



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

“CLEANER PRODUCTION FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS”

## Economic Viability and Flammability of Polyurethane Composites, Aluminum Sludge and Polyethylene Terephthalate Residue

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### Abstract

Polyurethane is used in the construction industry because of its excellent thermal performance in roofs, floors, and concrete slabs. However, its high flammability restricts the use. The study reports the use of polyethylene terephthalate and aluminum-anodizing sludge residues in the production of boards with different densities and fire resistance. Boards with 10%, 20%, 30%, 40%, and 50% of polyethylene terephthalate residue were prepared to replace primary polyurethane raw materials, to which 20% aluminum sludge was added. In the horizontal burning test (UL94), the boards presented a combustion deceleration until flame extinction due to the presence of aluminum-anodizing sludge. There was a cost reduction of about 70% for the boards with the greatest amount of residues incorporated. The construction industry should consider incorporating waste into the life cycle of products from other segments as part of its formulations, saving natural resources and becoming more sustainable.

*Keywords: Aluminum sludge; Polyethylene terephthalate (PET); Polyurethane (PU); Recycling; Flammability.*