



Measuring and monitoring light and colour objectively and accurately are important to various industries and applications. Each industry has its own needs and challenges when it comes to measuring light and colour, for example in R&D or production. With a smart standardized approach, Admesy offers high precision instrumentation for applications such as OEM spectrometry, display, lighting and analysis, with the added benefit of offering high-end measurement results for a much lower price than its competitors.

## Measuring light

Admesy was founded in 2006 by former Philips employees from the Philips Mobile Display Department which developed and produced displays for phones. At the time, mobile displays were shifting from black and white to colour and the need for accurate and immediately available in-line colour measurement became important. But as the testing of displays was felt to be too small a niche market for a large company such as Philips, some of the company's engineers saw an opportunity. As a result, and with the support of Philips, a spin out was organized in 2006 resulting in the formation of a new company: Admesy. With the immediate advantage of available knowledge and expertise, Admesy quickly developed into a global niche player.

In the following fifteen years, Admesy became a well-known brand for a range of user-friendly and robust light and colour

measurement devices. With a specialized product portfolio including light meters, spectroradiometers, colorimeters and 2D imaging colorimeters, as well as accessories such as stabilized light sources and integrating spheres, Admesy was able to successfully focus on large consumer brands.

With customers all over the world, but particularly in Asia, Admesy opened an office near Seoul, Korea, in 2013 followed by an office in Shenzhen, China in 2017 and near Tokyo Japan in 2021.

*"Our mission is to provide customers with innovative test and measurement solutions tailored for colour and light measurement in production processes."*

- Steven Goetstouwers, CEO

### Move to analytical equipment

Recently, Steven Goetstouwers started to expand his company into a new direction: the highly specialized market of analytical equipment. The idea behind this strategic move came from the fact that high-end spectrometer technology from Admesy is capable of competing with more expensive equipment in multiple markets and applications.

*"Our spectrometry instruments can be used by many different industries: measuring the amount of fertilization in the fields, emissions in the petrochemical industry or the pollution of surface water."*

Admesy offers a broad range of test and measurement instruments focused on colour and light measurements in all environments ranging from the R&D lab to the production

*"There is only one thing that you sacrifice when using our equipment and that is flexibility."*



**ABOUT SPECTROMETRY**

A broad range of applications in research and development and in-line production demand highly accurate analysis of light or spectrum. This is done by spectrometry, which can be described as the study that focuses on the analysis of light by dispersing light beams into individual wavelengths. This analysis is typically done with a spectrometer: an instrument which can determine the composition of light. Spectrometry, sometimes known as spectroscopy, allows detailed data regarding the composition of light per wavelength.

By dispersing a light beam via a prism or grating, the amount of energy at individual wavelengths can be measured. Spectral information can, for example, be used to determine spectral power distribution, presence of undesired wavelengths, colour rendering properties of light sources or transmissive/reflective properties of materials. This is generally considered as regular spectrometry. Admesy offers different types of spectrometers, each serving specific needs for R&D and in-line production measurements.

floor. Traditionally, spectrometers are often found in an R&D or laboratory environment as these are safe, time is not an issue and the workforce is highly educated. However, in addition to measurement, light spectrometers are used for many different analytical and industrial applications, for example the testing of substances such as blood in laboratories, measuring emissions in industries, or measuring alcohol during brewing processes.

To make and market instruments which are primarily destined for a production environment, Admesy specifically develops its devices for industrial use and system integration by combining high speed accurate measurement from a robust device that does not need a high level of maintenance. To focus on its core competence of delivering high precision colour and light measurement, Admesy needs to know exactly what determines the performance and margins of error of the equipment, and control this by standardizing. As a result, the measuring devices are relatively inexpensive compared with their competitors. The disadvantage is that if a

client wants small volume customization, needing new variables and uncertainties about the measuring outcome, this may not always be possible.

*"Sometimes, we have to say no to a client who wishes to change a setup. We know our strengths, but also our weaknesses. Our relatively low-cost and high precision tools cannot be adjusted to any situation. There is only one thing that you sacrifice when using our equipment and that is flexibility."*

**For the highest of standards**

For most industries, quality testing is a crucial part of their production processes. This is further driven by existing trends in modern society, as standards of expected safety are rising quickly. In some branches, for example consumer electronics and automotive, standards are even higher, underscoring the necessity to test all products as thoroughly as possible during the production process. Admesy's instruments play an important role in this testing and are an integrated part of the production processes that seek to guarantee a higher quality without

malfunctions. The unique feature about Admesy's measuring devices is that testing can be done continuously in-line (instead of by sampling) and results can be given in real-time.

*"Continuous and accurate measuring during production in industries such as food or automotive, offers much higher safety levels than the still often-used sampling method."*

To achieve the highest level of quality all Admesy production is undertaken in a cleanroom or a controlled environment. Within the cleanroom dedicated workspaces are tailored to suit each production step, offering higher efficiency, higher levels of traceability, higher stability of calibrations and inspections and less chance of human error.

**Safety and aesthetics of Admesy's screens**

We live in a world where people are behind a screen for a large part of their time, whether this is for work or social activities. People have become used to enjoying top-quality displays in their mobile phones, tablets, laptops and even cars. The handling of optical characteristics such as differences in brightness, colour and flicker are not only considered an aesthetic aspect of good lighting products, but are also directly related to human well-being and health. Also, emerging technologies such as lighting surfaces for office and home illumination are expected to be safe and look perfect.



**MEASURING THE LIGHT OF THE FUTURE**

LED and Solid-State Lighting [SSL] are often referred to as the light of the future: combining low energy consumption, efficient technology and long product life times. An inherent challenge to the production process of LED and SSL products are driver-related variations in their optical characteristics such as brightness, colour and flicker, even in the same production batches. In order to assure a high-end lighting product, it is necessary to measure these optical characteristics during the development of LEDs and perform a 100% inspection during the production processes.

For LED lamps the flickering of the light is a huge challenge. Studies have shown that the human eye can perceive flicker of LEDs at rates of up to 90 Hz, with anything above that being imperceptible to the human eye. Generic lighting tends to operate at frequencies of 50 - 90 Hz, which is designed to illuminate an environment and give the impression of a stable and constant light source, even though the LEDs are consistently switching on and off hundreds of times per minute.

Further studies have shown that flicker rates of up to 500 Hz can result in unintentionally hazardous stroboscopic effects, while the perceived flicker of up

to 70 Hz can have serious consequences such as seizures, headaches, fatigue, blurred vision, eyestrain or reduced visual task performance.

That is why 100% testing is necessary during the production process, as any one sample cannot be used as a basis for concluding the quality of the previous or next lamp. Lamp manufacturers are becoming more and more aware of the risks involved. Also, large retailers acknowledge that they are responsible for the sold product and its quality, including the stability of the light and colour.

*"Our light measurement equipment for a broad range of applications, with dedicated instrumentation, is designed to measure lighting products at all stages of the production process."*

Admesy offers high-speed light measurement devices which are sampling a light source at speeds of up to 186,567 samples per second and are capable of measuring flicker as a percentage or index values as well as newly developed standards or recommendations that take into account multiple frequency components and their modulation.

Controlling the quality of any display or lighting surface requires high quality standards during both development and production. Laboratories need high performance measurement devices to quantify and validate prototype parameters against design specifications. Manufacturers need fast, robust and reliable measurement devices in their production lines to test and adjust their products, to ensure both top quality and high production yields.

Admesy's dedicated instrumentation (imaging colorimeters) is designed to measure displays and luminous surfaces at all stages of the production process and thus guarantee safety and aesthetics.

**Road to success**

With the recent strategic shift towards the specialized market of analytical equipment, Admesy aims to find new markets and applications for its improved spectroscopy technology platform. Already, its spectrometry instruments are finding their way to new industries in food and healthcare. Admesy is confident that the road to yet more success has only just started.

*"We can technically compete with the most expensive equipment in multiple markets and applications: but for a much lower price."*

**THE THINGS YOU NEED TO KNOW ABOUT LIGHT...**

**What exactly is light?**

From a biological perspective light is energy that triggers the human eye and brain. The combination of light, eye and the brain provides sight. In physics, light can be described according to two different theories: one theory defines light as particles and the second as waves. From the perspective of measurement equipment such as spectro[radio]meters which measures in wavelengths, the second theory is the most applicable explanation.

**The human eye is not objective.**

Sensing light in contrast to objective measurement equipment, humans are biased when it comes to seeing light and colour. The human eye cannot distinguish individual wavelengths but is sensitive towards different parts of the spectrum covering multiple wavelengths. This response forms the basis of the photometric principle. Eyes contain rods and cones which make it possible to see under different luminance levels and distinguish colours respectively. However, one of the major shortcomings of the human eye is the fact that it cannot sense light objectively. Its automatic adaption to different light levels makes it impossible to quantify absolute luminance levels.

**Light is invisible!**

Light is actually only visible when looking either directly at a luminous object, for example a lamp, or when looking at illuminated objects that reflect light from a source. In a theoretical situation without any objects and a light source behind you, when looking straight ahead no light is visible. Although the light rays pass by: one would be staring at a black wall.

