

# Rhopoint ID Application Notes

## CLARIFYING ADDITIVES



Analysing the use of clarifying additives  
in transparent PP plastic materials

### Overview

For many end-use products including food packaging, medical devices and high clarity household and cosmetic containers, Polypropylene (PP) is a natural choice when compared to other materials due to its low cost, strong physical qualities and easy processing.

In its raw state PP is translucent or opaque. By using clarifying agents or additives the optical quality of the material can be increased by reducing the size of the spherulites (spherical semi-crystalline regions) allowing more light through the polymer thereby decreasing haze values.



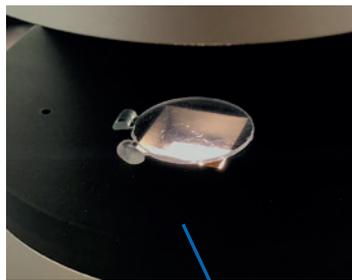
*The image shows two PP samples one containing a clarifying agent (right) and the other in its natural state (left). The sharpness of the image viewed through the sample on the right appears much clearer than that of the one on the left.*

#### OTHER APPLICATION NOTES:

- Surface roughness and bulk scatter
- Taber abrasion
- PET bottles
- Distance haze
- Blister packaging

The use of clarifying agents needs to be strictly controlled to ensure optimum cost versus benefit. To ensure the correct dose rate and usage, haze measurements of the treated sample need to be made both when formulating and during the manufacturing process.

Using the Rhopoint ID it is possible to investigate this to a high level of detail.



PP plaques

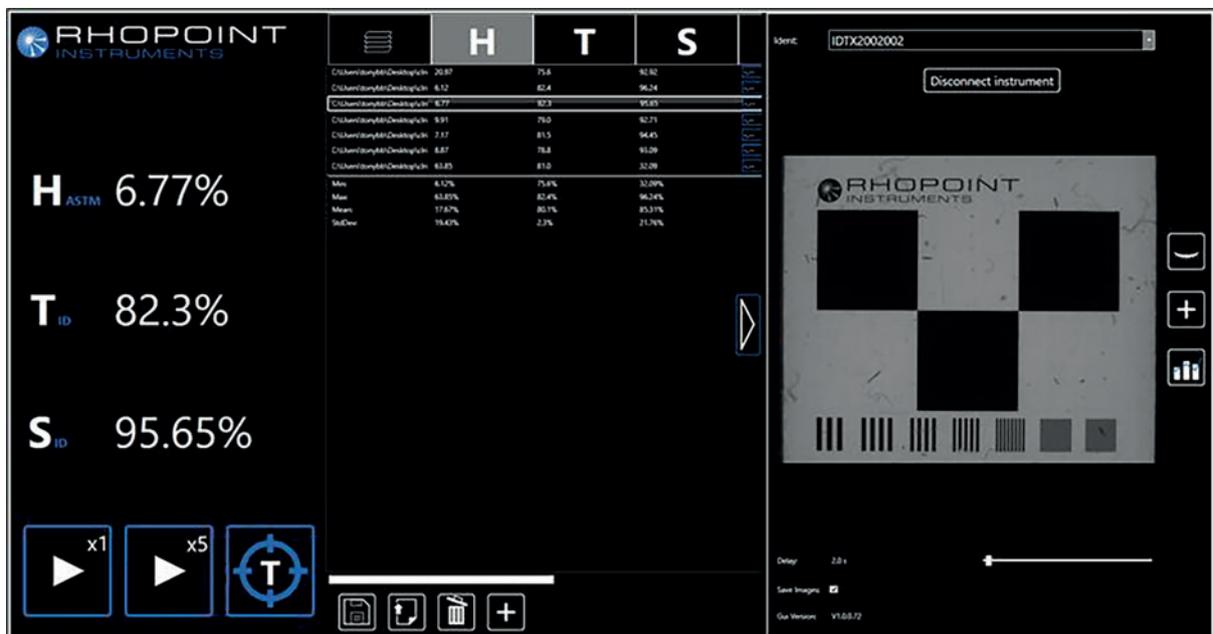
**STEP 1:** The samples were mounted directly onto the ASTM spacer adaptor on the measurement graticule.

Eight different samples of PP plaques were used to analyse the effects of increasing dosage rates of clarifying agent on optical quality. Each sample was tested using Rhopoint ID-L to provide results for Sharpness (S), Visible Transmission (VT) and Haze ID (H<sub>ID</sub>).

Measurements of Total Transmission (TT) and Haze ASTM (HASTM) were taken using a sphere-based ASTM D1003 Hazemeter for comparison.



**STEP 2:** Using the Rhopoint ID-L software it was possible to observe and identify the changes in optical quality.

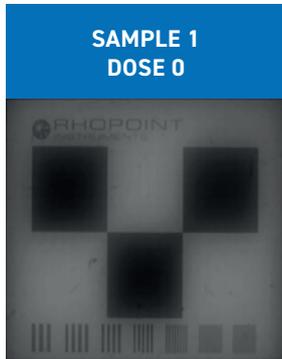


**STEP 3:** Measurement images and data were obtained for all samples.

**Measurement Results**

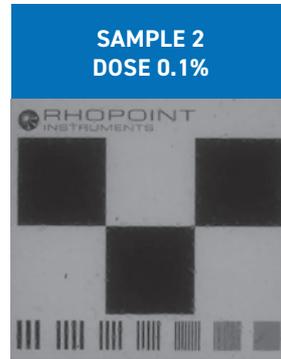
**Key:**

**S**=Sharpness    **VT**=Visible transmission    **TT**=Total transmission    **H<sub>ID</sub>**=Haze (ID)    **H<sub>ASTM</sub>**=Haze (ASTM)



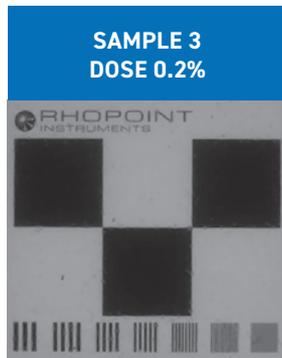
**SAMPLE 1  
DOSE 0**

S:	32.09
VT:	81.00
TT:	94.00
H <sub>ID</sub> :	63.85
H <sub>ASTM</sub> :	68.21



**SAMPLE 2  
DOSE 0.1%**

S:	92.71
VT:	79.00
TT:	91.40
H <sub>ID</sub> :	9.91
H <sub>ASTM</sub> :	7.50



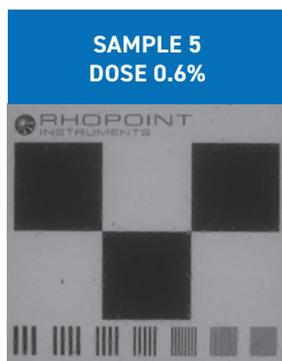
**SAMPLE 3  
DOSE 0.2%**

S:	92.92
VT:	75.60
TT:	90.70
H <sub>ID</sub> :	20.97
H <sub>ASTM</sub> :	26.99



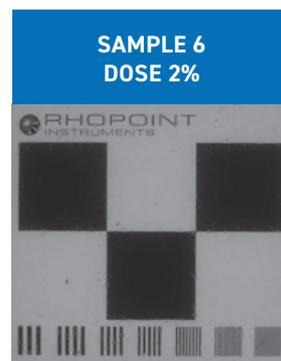
**SAMPLE 4  
DOSE 0.4%**

S:	92.92
VT:	75.60
TT:	90.70
H <sub>ID</sub> :	20.97
H <sub>ASTM</sub> :	26.99



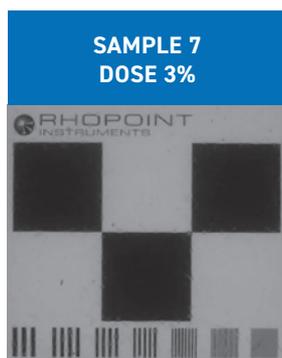
**SAMPLE 5  
DOSE 0.6%**

S:	95.65
VT:	82.40
TT:	91.40
H <sub>ID</sub> :	6.77
H <sub>ASTM</sub> :	8.26



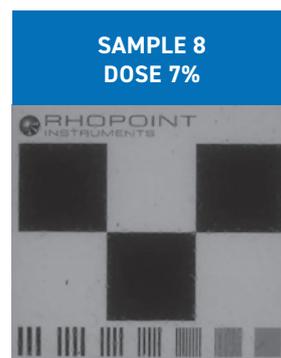
**SAMPLE 6  
DOSE 2%**

S:	94.45
VT:	81.50
TT:	90.70
H <sub>ID</sub> :	7.17
H <sub>ASTM</sub> :	8.50



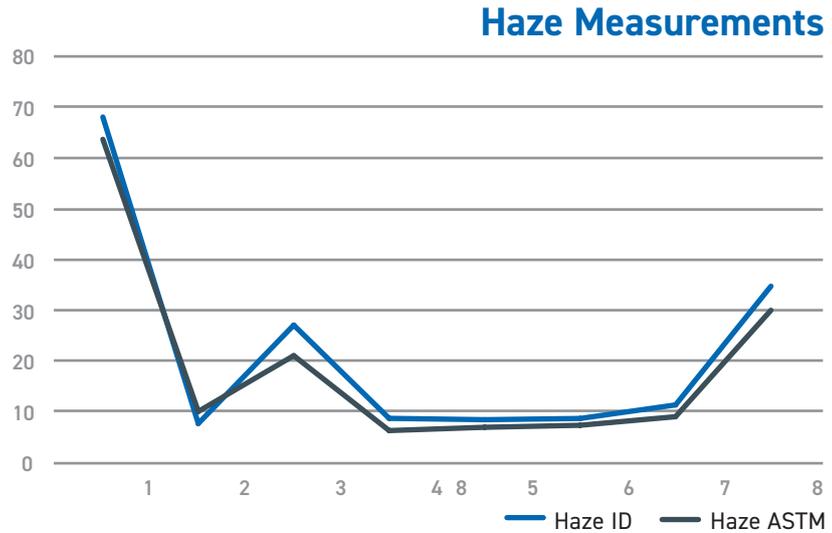
**SAMPLE 7  
DOSE 3%**

S:	93.09
VT:	78.80
TT:	88.70
H <sub>ID</sub> :	8.87
H <sub>ASTM</sub> :	11.18



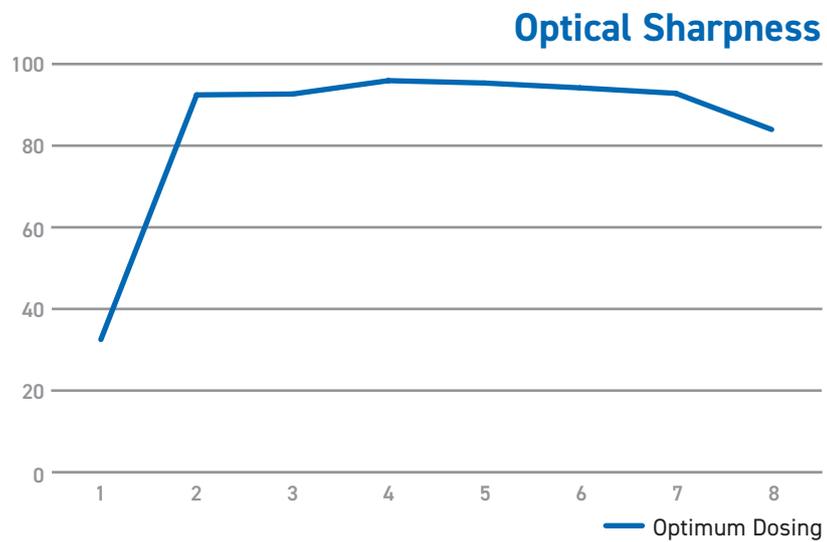
**SAMPLE 8  
DOSE 7%**

S:	84.13
VT:	58.30
TT:	77.70
H <sub>ID</sub> :	29.97
H <sub>ASTM</sub> :	34.70



From the results it was observed that a dosage rate of 0.4% provided an optimum reduction in haze value and corresponding increase in optical sharpness.

Increasing the rate above this had an adverse effect on the haze value due to misting with a corresponding reduction in Sharpness.



**Observations of results**

Interestingly, the optimum dosage point is less distinct using the ASTM sphere-based test method. The inherent reduction in sensitivity is due to averaging over the large measurement area.

Being an imaged based system, Rhopoint ID uses the combination of a number of analysed measurement points across the sample surface increasing sensitivity and issues caused by averaging.

# 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 Haze, Transmission and Optical Sharpness in one fast measurement
- ✓ Captured images provide confirmation of change in Optical characteristics during dosing
- ✓ Increased sensitivity of image-based measurement compared to ASTM sphere based method
- ✓ Rhopoint ID-L software allows comparison of sample data and images
- ✓ Sample movement between measurement ports not required
- ✓ Permits changes to be determined quickly and effectively during formulation or in-process
- ✓ Faster more discriminative measurement providing higher accuracy and sensitivity
- ✓ Easily compare multiple sample measurements on screen

[FULL PRODUCT DETAILS](#)

[VIEW DATA SHEET](#)