Rhopoint ID Application Notes

AGRICULTURAL FILM

Overview

With the aid of agricultural plastics, growers can secure and significantly increase produced output per hectare while enhancing crop quality. The wide range of plasticulture applications includes greenhouse, mulch and silage stretch films, silage sheets, drip irrigation pipes, nettings, nonwovens and many more. Light stability is one of the major requirements for plastics that are used in agricultural applications.

Greenhouse Films

Plastic greenhouses help to increase and secure the yield. But greenhouse films are exposed to high UV radiation, heat build-up on the greenhouse supports, and the effects of crop protection as well as soil disinfection chemicals. Agricultural plastics are mostly made of polyethylene or similar polymers. These materials are susceptible to photo and thermal oxidation, resulting in the rapid and dramatic loss of physical, mechanical and optical properties. Solar radiation also causes these materials to become brittle over time.

Rhopoint ID can be used to quantify the changes in transparency caused by introducing additives into the film formulation process. This is useful both in R&D and in manufacturing.

Mulch Films

Mulch films are used to modify soil temperature, limit weed growth, prevent moisture loss, and improve crop yield as well as precocity. Because of their thickness, use of pigments and their exposure to high solar irradiation, mulch films need to be durable. Additives provide protection against solar irradiation and agro-chemicals but can affect the optical characteristics. Using the Rhopoint ID changes can be quantified and corrected.

Silage Films And Stretch Films

Silage films are used primarily to preserve silage, hay and maize. They maintain the nutritional value of the contents and inhibit undesirable fermentation processes. The use of light stabilizers, UV absorbers and antioxidants for agricultural applications improves performance in terms of working life, durability and thermal protection.

OTHER APPLICATION NOTES:
- Surface roughness and bulk scatter
- Taber abrasion
- PET bottles
- Distance haze
- Clarifying additives
- Blister packaging

Example – Evaluating agricultural films



STEP 1: A manufacturer of agricultural films supplied 3 samples from their different worldwide manufacturing locations for analysis. The manufacturer was concerned about the wide variation of visual quality of materials from each location and issues that could be caused due to variations in optical clarity.


STEP 2: The samples were mounted onto the surface roughness and small parts ASTM (8mm) adaptor on the measurement graticule to obtain results compatible with ASTM D1003.

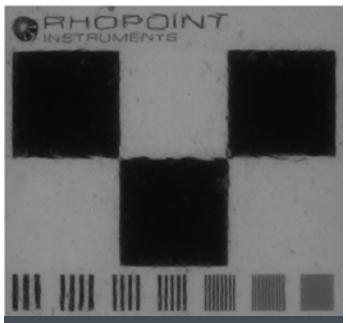
STEP 3: Each sample was measured over the surface area using Rhopoint ID-L to obtain results for Sharpness (S) and Haze (HASTM).

Example – agricultural films

Measurement Results

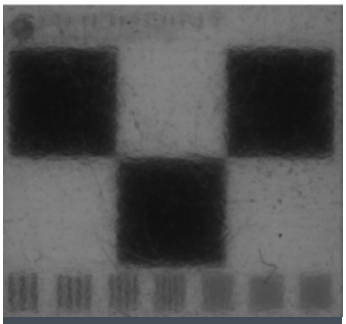
The time taken to measure all 3 samples was incredibly quick; less than 1 minute

Using the Rhopoint ID-L software the measurement data and images were then analysed to identify changes in optical quality. Average results were calculated and used for the purpose of this report.



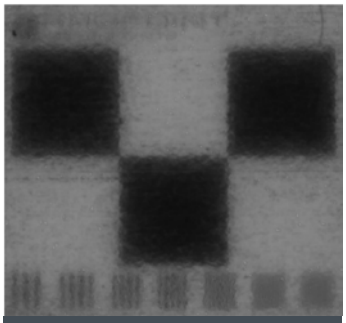
SAMPLE A:

Haze:	20.82
Transmission:	85.8
Waviness:	24.5
Sharpness:	49.11
Clarity:	88.46



SAMPLE B:

Haze:	48.67
Transmission:	81.1
Waviness:	NaN
Sharpness:	12.27
Clarity:	80.07

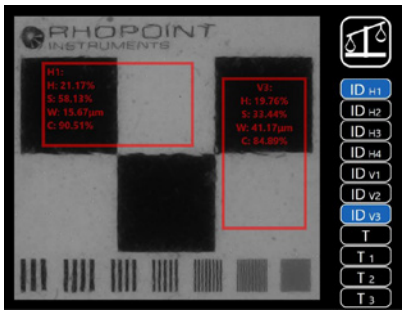


SAMPLE C:

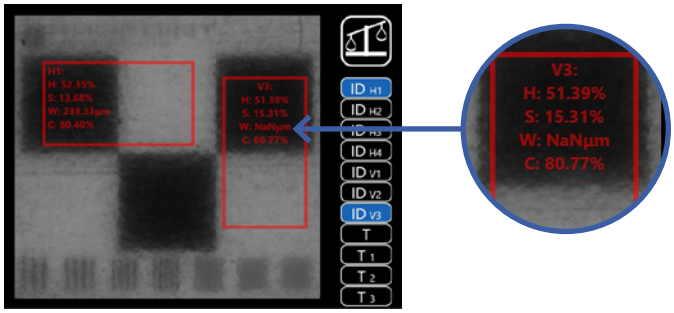
Haze:	51.39
Transmission:	84
Waviness:	NaN
Sharpness:	15.05
Clarity:	80.71

Example – agricultural films

Sample A

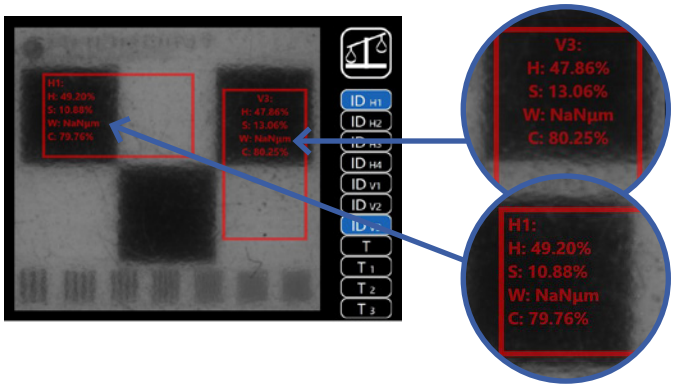


Sample B



Surface waviness in vertical direction not measurable due to high orange peel effect

Sample C



Surface waviness in not measurable due to high orange peel effect

Observations of results

Analysing the results, the variation of Haze and Sharpness across the samples could be observed.

Sample A has best optical quality. Measured values for Samples B & C show poorer optical quality with higher haze, lower sharpness and very high surface waviness. Anisotropy was also present. Measured transmission values for each were consistent (81.1 - 85.8)

The ability to obtain numeric and image data from the Rhopoint ID allows visual confirmation of the data.

The measurement of these samples, due to their shape and size, would have been impossible using a traditional hazemeter.

Features of the Rhopoint ID

No moving parts

Eliminates risk of mechanical failure

Stand-alone instrument

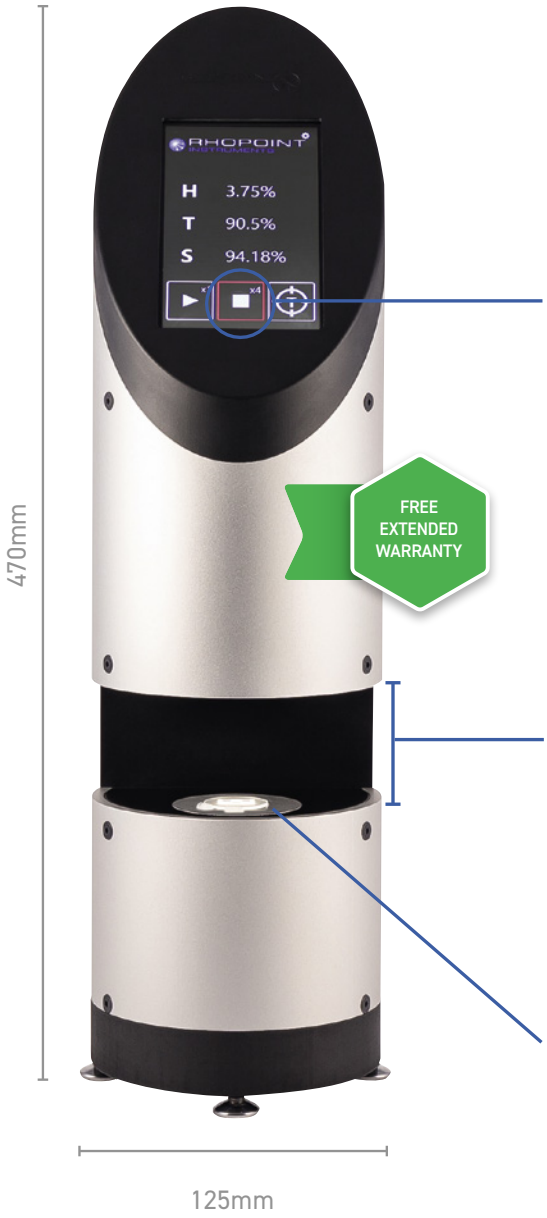
Small footprint reduces space required in laboratory

Lightweight

Easy to move in the laboratory or production line

Resistant and durable

Made from durable, recyclable materials



Touch screen

Single measurement time of 2 seconds to measure ALL parameters (up to 15 seconds on a comparable sphere instrument)

Large mounting area

Minimal sample preparation required possible to measure non flat samples without bending or deforming.

Fully sealed optics

Ideal for measuring liquid samples and solid materials impervious to damage through accidental spillage

KEY FEATURES
✓ Measurement of complex shaped samples
✓ Measurement of Haze, Transmission and Optical Sharpness
✓ Fast measurement enabling multiple data points to be captured over sample area
✓ Captured images provide confirmation of variation in optical quality
✓ Rhopoint ID-L software allows comparison of sample data and images
✓ Impossible previously using traditional sphere-based measurement systems
✓ Sample movement between measurement ports not required
✓ Significant reduction in time taken to measure each sample
✓ Allows identification of potential issues in manufacturing process
✓ Easily compare multiple sample measurements on screen

FULL PRODUCT DETAILS

VIEW DATA SHEET

TRY BEFORE YOU BUY

We offer two options for you to try out the Rhopoint ID before buying.

1. **Online demonstration:** Online presentation of the Rhopoint ID with your samples measured LIVE on Zoom, TEAMS or Skype. Includes a consultation with an application specialist.

2. **Factory sample testing:** Send in samples of your material for testing and receive a comprehensive test report.

Arrange a demo

Ready to receive a quote? **Click here**

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UKAS CALIBRATION

BPF BRITISH PLASTICS FEDERATION