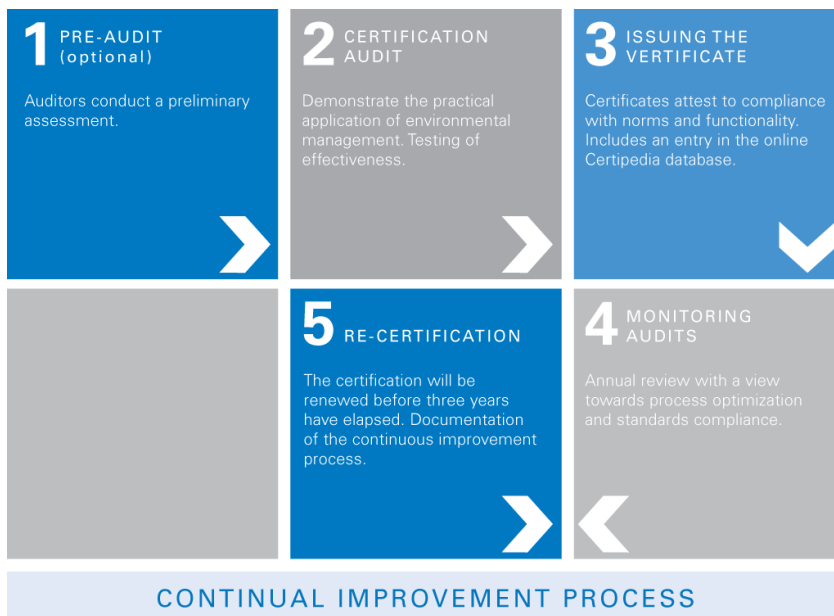


Figure 3: Certification and re-certification process as presented by TÜV (TUV (n.d.))

Multiple certification bodies exist which provide the certification service. Some of them are for example:

- TÜV Rheinland - <https://www.tuv.com/world/en/>
- DNV-GL - <https://www.dnvgl.fi/>
- Eurofins - <https://www.eurofins.fi/expertservices/>
- Bureau Veritas - <https://certification.bureauveritas.com/>

8. Examples of successful implementation

Sustainability is in increasing focus of corporations. Consumers have started to identify sustainability as a factor in their decision making when purchasing products or using services. This pushes corporations to recognize sustainability as a key variable when considering their future business.

It is nowadays more of a rule than an example that a major stock company has been certified to fulfill the ISO 14001. It is a standard practice to state how company recognizes climate risks potential effects on the business and as a risk management method ISO 14001 fulfillment has been implemented. For example, Kone states in its sustainability report 2019 how all -of their own corporate units and strategic suppliers have been ISO 14001 certified. Fulfilling the standards criteria has become a requirement to compete, cooperate or to be able to supply components for recognized companies.

Thus, recognition of environmental actions follow up in companies which operate with larger corporations such as industry's component suppliers. For example, Finnish machining shops Konepaja Häkkinen and G-tronic which both state on their websites how they have been certified to fulfill the standards requirements. As a proof of this a certificate logo is presented by the company, similar as shown in figures 4 and 5.



Figure 4: DNV-GL proof of ISO 9001 & 14001 certification (DNV-GL. (n.d.))



Figure 5: Bureau Veritas proof of ISO 9001 & 14001 certification (Bureau Veritas 2006)

9. Afterword

ISO 14001 is already an established standard with recognized position within all industries worldwide. Similarly, as ISO 14001 and ISO 9000 have been taken in wide use, ISO 50000 for energy management is being recognized as essential part of continual improvement (ISO 7. (n.d.))

References

Advisera Expert solutions. (2018) Checklist of Mandatory Documentation Required by ISO 14001:2015 Zagreb:Advisera Expert Solutions Ltd. 11p.

ASQ (n.d.) What is the Plan-Do-Check-Act (PDCA) cycle? Available from: <https://asq.org/quality-resources/pdca-cycle> [Accessed on 13.10.2020]

Bureau Veritas. (2006) Client instruction for use of Bureau Veritas Certification' certification marks.Tallinn: Bureau Veritas. 15p.

DNV-GL. (n.d.) Use of certification marks. Available from: <https://www.dnvgl.com/assurance/Management-Systems/Use-of-certification-marks.html> [Accessed on 6.10.2020]

G-tronic (n.d.) Landing page. Available from: <https://g-tronic.fi/> [Accessed on 6.10.2020]

ISO 1. (n.d.) standards. Available from: <https://www.iso.org/standards.html> [Accessed on 6.10.2020]

ISO 2. (n.d.) Benefits of standards. Available from: <https://www.iso.org/benefits-of-standards.html> [Accessed on 6.10.2020]

ISO (2015) ISO membership manual. Geneva: ISO. 36p.

ISO 3. (n.d.) Members. Available from: <https://www.iso.org/members.html> [Accessed on 6.10.2020]

ISO 4. (n.d.) Get involved. Available from <https://www.iso.org/get-involved.html> [Accessed on 6.10.2020]

ISO 5. (n.d.) SFS TC participation. Available from: <https://www.iso.org/member/1734.html?view=participation&t=PT> [Accessed on 6.10.2020]

ISO 6. (n.d.) Certification. Available from: <https://www.iso.org/certification.html> [Accessed on 6.10.2020]

ISO 7. (n.d.) ISO 50001 Energy management. Available from: <https://www.iso.org/iso-50001-energy-management.html> [Accessed on 6.10.2020]

ISO 8. (n.d.) ISO/TC207/SC1. Available from: <https://committee.iso.org/sites/tc207sc1/home/projects/published/iso-14001---environmental-manage/life-cycle.html> [Accessed on 6.10.2020]

ISO 9. (n.d.). ISO 14001 environmental management Available from: <https://www.iso.org/iso-14001-environmental-management.html> [Accessed on 14.10.2020]

ISO 10. (n.d.). Introduction to ISO 14001:2015 Available from: <https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100371.pdf> [Accessed on 14.10.2020]

ISO 11. (n.d.). home Available from: <https://www.iso.org/home.html> [Accessed on 14.10.2020]

ISO 12. (n.d.). iso 14001 environmental manage Available from: <https://committee.iso.org/sites/tc207sc1/home/projects/published/iso-14001---environmental-manage.html> [Accessed on 14.10.2020]

ISO 13. (n.d.). link with iso 9001 revision Available from: <https://committee.iso.org/sites/tc207sc1/home/projects/published/iso-14001--environmental-manage/link-with-iso-9001-revision.html> [Accessed on 14.10.2020]

ISO 14. (n.d.). Available from: <https://www.iso.org/management-system-standards.html> [Accessed on 14.10.2020]

ISO 15 (2019) My ISO job - Stages of developing ISO standards. Digital image Geneva: ISO p 24.

ISO 16 (2019) My ISO job. Geneva: ISO. 44p.

ISO 14001 (n.d.) ISO 14001 Requirements Available from: <http://www.iso14001.com.au/iso-14001-requirements.html> [Accessed on 12.10.2020]

Kone (2019) Sustainability Report 2019. Espoo: Kone Oyj

Konepaja Häkkinen (n.d.) Laatu. Available from: <https://www.konepajahakkinen.fi/laatu> [Accessed on 6.10.2020]

McCann (2016) . A brief overview of ISO 14001:2015. [Video Recording] Youtube Post, 20 of April. Available from: <https://www.youtube.com/watch?v=xf0q4wM2Vt8> [Accessed on 13.10.2020]

Morrill & Berthelot (2012). The Purpose of ISO 14001 Certification: Independent Assurance or Improved Environmental Management System?. Issues In Social And Environmental Accounting. 6. 157. 10.22164

SFS 1 (n.d.). Available from:

https://www.sfs.fi/julkaisut_ja_palvelut/tuotteet_valokeilassa/iso_14000_ymparistojohtaminen/ymparistojarjestelma [Accessed on 14.10.2020]

SFS 2 (n.d.). Available from: https://www.sfs.fi/files/8398/9000-sarjan_valinta_A5_web.pdf [Accessed on 14.10.2020]

SFS 3 (n.d.). ISO 14001:2015 Available from:

https://www.sfs.fi/julkaisut_ja_palvelut/tuotteet_valokeilassa/iso_14000_ymparistojohtaminen/iso_14001_2015 [Accessed on 14.10.2020]

TÜV (n.d.) ISO-14001 Certification. Available from: <https://www.tuv.com/world/en/iso-14001-certification.html> [Accessed on 6.10.2020]

Suomen standardisoimisliitto SFS (2015.) Environmental management systems. Requirements with guidance for use (SFS-EN ISO 14001) Second Edition. Helsinki. Suomen Standardoimisliitto. 42p.