Environmental Engineering and Management Journal

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

LIFE CYCLE ASSESSMENT OF FLEXIBLE ALUMINIUM DUCT PRODUCTION

Boris Agarski*, Sladjana Jovanovic, Milana Ilic Micunovic, Miljana Prica, Djordje Vukelic

University of Novi Sad, Faculty of Technical Sciences, Trg Dositeja Obradovica 6, 21000 Novi Sad, Serbia

Abstract

Evaluating the environmental impact of products such as flexible aluminium ducts is essential for uncovering opportunities to minimise their ecological footprint and enhance sustainability. By analysing the product's specific life cycle phases with life cycle assessment, from raw material extraction to end-of-life disposal, it is possible to identify stages where environmental impacts can be minimised. This research analysed the impact of upstream and core life cycle phases of flexible aluminium duct production on the environment. The aim of the research is to determine the potential environmental impact of flexible aluminium duct production with life cycle assessment and future improvements with scenario analysis. The life cycle assessment results showed that, in the flexible aluminium duct production process, the largest amount of environmental loading (more than 90% for all impact categories) is attributed to the upstream life cycle phase (1.5E+01 kg CO2 eq. for global warming potential), associated with aluminium sheet consumption. Scenario analysis showed that the potential environmental impacts in the upstream life cycle phase can be reduced with the use of different raw material suppliers. Scenario S2 with specific background data derived from environmental product declarations reduced impacts in abiotic depletion potential, metals and minerals, Eutrophication potential, aquatic freshwater and terrestrial by more than 70% compared to default scenario S1.

Key words: environmental product declaration, flexible aluminium duct, Life Cycle Assessment

Received: April, 2025; Revised final: September, 2025; Accepted: October, 2025

* Author to whom all correspondence should be addressed: e-mail: agarski@uns.ac.rs; Phone: +381 214852306; Fax: +381 21454495