LIFE CYCLE ANALYSIS: ENVIRONMENTAL MANAGEMENT TOOL APPLICABLE TO THE CERAMIC SECTOR

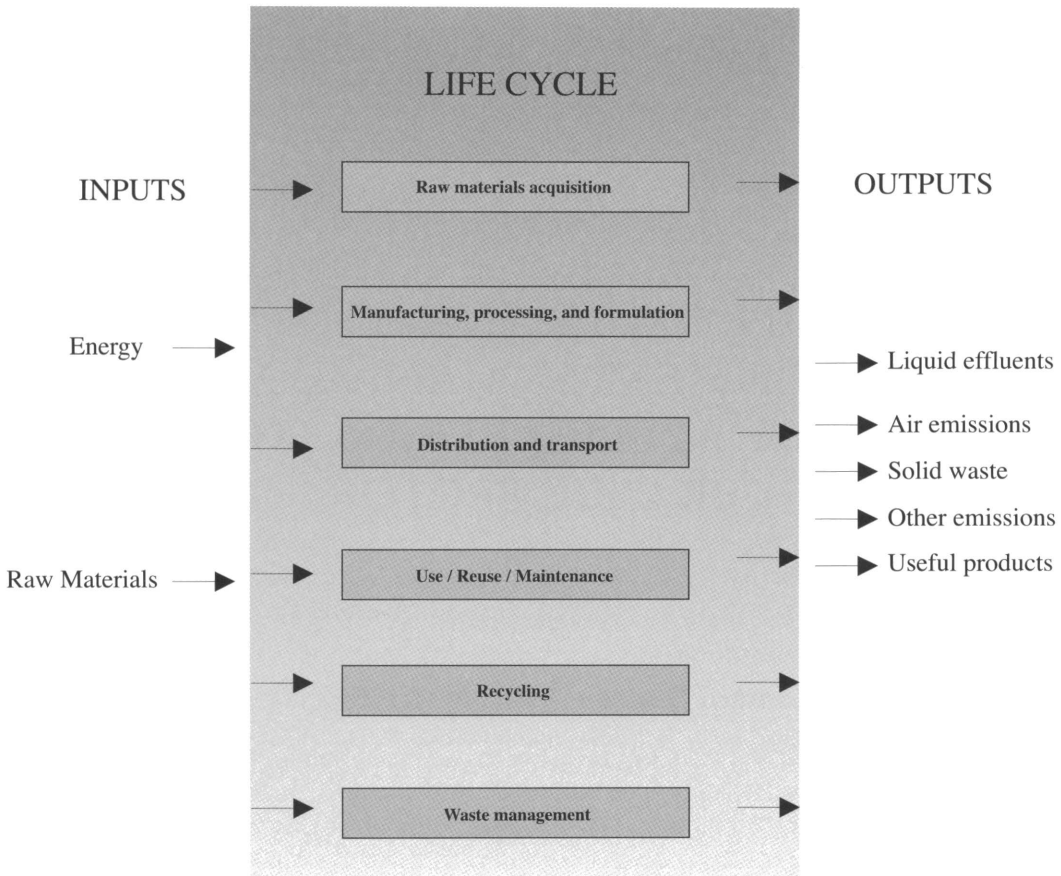
Romero Díaz de Ávila, María Teresa

Norcontrol, S.A.

Standard *UNE-EN ISO 14040 (Environmental Analysis. Life Cycle Analysis. Principles and Structure)*, defines LCA as a technique that allows evaluating environmental aspects and potential impacts associated with a product/process or activity by means of:

- *Compiling an inventory* of the relevant inputs (material and energy) and relevant outputs (products, air emissions, solid waste, etc.) of the system (product, process and/or activity under study)
- *Evaluation of potential environmental impacts* produced as a result of the foregoing inputs and outputs.
- *Interpretation* of the results of the foregoing stages (impact inventory and evaluation), in accordance with the objectives to be achieved by LCA.

Conducting a LCA involves taking into consideration the whole life cycle of the product/process or activity under study, i.e., from the time the resources are extracted to the sending of the waste to their final destination. For this reason, LCA is also called Cradle-to-Grave Analysis, comprising the stages shown in the accompanying figure.



ENVIRONMENTAL MANAGEMENT STANDARDS IN RELATION TO LCA

- *UNE-EN ISO 14040. Environmental Analysis. Life Cycle Analysis. Principles and Structure.*
- *UNE-EN ISO 14041. Environmental Analysis. Life Cycle Analysis. Definition of Objectives and Scope and Inventory Analysis.*
- *ISO/FDIS 14042. Environmental Analysis. Life Cycle Analysis. Evaluation of Life Cycle Impact.*
- *ISO/FDIS 14043. Environmental Analysis. Life Cycle Assessment. Life Cycle Interpretation.*

LCA APPLICATIONS IN THE CERAMIC SECTOR

LCA is a useful tool for providing information for companies with regard to decision taking relating to environmental improvements. This information, combined with economic data can be used to take important strategic decisions, which extend their applications beyond the environmental sphere. In the ceramic sector, LCA has different applications, which are summarised below:

- Applications as a tool for planning environmental strategies.
- Image enhancement and environmental marketing.
- Selection of waste management alternatives.

- Decision-taking tool during the new product design stage.
- Functional comparison of equivalent products.
- Comparison of different options in a new process with a view to minimising environmental impacts.
- Tool for identifying processes, components and systems whose contribution to environmental impact is significant.
- Evaluation of effects produced by consuming resources at the facilities.

DEVELOPMENT OF A LCA IN ACCORDANCE WITH UNE-EN ISO 14040

The development of a Life Cycle Analysis in accordance with UNE-EN ISO 14040, should cover the following methodological stages:

- *Definition of the study objective and scope.* The definition of objectives comprises the explanation of the motives for the study and description of its target user. The scope is the definition of the extent, depth and detail of the study.
- *Inventory analysis,* consisting of the quantification of the inputs and outputs of the system under study, including the use of resources (raw materials and energy) emissions into the air, ground and water and waste production.
- *Impact evaluation.* The Life Cycle Impact Evaluation relates the results of the inventory analysis to the environmental effects that they produce, with a view to assessing the importance of the potential impacts they give rise to. This is developed in three stages: classification, characterisation and assessment.
- *Interpretation.* Interpretation is a systematic evaluation of the needs and opportunities of reducing the environmental loads associated with energy consumption, raw materials and environmental impact of the emissions that arise during the Life Cycle of a product, process or activity.