



# 5<sup>th</sup> INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“CLEANER PRODUCTION TOWARDS A SUSTAINABLE TRANSITION”

## Life Cycle Assessment – Comparative study of extruded Aluminium profile and Polyvinyl Chloride (PVC)

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### Abstract

The growing concern about the quality of the environment has driven the development of new techniques to support decision-making in companies, aimed at creating new models of production and selection of materials that are environmentally sustainable and economically viable. Among these new techniques, stands the Life Cycle Assessment (LCA). The LCA identify and quantify in a systematic form the materials flows, energy, wastes, and emissions caused during the product life cycle, allowing quantify previously the potentials environmental impacts. In this paper was made a comparative LCA between two materials used in the automotive industry: Aluminum profile Vs. Polyvinyl Chloride (PVC). Those materials were compared using the bulkhead's profile manufacturing process, showing the characteristics of each one and the most relevant importance about the main environmental indicators: Energy Consumption, and potential environmental impacts. For this, were modeled two scenarios of product's manufacturing process, having as main variable the number of recycling aluminum and PVC. The results showed that the energy consumption in the aluminum life cycle was 494 times higher than for PVC. Additionally, the impacts categories Ecotoxicity water acute, Ecotoxicity water chronic, Human toxicity air, Human toxicity soil, Human toxicity water, Human toxicity water, Photochemical oxidant potential, were responsible for 90% higher impact for on the aluminum comparatively with the PVC, considering the recycling scenarios modeled. These results are presented gave mainly due to the amount of resources required for the production of aluminum. Therefore, the bulkhead profile for use in the studied (Automotive Industry) should be produced in PVC, so that environmental impacts are minimized in support of environmental sustainability.

**Keywords:** Life Cycle Assessment, PVC, Aluminum, Environmental Performance, Automotive Industry.