APPLICATION**NOTE**

Fire Testing – TRD_LED

TRD_LED – The Latest Measurement Technique for Transmission and Optical Smoke Density

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Introduction

In fire testing, optical methods are used for determination of the smoke density. The basis for this is a light source and a light receiver, the optical axis of which is arranged such that the light beam penetrates a representative cross-section in the flue gas canal or a smoke chamber. The measurement signal corresponds to the transmission of the light through the flue gas. From the transmission value (0 – 100%), the optical density along with the smoke density can be determined at a known volume flow.

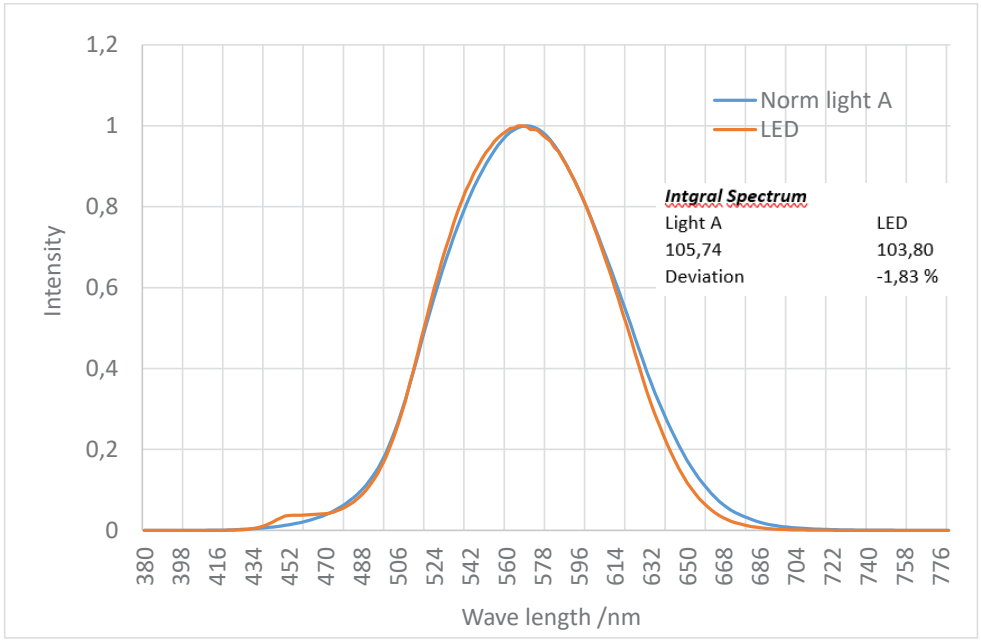
Fire Testing Systems by NETZSCH TAURUS Instruments

For many years, well-known light measurement systems based on TRDA and TRDL techniques have been used in the fire testing instruments developed by NETZSCH TAURUS Instruments. For the cable and building industry, these include KBT 916 (EN 50399, IEC 60332-3-10) and SBI 915 (EN 13823), and for flooring materials and material research, they include TBB 913 (EN ISO 9239-1) and TCC 918 (ISO 5660-1, ASTM E1354). Here, halogen lamps (A) and laser (L) are used as light sources.

With the newly developed TRD_LED light measurement system in accordance with ISO/TS 19850:2022, NETZSCH TAURUS Instruments is setting new standards in efficiency, performance and availability over conventional technology with halogen lamps.

The Standard is Exceeded

The dimensions of the new system are almost identical, as are light beam behavior and spectrum as well. The requirements in the new ISO/TS 19850:2022 standard with regard to the light spectrum are specified with a maximum possible deviation of 5% for the area integral. For the TRD_LED, agreement of the LED/halogen spectra of better than 98% can be achieved (deviation less than 2%). Figure 1 shows the spectra comparison.



1 Light spectrum for the TRD_LED compared to the TRDA with halogen lamp.

NGB · Application Note 305 · EN · 0124 · Techical Specifications are subject to change.

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Better Performance

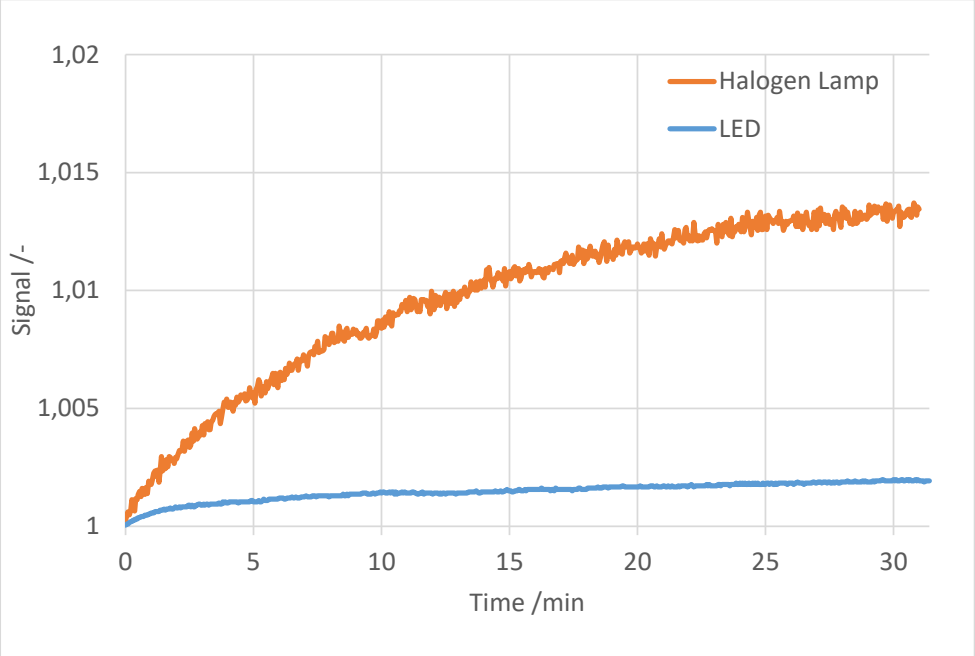
The use of LED technology with integrated voltage regulation and temperature compensation results in considerably better stability and immediate readiness for use. Virtually no warm-up time is required and the system is ready for measurement immediately after switching on. After a warm-up time of only 2 minutes, the signal is stable to ±0.2% and a measurement can be started. Figure 2 depicts the comparison between LED and halogen technology. For the halogen technology, there are signal changes of 1 to 2% within 45 min after switching on, due to the warm-up phase.

Higher Efficiency

Due to the typical characteristics of LED technology, firstly, the power consumption of LED is significantly lower (<0.3 W compared to 10 W for halogen); secondly, a regulated power supply is no longer required. In addition, the service life of the LED is 10 times higher than the halogen lamp.

Compatibility

The 24-V power supply can be provided by a simple power supply unit and there is full electrical compatibility with the existing electronics of the TRDA. It is therefore easy to update older equipment from NETZSCH TAURUS Instruments to the new LED technology.



2 Warm-up time for the TRD_LED compared to the TRDA with halogen lamp.

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