LCA

Communication to the agents

Millenium 2-gang Double- pole switch 2CLA643799N1101

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# Introduction

## Quality and environmental management

Our policy of continuous improvement also requires a demanding and responsible work, which has led to the implementation of the UNE-EN-ISO 14006: Environmental management systems Guidelines for incorporating eco-design in our Quality Management System and Environment.

Eco-design is understood as a process integrated within the design and development that aims to reduce environmental impacts and continually to improve the environmental performance of the products, throughout their life cycle from raw material extraction to end of life.

In order to be of benefit to our organization and to ensure that we achieve our environmental objectives, we carry out eco-design as an integral part of the business operations of our organization.



So, in 2007 Asea Brown Boveri, S.A. NIESSEN factory, certify the Environmental Management Design and Development process according to UNE 150301. To subsequently adapt the system to the international standard UNE EN ISO 14006.



**ED-0008/2007**

## Purpose of the study

In this study, 2-gang Millenium’s double-pole switch has been environmentally analyzed to seek for an improvement, and it has been compared with a previous version of the same product to check the reduction in its environmental impact.

## Eco-designed product

|  |  |
| --- | --- |
| **Representative products** | Frames and mechanism from the Millenium range, in this case for a double-pole switch of 2 gang. |
| **Description of the products** | PC based frames that provide protection to the switch. Moreover, there are metallic pieces which make up switch’s mechanism. |
| **Functional unit** | It will take as functional unit a single switch. |

2

3

1

4

5

6

|  |  |  |
| --- | --- | --- |
| Part | Name | Material |
| 1 | Middle frame | PC |
| 2 | Metal frame | Steel |
| 3 | Back cover | PC |
| 4 | Rocker | PC |
| 5 | Phase contact | Brass |
| 6 | Neutral contact | Brass |

## Raw materials used

# Considerations of the eco designed products

## Usage considerations

- Make strong electrical connections; this will prevent heat loss in connections, and unnecessary energy consumption.

## Recyclability considerations

-The cardboard packaging is recycled.

-The plastics are recyclable, and they include a marking inside (indicating the material they are made of) so they can be disassembled.

## Environmental improvements

- Minimum cardboard for recyclable packaging

- Optimization of mass for the components, thereby savings in energy and raw materials in manufacturing processes.

- Use of water-based paints, avoiding the use of solvents harmful to the environment.

- Use of a larger percentage of recycled material.

# Impacts

## Methodology and data

For this analysis the software Simapro Flow has been used, with the database Ecoinvent 3.6 Cut-off.
The calculations have been made with the methodologies IPCC GWP 100a and CML-IA baseline. With this methodology is studied the abiotic depletion, the air pollution, the ozone layer depletion, the water pollution, the photochemical oxidation, eutrophication, global warming and the acidification.
It is taken into account the entire lifecycle, which include the manufacturing, transport, use and the end-of-life stages. As we are comparing a modification in an element, in many of the stages (transport, use and end of life) there is not any variation.
The data has been obtained from the company’s data base SAP and different technical datasheet.

## Environmental impacts

Using the “CML-IA baseline” method, these compulsory indicators are calculated, which explanations are in the *Appendix.*

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| BEFORE |
| Impact indicators | **Unit** | **Total** | **Manufacturing** | **Transport** | **Use** | **End of Life** |
| Ozone depletion (OD) | **kg CFC-11 eq.** | **1,058E-08** | 9,417E-09 | 1,42E-09 | 3,74E-05 | -2,51E-10 |
| Photochemical ozone creation (POCP) | **kg C2H4 eq.** | **2,648E-04** | 2,459E-04 | 9,97E-07 | 2,17E-02 | 1,79E-05 |
| Eutrophication (E) | **kg (PO4)3 eq.** | **1,873E-03** | 1,733E-03 | 5,43E-06 | 9,19E-02 | 1,35E-04 |
| Global warming (GW) | **kg CO2 eq.** | **6,759E-01** | 5,859E-01 | 7,65E-03 | 1,43E+02 | 8,24E-02 |
| Depletion of abiotic resources – elements (ADPe) | **kg Sb eq.** | **2,078E-04** | 2,078E-04 | 2,69E-08 | 6,74E-04 | -2,36E-08 |
| Acidification of soil and water (A) | **kg SO2 eq.** | **4,695E-03** | 4,686E-03 | 2,44E-05 | 4,05E-01 | -1,54E-05 |
| Depletion of abiotic resources – fossil fuels (ADPff) | **MJ** | **6,606E+00** | 6,535E+00 | 1,144E-01 | 2,10E+03 | -4,267E-02 |
| Water pollution (WP) | **m3** | **1,243E+01** | 1,234E+01 | 4,599E-03 | 9,95E+01 | 8,204E-02 |
| Air pollution (AP) | **m3** | **4,129E+01** | 4,115E+01 | 1,391E-01 | 9,42E+02 | -1,360E-03 |

|  |
| --- |
| AFTER |
| Impact indicators | **Unit** | **Total** | **Manufacturing** | **Transport** | **Use** | **End of Life** |
| Ozone depletion (OD) | **kg CFC-11 eq.** | **1,041E-08** | 9,247E-09 | 1,42E-09 | 3,74E-05 | -2,51E-10 |
| Photochemical ozone creation (POCP) | **kg C2H4 eq.** | **2,640E-04** | 2,451E-04 | 9,97E-07 | 2,17E-02 | 1,79E-05 |
| Eutrophication (E) | **kg (PO4)3 eq.** | **1,871E-03** | 1,731E-03 | 5,43E-06 | 9,19E-02 | 1,35E-04 |
| Global warming (GW) | **kg CO2 eq.** | **6,737E-01** | 5,836E-01 | 7,65E-03 | 1,43E+02 | 8,24E-02 |
| Depletion of abiotic resources – elements (ADPe) | **kg Sb eq.** | **2,077E-04** | 2,077E-04 | 2,69E-08 | 6,74E-04 | -2,36E-08 |
| Acidification of soil and water (A) | **kg SO2 eq.** | **4,693E-03** | 4,684E-03 | 2,44E-05 | 4,05E-01 | -1,54E-05 |
| Depletion of abiotic resources – fossil fuels (ADPff) | **MJ** | **6,624E+00** | 6,510E+00 | 1,144E-01 | 2,10E+03 | -4,267E-02 |
| Water pollution (WP) | **m3** | **1,234E+01** | 1,233E+01 | 4,599E-03 | 9,95E+01 | 8,204E-02 |
| Air pollution (AP) | **m3** | **4,125E+01** | 4,111E+01 | 1,391E-01 | 9,42E+02 | -1,360E-03 |

## Comparative

The graphic shows the little impact differences that there are between the two versions of the product. As mentioned before, all the impact differences are made in the manufacturing stage. Just like hardly can notice a variation in the raw materials that is composed the product, in the same way it is showed the equality in the environmental impact on the graph.

# Conclusions

As mentioned in the previous graph, the difference in the impact of the products is hard to appreciate at first sight. A slight optimization on the metallic pieces and the use of the new packaging makes the product more likely to the environment.

It is important to mention that in a previous attempt of the eco-design study, the use of the switches were analyzed, however, the consumption of the USB charger made the study bad, limiting the ways to show the improvements made. From the previous model of the product, a big change has been the use of Usb-C in place of the Usb-A, which means a 61% more of consumption and kg CO2 equivalent emitted in the use of the product. That is the reason why it has centered the study in the designed parts.

Note: The presentation of these texts’ wrath according to the medium used (web, catalogs, instructions) so it does not always have this format.

 Cecilia de Acha

 Development Responsible

 03/03/2020

Appendix

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| --- | --- | --- |
| Impact indicators | Description | Unit |
| Global warming (GW) | Indicator of potential global warming caused by emissions to air contributing to the greenhouse effect. Includes fossil and biogenic | kg CO2 eq. |
| Ozone depletion (OD) | Indicator of emissions to air that contribute to the destruction of the ozone layer | kg CFC-11 eq. |
| Acidification of soil and water (A) | Indicator of the potential acidification of soils and water caused by the release of certain gases to the atmosphere | kg SO2 eq. |
| Eutrophication (E) | Indicator of the contribution to eutrophication of water by the enrichment of the aquatic ecosystem with nutritional elements, e.g. industrial or domestic effluents, agriculture, etc. | kg (PO4)3 eq. |
| Photochemical ozone creation (POCP) | Indicator of emissions of gases that affect the creation of photochemical ozone in the lower atmosphere (smog) because of the rays of the sun. | kg C2H4 eq. |
| Depletion of abiotic resources – elements (ADPe) | Indicator of the depletion of natural non-fossil resources | kg Sb eq. |
| Depletion of abiotic resources – fossil fuels (ADPf) | Indicator of the depletion of natural fossil resources | MJ (lower heating Value) |
| Water pollution (WP) | Indicator of the quantity of water necessary to dilute the toxic elements poured into water in all the stages of the product life cycle. | m3 |
| Air pollution (AP) | Indicator of the quantity of air necessary to dilute the toxic elements emitted into the air in all the stages of the product life cycle. | m3 |