

A Quick Reference Guide to
LCA DATA
and eco-based materials selection

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LCA DATA

and eco-based materials selection

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Preface

Life Cycle Assessment (LCA) is a well-defined method to calculate the environmental burden of a product or service.

The book “A practical guide to LCA, for students designers and business managers” (Vogtländer, Fourth edition 2016) is an attempt to explain LCA in such a way that students and other interested people (non-experts) can easily and quickly understand how to do the required calculations.

Another hurdle, however, is to acquire the data required for a specific LCA calculation. Although the internet is the modern source of data, there is still a need for data guides which provide data in an easy and well accessible way. The recently developed Idemat App for IOS and Android provides fast and detailed information on regularly used materials, however, not everybody has a smartphone yet. Especially in labs and workshops, it appears that look-up tables in a reference guide are faster than a search on the internet or searches in big computer databases.

A quick reference guide like this one seems to be very useful in the early design phases, when it is essential to have a good overview of alternative design solutions.

This Quick Reference Guide on LCA data provides frequently required data in practice, and gives URLs of where more specific data can be found. The single indicators which are provided in this guide are eco-costs 2012 and the Carbon Footprint. Data are given for three end-of-life scenarios: land-fill, waste treatment as it is common in Western Europe, and the circular economy. The underlying LCA calculations are based on LCIs from Ecoinvent v3.1 and Idemat2015.

The guide also provides charts to select the most appropriate materials for a certain function (Ashby, 2009). The educational version of the Cambridge Engineering Selector software, CES EduPack, has been used to make these material selection charts.

My hope is that this book will not only be used by students, but also by designers, architects, and business managers (and their consultants), contributing to the wider awareness that LCA is an indispensable tool in modern design and engineering.

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1 LCA indicator tables

On the following pages, so-called ‘single indicators’ of LCA are provided for materials and products¹:

- ✓ The eco-costs (euro)
- ✓ The Carbon Footprint (kg CO₂ equivalent)

Data in the tables are provided for 3 end-of-life scenarios, which are added to the cradle-to-gate data (note that the use phase is not included):

- Landfill (as it is common in many countries outside Western Europe)
- Openloop recycling and combustion with heat recovery (as it is common in Western Europe)
- Closed loop recycling (“the circular economy”)

Eco-costs are ‘prevention based’ and include toxic emissions and materials depletion. A short description on the eco-costs is provided in Section A.7. A comprehensive description can be found at Wikipedia and at www.ecocostsvalue.com. The theoretical background is given in (Vogtländer et al., 2010)

Carbon Footprint is the most applied single indicator in LCA. However, data do not comprise the issue of materials depletion, which is the reason that this indicator performs less good in some specific C2C calculations (the circular economy).

The Tables are based on the LCIs of Idemat2015. Idemat2015 is based on LCIs of the Ecoinvent v3.1 database. The data on Food (Section 1.3) are based on Idemat 2010.

Data on materials include transport to a harbour in the North Sea region. Data on electricity, transport (rail and road) houses and food are local, as specified in the tables.

The data provided in this Guide are a selection of bigger databases. More data can be found on www.ecocostsvalue.com tab data, excel file ‘Ecocosts2012 V3.3 LCA data on products and services EI V3 Idemat2015’. This excel file comprises more than 6000 items, and includes AgriFootprint data. Data for pure emissions can also be found on www.ecocostsvalue.com tab data, excel file ‘Ecocosts2012 V3.3 data on emissions and materials depletion’.

Chapter 2 of this guide provides charts to select the most appropriate materials for a certain function (Ashby, 2009). The Cambridge Engineering Selector software, CES EduPack was used to make these materials selection charts.

¹ Data for the CED and ReCiPe indicators, and data for other single indicators (e.g. Ecoindicator 99, BEES, and Ecological Scarcity) can be found in the excel files at www.ecocostsvalue.com tab data.