

Delphi4LED



From measurements to standardized Multi-Domain compact models of LEDs



Objectives

The goal of the project is to develop a standardized method to create multi-domain LED compact models from testing data.

The key objectives are:

- Define set of LED model equations that can be implemented into a FEM/CFD tool, for the purpose of self-consistent multi-domain simulation of LEDs thermal, electrical and light output characteristics.
- Provide interfacing between measurement tools, modelling tools and simulation tools to allow the application of the compact LED models.
- Prove the benefits of the use of compact models in the development process to reduce development times, cost and prepare for the digital revolution.

Relevance and Impact

The European lighting industry faces a couple of key challenges due to the introduction of LED:

- On the market side, it is necessary to speed up development time, improve quality of current LED products and enable towards value-added activities in order to gain competitive advantage.
- On the development side, LED lighting has different challenges than conventional lighting applications. New characterisation procedures have to be defined as well as new standardization in order to boost LED adoption. This will lead to an industry standard in the lighting industry.

Achievement of this project is expected to boost time to market of LED products cut by 1/3, cut development cost by 50%, reduce Cost of Non-quality by 25%. The European lighting industry is offered a unique competitive advantage, necessary to catch the 30-40% speed of growth of its LED market and tap into potential new markets.

Delphi4LED provides first mover advantage to the European LED ecosystem in providing tools and methods for integration into Digital Manufacturing chain. Thus ensuring a long term competitive advantage.

Technical Innovation

In order to achieve a good design of LED systems, a modular, multi-domain based modelling approach is needed – this way allowing the freedom for LED component integrators to use such models in any kind of luminaire designs. In order to overcome those key challenges, seamless integration of the LED in the product development chain is necessary. For that a communication bridge, in the form of standardization, has to be established between the semiconductor industry (LED supplier) and the Lighting industry (LED component integrators).

In order to achieve this, the following tools have to be provided:

- Generic, multi-domain model of LED chips
- Compact thermal model of the LED chips' environment
- Modeling interface towards the luminaire

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15

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7

