Preparation of an Eco-balance for Coating Materials with Epoxidized Derivatives

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Abstract

The scope of the presented project is to illuminate and describe the potential environmental impacts caused by the production and application of coating material using epoxidized derivatives. Therefore an appropriate eco-balance in collaboration with the company BIOMEL GmbH located in Dessau (Germany) shall be conducted.

The eco-balance shall be prepared for two production processes and shall have a comparative character. The first eco-balance shall be conducted for coating materials whose solvents were build up on the basis of epoxy resin. The second eco-balance shall cover a coating material with an reactive diluent as solvent which is currently under development and can be used as solvent as well as binder. The reactive diluent will be produced on a pure native basis utilizing the seed oil of the so called dragon-figurehead plant.

In order to obtain and to derive reliable and significant results from the eco-balance as far as impact assessment and balance valuation are concerned, it is consequently necessary to compare and to evaluate material and energy flows within the production process for a coating material on a native basis (epoxy resin coating and/or epoxy dragon-figurehead methyl-ester) and for a similar coating material on a petrochemical basis (2K-epoxy resin white) as provided by the company WOLA GmbH.

The methodology of eco-balancing which provides the foundation for this study is based upon material flow networks. They are modeled and evaluated with the utilization of the software tool Umberto. In order to be able to set out the contribution of the processes to the overall environmental pollution, it is necessary to survey the internal work and production flows in the actual balance and to list these in as much detail as possible. What is more, knowledge about in-house contexts, such as the overview of the raw materials, auxiliary products/supplies and factory supplies/fuels involved in the particular production process, are just as necessary. Furthermore possible transports, use and disposal. For the eco-balancing it is necessary to ascertain precise data about all involved processes. After the modeling of the production process the overall model must be completed with the ascertained data in order to calculate the input and output flows and to generate the actual balance. Based on that the impact assessment and balance valuation can be done using coefficient systems implemented in Umberto.