

**R&D Services**

Our Service – Your Product

## A LOOK AT THE COMPANY



### ■ OUR COMPETENCE – YOUR ADVANTAGE

Headquartered in Kamp-Lintfort, a town in Germany's Lower Rhine region, Vossloh-Schwabe Lighting Solutions GmbH is not only a member of the Vossloh-Schwabe, but also of the Panasonic Group. As a globally operating and innovative company within the lighting sector, VS Lighting Solutions is ideally placed to tackle the challenges facing the lighting industry.

Years of experience and a wealth of knowledge gained in the process of numerous developments in the field of LED modules and particularly in the area of customised solutions have put VS Lighting Solutions at the forefront of the brisk development towards LED technology.

Apart from general lighting, such developments also include spectral modifications of lighting destined for use in the fields of plant cultivation and animal husbandry, but also in the area of human-centric lighting. The product range is rounded off by numerous further areas of special expertise. Close cooperation with associations, institutes and universities forms the scientific foundation for innovative products and systems. This background has seen VS Lighting Solutions emerge as a technology leader in recent years.

In addition to the named areas of expertise, the Kamp-Lintfort location also provides pre-assembled individual LEDs for the most diverse industrial applications. In total, more than 100 employees dedicate their time to every aspect of LED technology at our 4,800 m<sup>2</sup> location.

However, as a systems provider Vossloh-Schwabe's competence goes much farther than individual LEDs and LED modules. Thanks to our competence centres both in Germany and abroad, we can also provide our customers with control gear for LEDs (drivers), LED optics and other lighting technology components. From the first idea right up to the final product, our customers can therefore rely on receiving fully functioning systems with perfectly matched high-quality components and all from a single source.

In addition, our state-of-the-art laboratory facilities allow us to conduct all necessary photometric testing in-house. Photometric, chromatic and radiometric testing as well as simulations of thermal processes are all carried out using cutting-edge equipment.

Within the global Vossloh-Schwabe Group, more than 1,000 qualified and highly motivated employees are at the service of our customers. We invest heavily into research, development and



manufacturing with the aim of delivering innovative products and systems of the highest quality. And our membership in the Panasonic Group gives us access to considerable additional resources in these fields. Finally, Vossloh-Schwabe also plays an active part in organisations tasked with standardisation issues and product safety. And now as before, our focus remains firmly on ensuring the satisfaction of our customers.

## ■ OUR SERVICES – YOUR BENEFIT

Vossloh-Schwabe Lighting Solutions provides a variety of LED-related services.

### Thermal Simulations

Thermal simulations serve to analyse the basic idea of a luminaire or heat sink design. VS uses state-of-the-art computational fluid dynamics (CFD) simulation tools to calculate temperature distribution and heat flow in advance. Simulations can be conducted from chip level right up to whole luminaires, including drivers, heat sinks and LED modules. By reducing the number of required design iterations, thermal simulations also help to speed up the entire development process of a product.

### Optical Simulations

Optical simulations can range from the exact design of lens surfaces using different materials such as PMMA, PC, silicone and others, right up to light planning for streets and buildings. In addition, lenses are both designed and checked with the help of highly sophisticated Monte Carlo ray tracing, a method that makes it possible to predict the light and colour distribution of any given lens design. Finally, a variety of light planning tools are available to check the performance of a certain luminaire in a specific application.

### Optical Measurements

Our in-house light laboratory is available for conducting photometric measurements with the aim of determining and providing all required photo-, color- and radiometric values. Two goniometers serve to determine the exact radiation characteristics of individual LEDs or LED light modules up to a diameter of 350 mm, while an integrating sphere (CIE 127) is used for the purpose of optical characterisation. This sphere enables fast and precise measurement of the radiant power and luminous flux of different light sources.

### Thermal Measurements

With thermal management numbering among our core skills, we employ various methods of testing products or verifying thermal simulations. Apart from the classic method involving thermal probes, transient measurement techniques (MiReD®) can also be used to resolve individual thermal transfers, which makes it possible to check individual layers and thus enables targeted optimisation. An IR camera is also available for conducting hotspot measurements. This thermal imaging camera can display heat paths by taking temporally resolved readings.

### Design and Conversion

Using a wide range of proprietary products, VS can help you to convert from a luminaire-based to an LED solution, for which purpose we provide LED modules for various applications, such as street, office, shop or home lighting. On the basis of your application requirements, desired lumen output and light distribution, we can deliver a suitable solution for your needs.

### EMC Measurements

Our in-house laboratory is also used to carry out emission and immunity measurements on lighting equipment in compliance with EN55015 and EN61547. Such testing includes measuring disturbance voltage and radiated magnetic field strength as well as the degree of immunity to ESD, surges and bursts. Moreover, VS can also conduct EMC measurements required for EMC certification by the VDE in accordance with the scope of TDAP. Full EMC certification must be conducted in cooperation with the VDE.

### Production of PCB Samples

For application testing purposes, VS can additionally deliver samples – be they initial prototypes, destined for proof of concept or even small series – on request.

### Production of Plastic Samples

3D printing provides a simple and cost-effective means of producing plastic prototypes. VS can print samples up to dimensions of 250 x 250 mm. Such 3D samples make it easy to test their mechanical compatibility with other components.

**Each of our products is thus subjected to extremely thorough testing, which serves to verify all specified technical properties and so ensures consistently high quality.**

OUR  
KNOW-HOW  
YOUR ADVANTAGE



## ■ LISTENING, UNDERSTANDING, IMPLEMENTING

We collaborate with our customers to develop ideas and elaborate solutions. Whether the task involves making an individual LED, producing a fully assembled PCB, or creating a turnkey system, we can bring the wishes of our customers to life. Preliminary optical and thermal simulations already go to optimise the final product in advance.

Even when it comes to special customer wishes such as solar operation, moisture protection, control of chromaticity coordinates and colour temperature as well as the integration of motion sensors, we are your competent partner with the right know-how at our fingertips. Modules that respond to suit each respective situation thus provide light whenever and wherever it is needed.

Following the initial presentation and a first exchange of ideas with the customer, our application workshop can get to work and quickly produce any prototypes and samples that may be required.

Apart from integrating LEDs into existing luminaires, we can also break new ground by implementing a completely new idea for a luminaire design. In this respect, we consider close communication with our customers, fast response times and quick implementation of individual project stages to be key.

### **Our customers appreciate:**

- A SINGLE point of contact
- Teamwork
- VS as a provider of ideas
- Open communication channels
- Decades of experience

## ■ OUR SERVICE – YOUR PRODUCT

The following pages present a short overview of the individual LED light module development services offered by Vossloh-Schwabe. These services can be booked as individual development modules, or as part of a customer-specific turnkey development project. Please contact your VS representative for further details.

## OPTICAL SERVICES

### ■ OPTICAL MEASUREMENTS

Measurements using an integrating sphere  
(Assembly groups up to max.  $\varnothing 350\text{mm}$ )  
Processing time: 5 working days  
Result: report (total luminous flux; correlated colour temperature (CCT); spectrum, colour coordinates, CRI, TM30, radiant power, dominant-peak- and centre wavelengths. Electrical parameters U, I and power consumption, efficacy and efficiency)

**Ref. No. 557282**

Measurements using a goniophotometer  
(Assembly groups up to max.  $\varnothing 500\text{mm}$ )  
Processing time: 5 working days  
Result: light distribution curve in IES or Eulumdat format, report (light distribution curve, FWHM, total light flux; UGR, electrical: total power consumption)

**Ref. No. 557287**

Measurements using a near-field goniophotometer  
(Assembly groups up to max.  $\varnothing 300\text{mm}$ )  
Processing time: 8 working days  
Result: ray files in various formats (Lighttools, TracePro, Photopia, Speos, Zemax). Remark: ray origin points are on a sphere of  $\sim 300\text{mm}$  in diameter and need to be retraced to the corresponding geometry of each software package by the end user.

**Ref. No. 557288**

Photometric analysis of luminaires, including loss analysis of individual components  
(Assembly groups up to max.  $\varnothing 500\text{mm}$ )  
Processing time: 8 working days  
Result: report (luminous flux and power consumption; loss analysis of individual luminaire components)

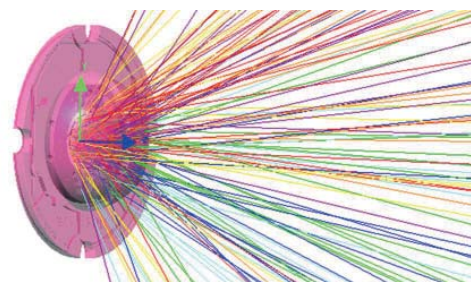
**Ref. No. 547993**



### ■ OPTICAL SIMULATION OF A GIVEN DESIGN

Creation of limited data on the basis of existing lens design, LED data and operating conditions  
Processing time: 5 working days  
Result: light distribution curve

**Ref. No. 547988**

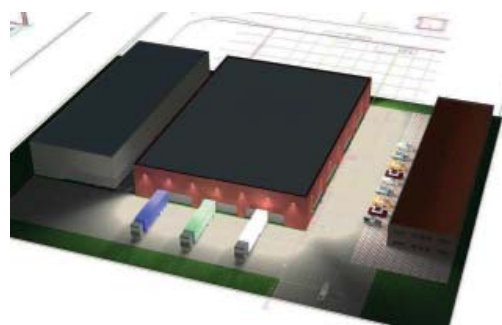


### ■ SIMPLE LIGHT PLANNING

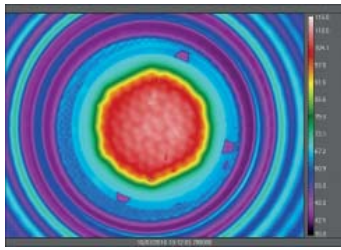
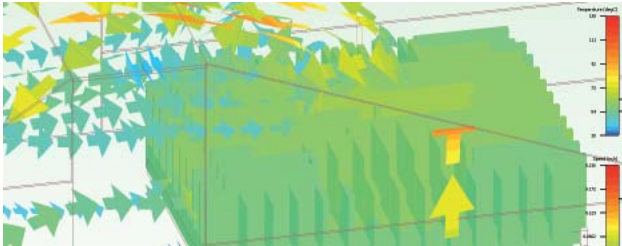
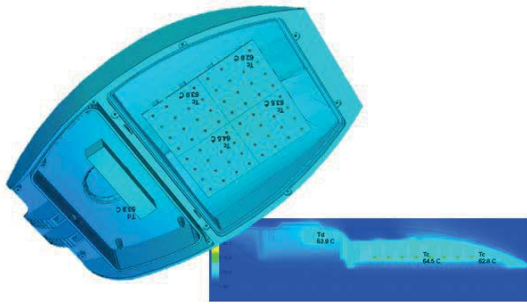
Simulation of lighting characteristics, light distribution and light radiation behaviour in a simple system (single room, example of street geometry, simple outdoor system) based on existing or known radiation data of light sources.

Processing time: 10 working days  
Result: report (simulation output)

**Ref. No. 547989**



**THERMAL SERVICES**



■ **THERMAL SIMULATIONS**

Calculation of system temperatures, heat sink calculation based on known geometries and the used materials.  
 Processing time: 10 working days  
 Result: report (values simulated at the tc points of components, lifetime analysis)

**Ref. No. 547991**

■ **THERMAL DESIGN**

Optimization of existing designs / design of a new heat sink  
 Processing time: 10 working days  
 Result: report (pdf)

**Ref. No. 547992**

■ **THERMAL MEASUREMENTS**

Thermal measurements taken at the application's tc points.  
 Processing time: 10 working days  
 Result: report (values measured at the tc points of components, lifetime analysis)

**Ref. No. 547994**

**DESIGN AND CONVERSION**

■ **CONVERSION TO A VS SOLUTION**

Replacement of conventional lamps or other LED products with a VS LED solution.

Processing time: based on project

Result: LED luminaires

**Ref. No. 557289**

## EMC SERVICES

### ■ EMI MEASUREMENTS

Measurements of emissions in compliance with EN55015:

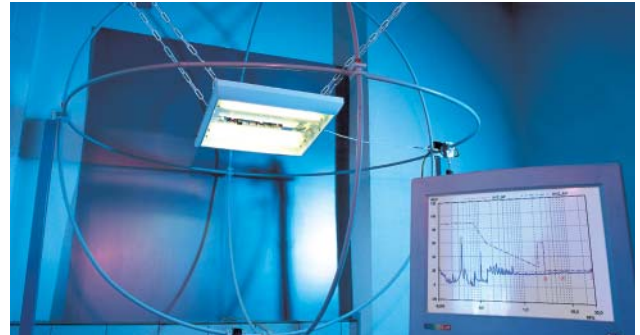
- Disturbance voltage (9 kHz – 30 MHz)
- Radiated magnetic field strength (9 kHz – 30 MHz)
- Disturbance voltage on control (150 kHz – 30 MHz)
- RF emissions (CDN method) (30 MHz – 300 MHz)
- AC-mains harmonic current emissions (DC – 2 kHz)

Processing time: 6 working days for non-dimmable devices

**Non-dimmable Ref. No.: 563531**

**Dimmable Ref. No.: 563532**

**EMI report Ref. No.: 563533** (evaluation of results in accordance with EN 55015)



### ■ EMS MEASUREMENTS

Immunity measurements in accordance with EN61547:

- Electrostatic discharge (ESD)
- Electrical fast transient (burst) immunity test
- Surge immunity test
- AC-mains voltage dips, short interruptions and voltage variations immunity test

Processing time: 3 working days for non-dimmable devices

**Non-dimmable Ref. No.: 563528**

**Dimmable Ref. No.: 563529**

**EMS report Ref. No.: 563530** (evaluation of results in accordance with EN 61547)



## SAMPLE-PRODUCING SERVICES

### ■ PRODUCTION OF PCB SAMPLES

Modules produced in a semi-automated process with a nearly mass-producible PCB

Processing time: based on project

Result: sample

**Ref. No. 547986**



### ■ PRODUCTION OF PLASTIC SAMPLES


Lens or other plastic part printed using a 3D printer.

Processing time: 5 working days

Result: sample

**Ref. No. 547990**





Whenever an electric light goes on around the world, Vossloh-Schwabe is likely to have made a key contribution to ensuring that everything works at the flick of a switch.

Headquartered in Germany, Vossloh-Schwabe has been a member of the global Panasonic group since 2002 and counts as a technology leader within the lighting sector. Top-quality, high-performance products form the basis of the company's success.

Vossloh-Schwabe's extensive product portfolio covers all lighting components: LED systems with matching control gear units, highly efficient optical systems, state-of-the-art control systems (LiCS) as well as electronic and magnetic ballasts and lampholders.

The company's future lies in smart lighting.

A member of the Panasonic group **Panasonic**

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SOLUTIONS

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