On-Site Visibility Measurement of Conspicuity Marking Tapes on Large Vehicles

Enhance road safety through conspicuity tape quality testing and wear detection

Large vehicles, such as trucks, trailers, and buses, pose a significant safety risk on roads, particularly in adverse weather conditions, low light, or at night. Reflective (conspicuity) tape plays a critical role in mitigating these risks by significantly improving the visibility of these vehicles to other road users.

This enhanced visibility allows drivers more time to react, thereby reducing the likelihood of accidents. However, the effectiveness of reflective tape is highly dependent on its quality and condition.

Over time, exposure to environmental factors, abrasion, and improper cleaning can degrade the retroreflective properties of the tape, rendering it less effective and compromising road safety.

Challenge

Ensuring the optimal performance of reflective tape on large vehicles presents several challenges:

- **Differentiating Quality:** It can be difficult to visually distinguish between high-quality, compliant reflective tapes, and lower-quality less effective alternatives.
- **Identifying Wear and Degradation:** Reflective tapes are subject to wear and tear, fading, and damage over time. Identifying when the retroreflectivity has fallen below safe thresholds requires objective measurement rather than subjective visual inspection.
- **On-Site Assessment:** The sheer number and dispersed nature of large vehicles make it impractical to bring them to a laboratory for reflective tape assessment. A portable, rapid, and accurate on-site solution is essential for routine inspection, and maintenance.
- **Compliance with Standards:** Regulatory bodies often mandate minimum retroreflectivity levels for conspicuity markings. Ensuring compliance requires a reliable measurement tool.

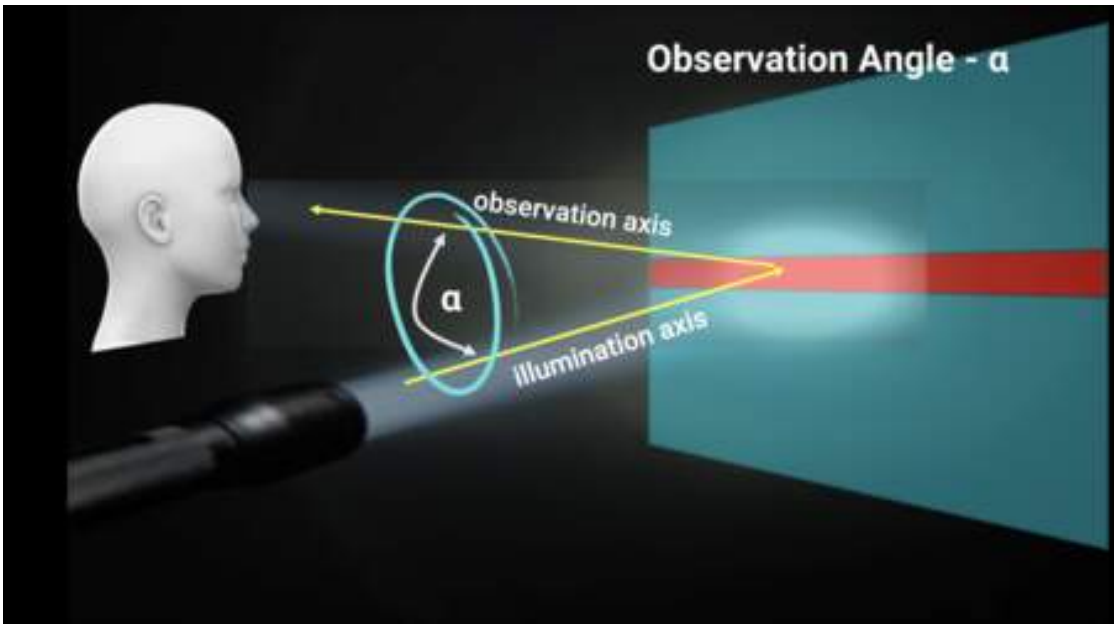
Compliance requires a reliable measurement tool. Without a robust method for assessing the visibility of reflective tapes in the field, there is a risk of vehicles operating with inadequate conspicuity, directly jeopardizing road safety.

Solution

The Zehntner ZRS 6060 is a state-of-the-art, portable retroreflectometer designed for fast and accurate on-site measurement of vertical retroreflectivity. Specifically engineered for use on a variety of reflective materials, including conspicuity tapes on large vehicles, reflective clothing, and road signs, the ZRS 6060 provides a precise and objective assessment of visibility performance.

What is measured with a portable retroreflectometer like the ZRS 6060?

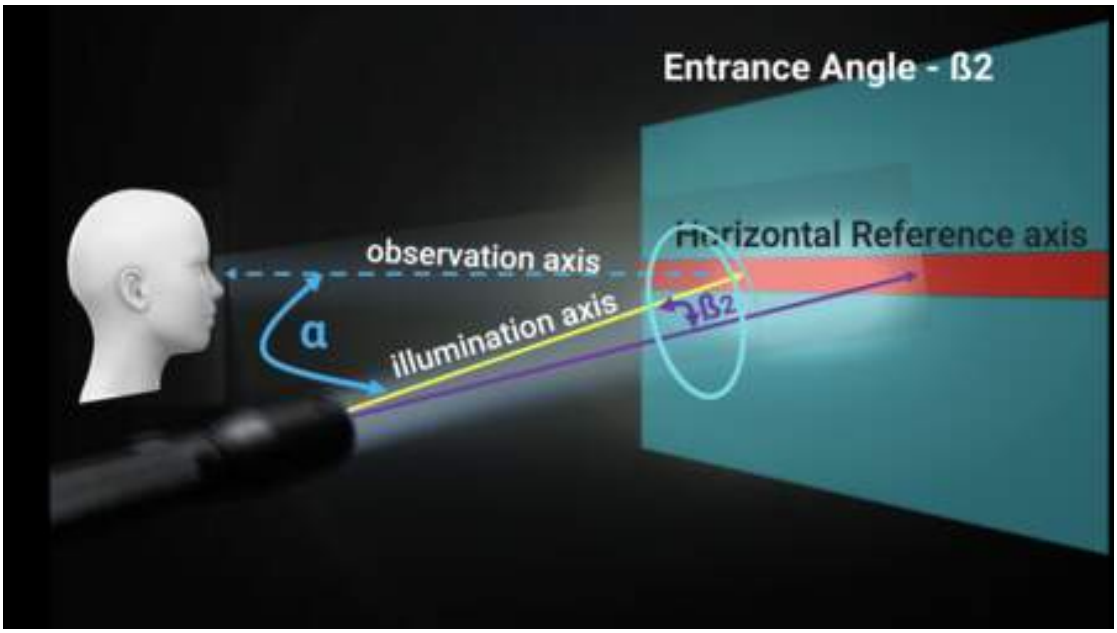
The effectiveness of retroreflective materials depends on the angles at which light strikes the surface and is subsequently observed. This is defined by two key parameters: the Observation Angle (α) and the Entrance Angle (β).



The angle between the illumination axis and the observation axis is measured as Observation Angle – a.

A smaller Observation Angle (α), generally means the retroreflective material appears brighter because more light is returned directly to the observer's eyes. Different vehicles (e.g., a passenger car vs. a large truck) will have different observation angles due to variations in headlight and eye positions.

The angle between the perpendicular axis to the horizontal retroreflector and the illumination axis is measured as Entrance Angle – β2. This measurement focuses on how light hits the tape from various angles in the horizontal plane (as a vehicle approaches or passes the tape).



An Entrance Angle (β) that is too large (i.e., the light hits the tape at a very sharp, oblique angle), the retroreflective elements become less effective.

Measuring these angles according to your local standard becomes easy and fast with the ZRS 6060 retroreflectometer.

Key Benefits of the Zehntner ZRS 6060:

- **Differentiating Quality:** With immediate results on-screen, you can differentiate between high-quality and low-quality tapes in seconds.
- **Identifying Wear and Degredation:** After some light preparation (wipe clean), inspecting the wear of reflective tape on large vehicles can be done in minutes, even in hard to reach areas using the telescopic extension.
- **Portability and Ease of Use:** Its lightweight and ergonomic design enables single-handed operation, making it ideal for quick and efficient on-site inspections. This significantly reduces the time and effort required, enabling more frequent and comprehensive assessments across the entire fleet.
- **Compliance with Standards:** The ZRS 6060 is designed to meet the relevant international standards for retroreflectivity measurement including UNECE Regulation No. 104 (ECE 104) Class “C” standard. This ensures that assessments are compliant with your country’s regulatory requirements.
- **Data Logging and Reporting:** The ZRS 6060 features internal memory for storing measurement data, which can then be easily transferred to a computer for detailed analysis, reporting, and record-keeping. This facilitates systematic maintenance programs.

By employing the Zehntner ZRS 6060, vehicle fleet operators, maintenance personnel, and road safety authorities can effectively monitor the performance of reflective tapes, ensuring consistent and optimal conspicuity.

Results

Since the device provides immediate quantitative data, you can eliminate subjective guesswork and ensure that reflective tapes meet the required quality standards.

Which tape will pass the quality test?

Results show high quality tape

Results show low quality tape

Instead of replacing tapes based on arbitrary schedules or visual estimations, the ZRS 6060 enables condition-based maintenance. This optimizes the lifespan of reflective materials and prevents premature replacements while avoiding the use of ineffective, worn-out tapes.

By identifying and replacing degraded reflective tapes promptly, the ZRS 6060 directly contributes to enhanced vehicle visibility, reducing the risk of accidents, particularly in challenging driving conditions.

Ready to provide fast, accurate, and objective on-site measurements of reflective tape visibility? The Zehntner ZRS 6060 is an indispensable tool for anyone responsible for the safety and maintenance of large vehicle fleets.