

## Applicability Study of ISO 14001: 2015 for Implementation of the Environmental Management System in an Electro-Electronic Industry in PIM

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This article presents the result of a diagnosis made through a checklist based on the ISO 14001: 2015 normative items in a company that operates in the electronics industry. This study sought to identify the level of environmental sustainability recommended by ISO 14001, the change in behavior with the implementation of selective collection in the company and the elaboration of environmental control procedures, idealizing economic growth in a sustainable manner, preserving the environment and ensuring the environment. future of future generations. The conclusions are that the evaluated company needs to comply with 65% of the mandatory items of NBR ISO 14001: 2015, which evidenced the need for an environmental education program to assist in the implementation of the environmental management system in the evaluated industry.

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# **Applicability Study of ISO 14001: 2015 for Implementation of the Environmental Management System in an Electro-Electronic Industry in PIM**

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## **Abstract**

*This article presents the result of a diagnosis made through a checklist based on the ISO 14001: 2015 normative items in a company that operates in the electronics industry. This study sought to identify the level of environmental sustainability recommended by ISO 14001, the change in behavior with the implementation of selective collection in the company and the elaboration of environmental control procedures, idealizing economic growth in a sustainable manner, preserving the environment and ensuring the environment. future of future generations. The conclusions are that the evaluated company needs to comply with 65% of the mandatory items of NBR ISO 14001: 2015, which evidenced the need for an environmental education program to assist in the implementation of the environmental management system in the evaluated industry.*

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## **1. Introduction**

Organizations, faced with the current economic and technological scenario, impose the need for continuous changes in the way they operate and manage their business so that they adapt to the new reality and remain

competitive [1].

Thus, several environmental laws and regulations have emerged that serve as guidelines to safeguard and ensure the preservation of the environment. The norm [2], is one of these norms to provide guidelines for the implementation of an environmental management system (EMS), does not define forms and methods, only directs companies, allowing each one, in their particularity, to develop their own solutions to achieve the requirement of the standard.

The EMS, based on ISO 14001 offers several benefits, the motivation of employees to achieve environmental goals, the reduction of electricity, water and fuel consumption, are examples that characterize a certified company, contributing to sustainable development, increasing its power of negotiation with investors. In contrast, society expects organizations to also bring benefits to the community by reducing the consumption of natural resources and harming the environment less [1].

One of the significant changes generated by an environmental management system is the behavioral one, because only through the environmental education tool, several indicators defined within the management are achieved [3]. The conception of environmental education is an essential component for sustainable development, beginning in 1946 with the creation of UNESCO which initiated the debate on environmental education globally [4].

We must consider that the implementation of an environmental management system must be founded, through widespread environmental education among the employees of a company, as well as compliance with environmental legislation and regulations, making the EMS become robust and efficient.

Although the main objective of companies is profit, environmental issues have become important due to the consumers' environmental awareness of these products, as well as large organizations seeking economic partners with certifications that guarantee cleaner production practices [1].

The result of the diagnosis aims to show the benefits of implementing the environmental management system in an industry, based on environmental education programs seeking behavior change, the elaboration of environmental controls in their processes, including the mitigation of environmental impacts, as a way of improve the implementation of an environmental management system in an industry [5].

## **2. Material and Method**

### **2.1 Study area**

The studied company, of Brazilian nationality, with 30 years of experience in the electronics and telecom market. It has distinguished the satellite receiver market by introducing innovative TV signal reception solutions throughout Brazil, with better performance and unique functions, ensuring better range, signal quality and stability, ease of installation, simplicity of operation and high durability (Figure 1).



Figure 1 - Industry Location Map where the diagnosis was made.

Source: Own authorship, 2019.

## 2.2 Data collect

To carry out the environmental diagnosis, a verification checklist was prepared, based on the requirements of the standard [2], where all normative items were verified and classified by status, describing the evidence of compliance with the requirements of the cited standard.

After the environmental diagnosis was carried out, an action plan was developed, using the 5W2H methodology as one of the most used resources in activity planning and project design, distributing the functions among the various members of a multidisciplinary team, ensuring the control and the execution of activities [6].

The Environmental Education Program started with weekly environmental dialogues with the main subject of Selective Collection, the acquisition and availability of collectors was an important step to start the implementation of the Environmental Management System.

## 3. Results and Discussion

For the environmental diagnosis it was necessary to apply the “ISO 14001: 2015 Diagnostic Check List”, and a detailed evaluation of the processes and activities, through on-site verification and analysis of existing documents in the studied company.

### 3.1 Context of the organization (item 4 - ISO 14001: 2015)

The Strategic Planning, determined by the organization, with internal and external actions that could affect its environmental performance was not evidenced, but it was not defined in its scope, environmental conditions that affect or are capable of affecting the organization.

### **3.1.1 Recommendation**

Define which stakeholders are relevant to the environmental management system, as well as the relevant needs and expectations of those stakeholders, define which legal and other requirements become mandatory for the environmental management system.

Another recommendation to address this item is the elaboration of the environmental scope, which should describe internal and external issues that may affect the management system, its organizational structure, its processes and activities and its authority and ability to exercise control and influence.

The implementation of the environmental management system has as its main intention the improvement of environmental performance, is based on the premise that the organization should periodically analyze and evaluate its management system, thus verifying the points of improvement [6].

### **3.2 Leadership (item 5 - ISO 14001: 2015)**

According to item 5 of the standard used, senior management must demonstrate leadership and commitment to the environmental system, must ensure that its environmental policy (sub-paragraph 5.2) and its environmental objectives are established and compatible with the strategic direction of the organization.

#### **3.2.1 Recommendation**

The diagnosed company does not yet have an environmental policy and its defined environmental objectives, making it necessary to develop an environmental policy that is aligned with its strategic business, ensuring that the results obtained ensure the effectiveness of the environmental management system.

The environmental policy of an organization is of paramount importance, as they attest that the company performs its activities focusing on the environmental management system, aiming at the sustainable use of natural and renewable resources. In general, policy within the management system seeks solutions and alternatives to maintain environmental balance, reducing or recovering environmental degradation [7].

### **3.3 Planning (item 6 - ISO 14001: 2015)**

This item describes that the organization must determine the risks and opportunities related to its environmental aspects, ensuring that the environmental system achieves the desired results and continuous improvement.

Another important point addressed in the planning item is that the organization must determine the environmental aspects (sub-item 6.1.2) of its activities, products and services which it can control and those it may influence. When determining environmental aspects, the organization must take into account changes, including new product and service projects, foreseeable emergency situations.

Communication about its environmental aspects must be between the various levels and functions of the organization, and documented information must be maintained, the company must determine and have access to the legal requirements related to its environmental aspects.

The survey of environmental aspects and impacts in an industry is one of the tools used in the control and monitoring of its production activities. It establishes the organization's responsibility for the environment and presents itself to society and its customers with the differential of being an environmentally friendly

company [8].

In compliance with legal requirements and other requirements (sub-item 6.1.3), the company has LO - Environmental Operation License, where conditions were defined, such as performing bimonthly monitoring of effluent from the effluent treatment system, indicating the pH parameters, color, turbidity, BOD, COD, vegetable oils and greases, solids (dissolved, suspended, settleable, volatile, fixed and total), total nitrogen, thermotolerant nitrates, nitrites, sulfides, phosphates and coliforms and these analyzes should be submitted to IPAAM - Amazonas Environmental Protection Institute every six months, reporting to the supervisory body.

### **3.3.1 Recommendation**

Raise significant environmental aspects, considering changes, including planned or new developments, present key legal requirements applicable to the scope of the EMS and evidence of compliance with these requirements (environmental permits, environmental technical reports, etc.), present environmental objective made available to relevant stakeholders. The company performs the analysis related to the condition of its operating license, but it is necessary to deliver these reports to the competent agency.

Environmental issues in industries primarily seek to meet the conditions imposed by environmental licensing [9]. Which conveys a false thought when it comes to the environmental system, where the survey of environmental aspects and impacts is a guarantee of environmental control of its production chain.

### **3.4 Support (item 7 - ISO 14001: 2015)**

The organization shall determine and provide the resources necessary for the establishment, implementation, maintenance and continuous improvement of the environmental management system.

Regarding competence (sub-item 7.2), the organization shall determine the necessary competencies of employees performing work under its control, shall determine the training needs associated with its environmental aspects and its environmental management system and maintain documented information about the theme.

Another point to consider concerns environmental policy awareness, where the organization must ensure that employees are aware (sub-section 7.3) considering the significant environmental aspects and their actual and potential environmental impacts associated with their activities, their contribution to effectiveness of the environmental management system and the implications for not meeting the legal and other requirements defined for the environmental management system.

In sub-item 7.4, it talks about communication, the organization must establish, implement and maintain process (s) necessary for communication.

relevant internal and external to the environmental management system, including: what to communicate, when to communicate, with whom to communicate, how to communicate, always taking legal and other requirements into account, and consistent and reliable.

### **3.4.1 Recommendation**

The organization should direct an annual budget for the implementation of the environmental management system, as it is a practice in its strategic planning, the provision of resources for the various areas of the

organization. It should elaborate a competence and development matrix of its collaborators, with training focused on the environmental management system. The awareness of all employees about the EMS is also audited requirement, in this item the environmental policy and the aspects and impacts of the organization should be disseminated in training, murals and informative.

The organization already provides communication channels such as intranet, TV monitors, murals, facilitating internal and external communication.

The success of the implementation of an environmental management system is the awareness of its workforce, this is through environmental education programs, as it develops the construction of critical thoughts, so that these individuals identify and realize their collaboration and importance. within the EMS [3].

### **3.5 Operation (item 8 - ISO 14001: 2015)**

In subitem 8.1, which deals with operation, the organization shall establish, implement, control and maintain the processes necessary to meet the requirements of the environmental management system. Controls can be engineering and procedural, the company must control all planned changes and critically analyze the consequences of these.

Outsourced processes must also be controlled as various environmental services are performed by service companies. Controls should be appropriate to ensure compliance with legal requirements in the organization's design, product and service development.

All controls should be kept as documented information to the extent necessary to be confident that the processes are carried out as planned.

#### **3.5.1 Recommendation**

The organization already controls service providers, significant changes in their processes, and compliance with legal requirements, the point to be improved is only to extend existing controls to the environmental management system.

In 8.2 - Emergency preparedness and response, the organization shall establish, implement and maintain the processes necessary to provide actions to prevent or mitigate adverse environmental impacts of emergencies, periodically test planned response actions, critically review and review provide relevant information, provide emergency preparedness training, and above all maintain documented information to the extent necessary to be confident that the process (s) will be carried out as planned. ).

#### **3.5.2 Recommendation PAE**

The evaluated company has an Emergency Response Plan (PAE), which contemplated the scenario of chemical spillage and leakage. It was evidenced through documented information the practice of simulations and training of the brigade members in the practice mentioned above.

The study of the environmental impact of an organization within the environmental management system is performed by assessing the significance of impacts, and the necessary actions to eliminate or mitigate environmental aspects are proposed. such as fuel consumption (diesel), the control is to draw up a CO2 smoke monitoring and measurement plan, and also to carry out the control to assess the CO2 emission and

black smoke of the trucks [12].

### **3.6 Performance appraisal (item 9 - ISO 14001: 2015)**

The organization shall monitor, measure, analyze and evaluate its environmental performance. Always taking into consideration what needs to be monitored and measured, the methods of monitoring, measurement, analysis and evaluation. Monitoring should be performed with properly calibrated equipment and kept in perfect condition.

It shall assess its environmental performance and the effectiveness of the environmental management system, communicate relevant environmental performance information internally and externally, and also maintain documented information as a guarantee of compliance with this standard item.

#### **3.6.1 Recommendation**

The evaluated organization does not yet have an environmental management system in place, but it will be necessary to evaluate the performance of the system in order to provide its proper functioning.

In sub-item 9.1.2 we verify the assessment of compliance with legal and other requirements, where the organization must establish, implement and maintain the process (s) necessary to comply with this normative item.

#### **3.6.2 Recommendation Guidelines**

It is the organization's practice to evaluate legal requirements, extending the activity to environmental laws applicable to the scope of the company.

Item 9.2 gives us guidelines on internal auditing, where the organization must conduct internal audits at planned intervals to provide information on the compliance of the environmental management system. Must establish, implement and maintain the internal audit program (s), including frequency, methods, responsibilities, requirements for planning and reporting on their internal audits.

In this internal audit program, the organization should consider the environmental importance of the processes, changes affecting the organization, and the results of previous audits, always defining the audit criteria and scope for each audit, selecting auditors to conduct the audit. audits, ensuring the objectivity and impartiality of the audit process.

#### **3.6.3 Recommendation Environmental Management**

An internal audit program for the quality management system is practiced within the organization, so for the environmental management system it is only to achieve the scope within the existing internal audit program.

Item 9.3 deals with a critical analysis of the company's representatives, and should analyze the organization's environmental management system at planned intervals to ensure its continued adequacy, sufficiency and effectiveness.

Consideration should be given to the status of actions from prior management reviews, changes in internal and external issues that are relevant to the environmental management system, stakeholder needs and expectations, including legal and other requirements, their aspects. significant environmental risks, the risks

and opportunities, the extent to which the environmental objectives were met and the information on the organization's environmental performance.

### **3.6.4 Recommendation Quality**

The organization conducts a top management review for the quality management system and should cover the environmental management system.

Recommendation: The organization conducts a top management review for the quality management system and should cover the environmental management system.

### **3.7 Improvement (item 10 - ISO 14001: 2015)**

The organization shall continually improve the system implemented by ensuring the adequacy, adequacy and effectiveness of the environmental management system to increase environmental performance.

#### **3.7.1 Recommendation**

With the implementation of the environmental management system, the organization should continually improve it, ensuring its effectiveness and increasing its environmental performance.

Sustainable routines and waste policy adoption are practices that align with industry principles 4.0. EMS can beneficially interact with this new production model, through environmental operational controls and indicators help to avoid waste, reduce pollution and control manufacturing processes, making them more rational.

Environmental performance is defined by ISO 14001 as the measurable results of managing an organization's environmental aspects through environmental performance can measure compliance with legal requirements as well as company revenues and expenses. Programs focused on improving environmental performance can reduce waste and losses, resulting in lower costs, which is one of the industry formats 4.0 guidelines [11].

## **4. Conclusion**

The survey carried out in an electronics industry, consisted of the elaboration of an environmental diagnosis for the implementation of ISO 14001. Initially a checklist was elaborated with the main requirements of the standard, where we verified the existence of the environmental policy, the survey of risks and opportunities and by complying with legal and other requirements, this methodology has enabled us to make a reliable diagnosis, generating the necessary actions and understanding to meet the requirements of the standard.

Other aspects evidenced in this diagnosis was the practice of selective collection, the company evaluated did not have the same implemented, it is recommended that the organization carry out an environmental education work for the development of labor and the future implementation of selective collection in its manufacturing plant.

Of the 65 items evaluated in the standard, 65% are not being met, 20% are met and 15% partially answered. Those being partially met are the items that already exist in the quality management system, and only need

a scope for the environmental management system.

This diagnosis will make it possible for the evaluated company to create an implementation schedule for the Environmental Management System (EMS), which will benefit future certification and make it more competitive, showing that its production chain is in accordance with international control and monitoring standards. aiming at its economic, sustainable and social growth.

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