Standardised measurement of hemispherical light transmission in greenhouse covering materials

With population growth and food shortages requiring cost-effective food production, light transmission is crucial for greenhouse materials – jointly impacting crop growth and yield. The NEN 2675 standard was revised to measure light transmission from different angles of incidence. The H-LT meter exceeds the requirements of the standard, providing accurate measurements for growers and greenhouse horticulture in general.

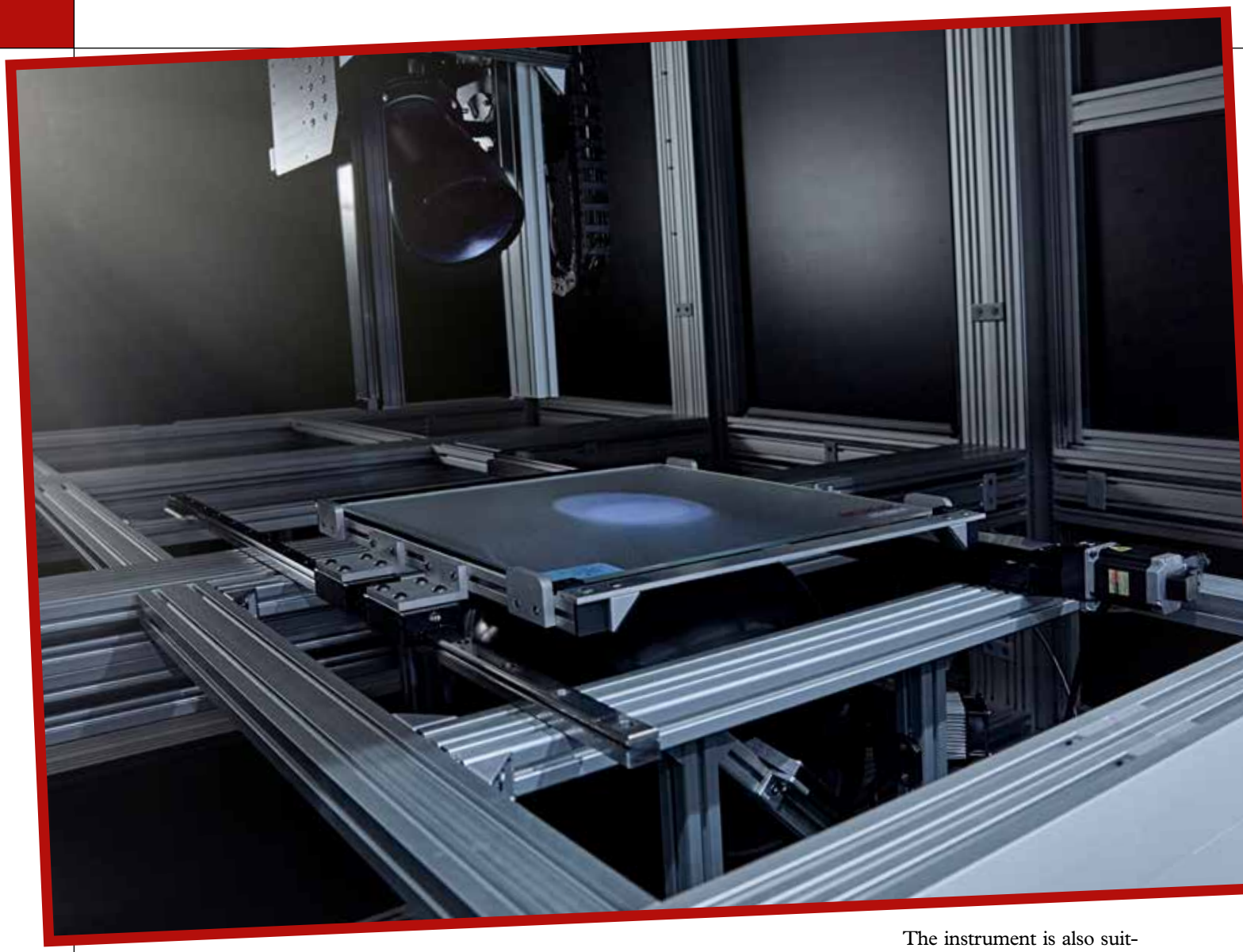
The food shortage crisis combined with the increasing population indices are serious incentives to find more economical ways to produce food. Light transmission is crucial for greenhouse covering materials. Indeed, the amount of light available to a crop in a greenhouse is directly related to the growth and development of the crop concerned, and therefore to the yield for the grower. For crops such as tomatoes, for example, a mere one percent increase in light transmission results in approximately 0.7 to one percent extra production. Measuring the hemispherical light transmission serves as the most representative method of measuring the optical properties of clear materials used in greenhouses and other agricultural clear structures.

The NEN 2675 standard was devised for the determination of optical properties of greenhouse covering materials and screens, and it was revised in 2018 after the NEN 2675:1990 iteration of the standard was deemed outdated and unsuitable for determining the optical properties of coated or diffused screens in horticultural applications.

LIGHT TRANSMISSION MEASURING PARAMETERS

Previously, the instruments commercially available only measured the perpendicular light transmission. However, to better mimic real solar radiation, the updated NEN 2675:2018 standard requires that light transmission measurement should be taken from different angles of incidence, mirroring the movement of the sun. In response to this requirement, the Wageningen University & Research (WUR) Business Unit Greenhouse Horticulture developed an academic prototype for hemispherical light transmission measurement in conformity with the brand new NEN 2675:2018 standard.

Until now, such a device was primarily accessible for research purposes through WUR. To bridge this market gap, WUR granted specialized engineering company Admesy a license to design and manufacture a standardized hemispherical light



transmission measurement tool for broad commercial distribution.

AYROX TEAMS UP WITH ADMESY

Leveraging its expertise in quality control instruments in the glass and plastics sector, Ayrox joined to reinforce the distribution and commercialisation of the testing and machine sales. Together with Admesy, Ayrox now proposes a measurement service and a device according to the new requirements of the NEN 2675:2018: the Hemispherical Light Transmission meter (H-LT meter).

DEVICE SPECIFICATIONS

The H-LT meter features a suspended gonio system surrounded by an enclosure made from high-end Item® profiles and panels that block external light while safeguarding users from moving parts, thereby ensuring their safety. With the ability to take measurements at various angles between 0° and 70° (at 5° intervals), this device provides comprehensive data for analysis. Furthermore, it covers a broad wavelength range of 250 nm to 1100 nm, dependent on the emission spectrum of the light source, ensuring accurate evaluation across the entire spectrum of interest. The current set-up has a light source that ranges from 360 nm to 950 nm. The system permits automated measurements on 50x50 cm samples made of glass or other materials. The instrument is also suitable for larger samples when the measurements are taken manually.

OPTIMISED PRECISION

The H-LT meter not only meets the requirements of this standard but surpasses them. Indeed, high levels of accuracy are key. Growers require a measurement device that can be accurate to one-tenth of a percentage, which is precisely what the manufacturer, Admesy, has ensured in its device. To validate the de-

vice's reliability, an interlaboratory comparison with WUR Business Unit Greenhouse Horticulture was conducted on clear and diffuse samples. Both sample types adhered to the requirement of the norm of being within one percent. The spread in results is proven to not exceed ±1 percentage point for hemispherical transmittance.

OFFERING ADDED VALUE

The H-LT meter provides glass processors, greenhouse engineers, and growers with an easy-to-use solution that enables precise measurement of hemispherical light transmission in greenhouse horticulture. Given that specific crops may benefit from certain ranges of light wavelengths, the H-LT meter is designed to measure both clear and diffuse panels. Interested in our hemispherical light transmission measurement service or the H-LT meter? Please contact us at deals@ayrox.com – www.ayrox.com

ABOUT AYROX

With more than 30 years of experience in the field of quality control for the glass industry as well as PVB handling and stretching machines, the Ayrox team provides solutions and support to customers and stakeholders in more than 90 countries in applications in architecture, automotive and pharmaceuticals. The company's goal is to make the quality and safety of transformed flat glass and plastics visible and measurable. Ayrox is also an ISO 17025 accredited calibration and testing laboratory for polarimeters.

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