

# THERMAL MANAGEMENT towards LED Applications

## Course Goal:

An introduction to electronics cooling and its basic principles for systems-, electrical- and other engineers involved in electronics systems architecture and design of LED applications.

## Course Deliverables:

Provide the basic tools and understanding to implement good thermal judgment while the system is at the design stage.

The course notes provide many examples and useful calculations for the required basic thermal analysis.

## Benefits:

This technical seminar will provide engineers, designers and program managers with valuable knowledge that can be applied right away to improve the product development process.

## Course Outline:

### Part 1: The Basics

1. What is electronics cooling?
2. Why do we need thermal management of electronic systems?
3. Why is thermal management important for successful implementation of High Power LED
4. Basics of heat transfer - a brief review of the basics.
5. Understanding thermal resistance
6. What is a heat sink and its role in thermal management?

### Part 2: Tools

1. Role of thermal analysis in the design cycle.
2. Selection of cooling system for LED application
3. Heat sink types and selection.
4. Effect of board layout on thermal performance - why do we need to optimize board layout.
5. Understanding system layout and its impact on cooling.
6. Thermal measurements in LED applications

**1 Day €495**



**Registration Form**

Fax to: + 31 (0)35 69 212 94

Name: .....

Company: .....

Job Title: .....

Address: .....

City: .....

Phone: .....

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**HOW TO REGISTER FOR THIS PROGRAM:**

The Thermal Management toward LED applications is offered at € 495 (excl. VAT). Seating is limited, so please make your reservation soon to guarantee your place.

Please contact ATS-Europe BV now via email at [info@qats-europe.com](mailto:info@qats-europe.com) or by telephone at +31 (0)35 69 847 15

**Course Dates\***  
25 November 2009  
27 Januari 2010

\* Course dates subject to change

**ABOUT THE PRESENTER:****Norbert P. Engelberts**

Norbert P. Engelberts is the director of Advanced Thermal Solutions Europe and has been actively involved in electronics cooling since 1992. Prior to ATS, Engelberts headed the Thermal Design and Environmental Testing Group for Bell Labs, Lucent Technologies (now Alcatel-Lucent). During his 11 year tenure at Bell Labs he was responsible for the thermal management and environmental testing of all telecommunications system (indoor and outdoor) equipment developed by the company in the Netherlands. In addition, Engelberts also brings with him expertise in HVAC system design, particularly those that house telecommunications and networking equipment.



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