RHOPINT INSTRUMENTS

RHOPINT AMERICAS

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RHOPINT iD
MEASURE WHAT YOU CAN SEE
IN-LINE

Advanced & Complete Analysis of Transparent Appearance

- New parameters matched to human perception

NEW In-line measurement version

Manufactured by Rhopoint Instruments in the United Kingdom

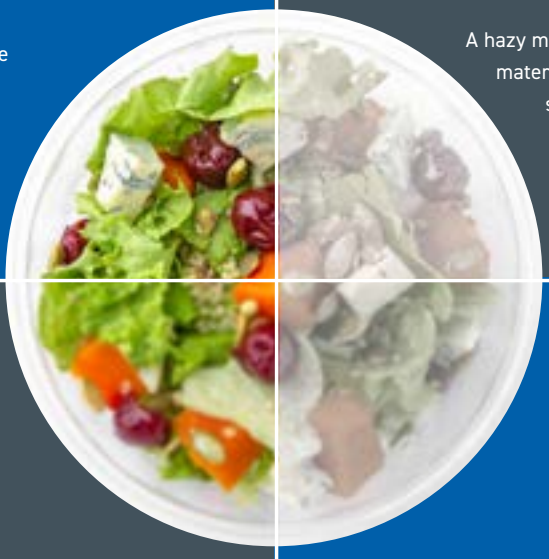
Why measure the appearance of transparent materials with an inline solution?

The functionality of a manufactured product or its perceived quality is often linked to its transparency. Matt shipping labels require good contact clarity which allows QR codes to be read on high-speed conveyor lines, while recycled salad trays are preferred with low haze so the consumer can appreciate the vibrant colours of packed vegetables.

To optimise and improve transparency, a constant inline measurement of key parameters is more efficient than occasional offline measurements. Instant feedback from an sensors allows fine tuning of a process, ultimately achieving a better-quality product, with measured consistency throughout every production run.

Materials with high optical quality have low visual impact on objects viewed through them. The material itself is visually unobtrusive and almost invisible to the observer.

A hazy material causes colour seen through the material to appear washed out or faded. The severity of this loss of contrast is often related to the size of the gap between the object and the material.

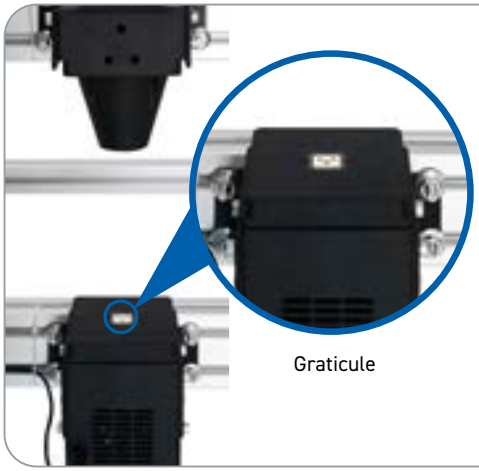


A material which blurs the view of objects has low sharpness. This effect can be directional causing a visible pattern to be seen in the material.

Materials with poor optical qualities are visually intrusive and can be described as milky or opalescent. Patterns and texture which may be visible in the material drastically blur viewed objects.

What is the Rhopoint ID-Inline?

The Rhopoint ID-Inline is a camera-based system which fully quantifies product transparency with parameters that are highly correlated to human perception.



Graticule

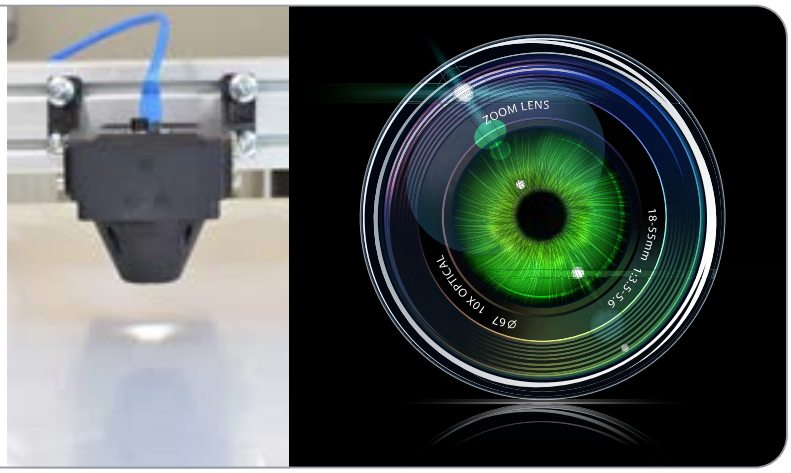
A live view of the graticule can be seen in the software

Step 01

A backlit, high accuracy, reference target graticule functions as the viewed object, creating a highly defined pattern of light intensities with optimally sharp transitions between the backlit and masked areas.

Step 02

The camera works like the human eye quantifying changes in the transmission of the light caused by a test material.

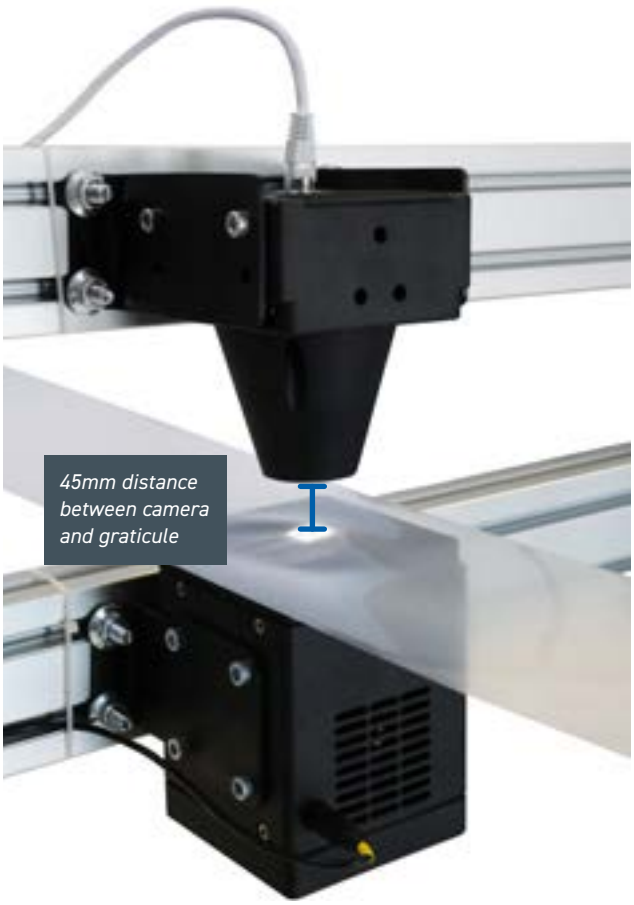


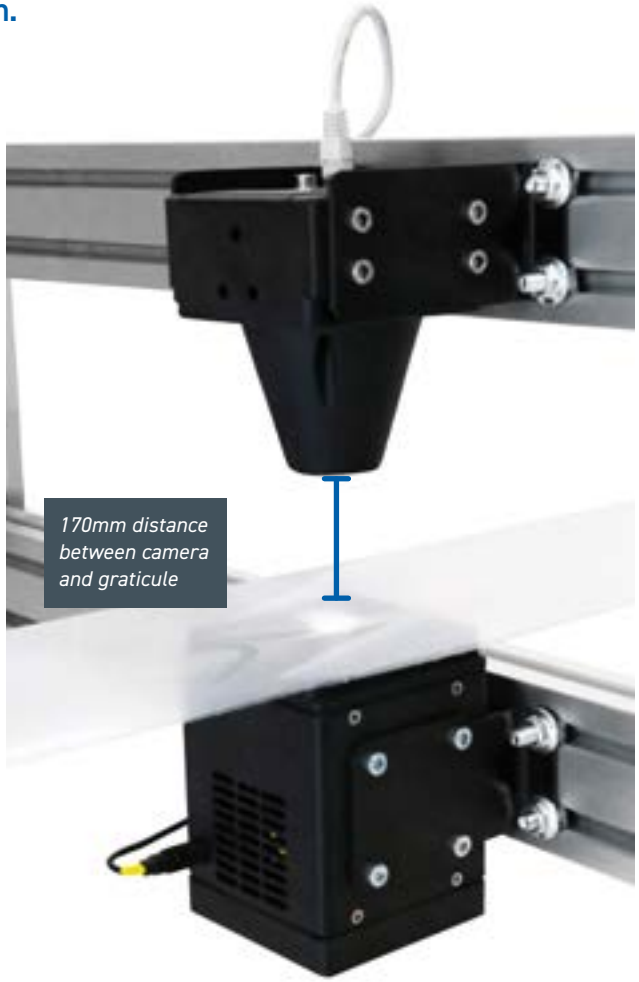
Step 03

Measurement results and images can be viewed in the Rhopoint ID-L software or integrated into process control software using the Rhopoint TCP/IP protocol.

Versions of the Rhopoint ID-Inline

There are two versions of the Rhopoint ID-Inline. A short focal length version which has a separation distance of 45mm between the camera and graticule, or the long focal distance version which has a separation distance of 170mm.





Short focal distance

The Rhopoint ID-Inline can be used for non-contact measurement of any sheeted or planar material - including plastic films, or glass. The Rhopoint ID-Inline can also be used for non-contact inline measurement of glass or plastic tubes.

Long focal distance

This version is most suitable for production processes where the large focal distance is more suited to the customer production line.

Measurement Station

Either version can be incorporated into an inspection station for 3D parts or large sheets of plastic or glass.

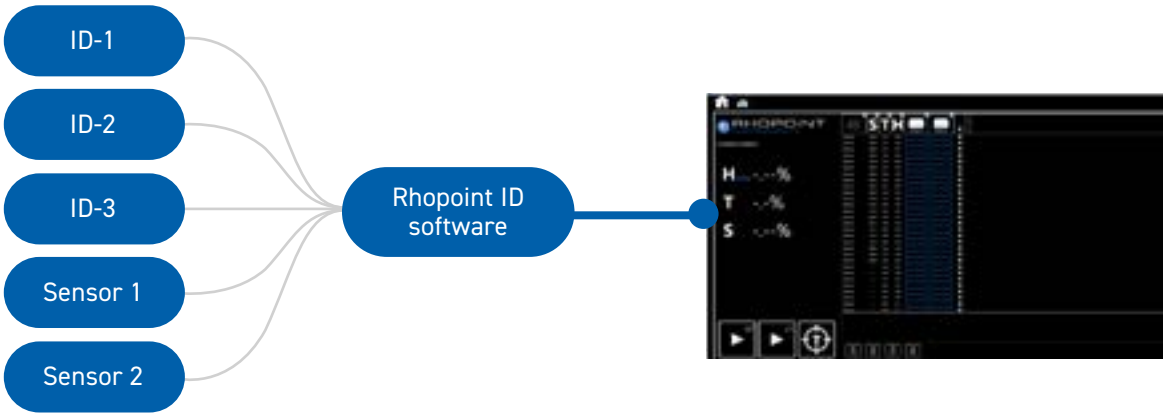
Standard or extended clearance models are available to encompass a wide variety of parts and installation configurations.

What software integrations are available for the Rhopoint ID-Inline?

Flexible software allows single or multiple ID sensors to be combined with compatible measurement devices and tabulated in the Rhopoint ID laboratory software.

Using Rhopoint ID Software

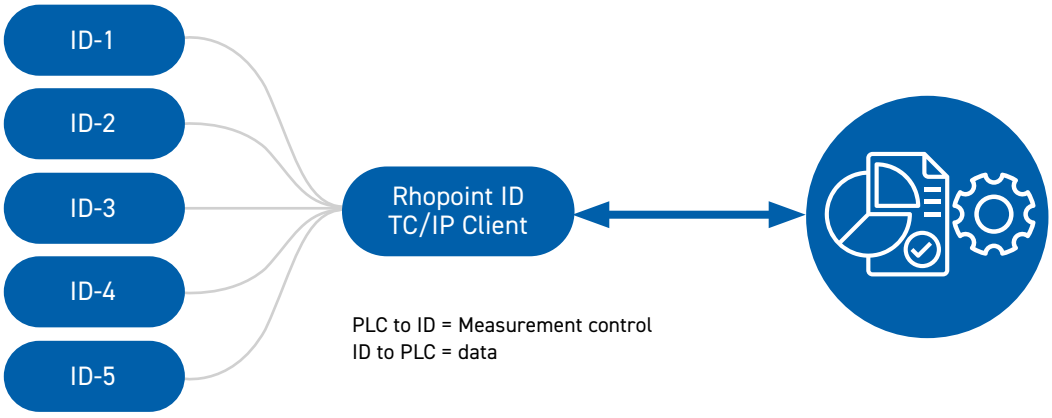
Up to 5 ID units or compatible sensors can be connected to and controlled by the ID-L software. The instrument calculates batch statistics, detailed measurement images and displays trend graphs of all measurement parameters.



Using Rhopoint TCP/IP Client

Up to 10 Rhopoint ID-Inline units can be connected simultaneously to a SAP/process control package using the Rhopoint ID TCP/IP connection client. This solution allows independent remote control of each instrument, measurement data is exchanged using Rhopoint TCP/IP protocol.

The TCP/IP client is designed to facilitate fast efficient operation of multiple devices by the SAP/process control package. Up to 10 measurements per second are possible from each sensor. The client can be hosted on a local PC or server.



MEASURED PARAMETERS:

Haze

Haze: Quantifies the loss of *contrast* for objects viewed through a material.

When a material has haze, it changes the appearance of both the material and any objects viewed through it. This can lead to a reduction in perceived quality.

- The product viewed through the material appears lifeless and dull - but details remain sharp.
- The colour of a viewed object appears washed-out and faded.
- The material itself appears cloudy or milky.

What Affects Haze?

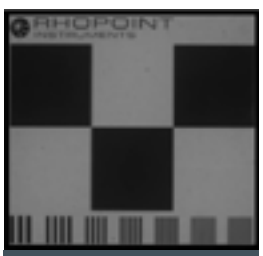
Haze can be affected by factors such as the choice of resin, the moulding process and any surface textures. Haze can be caused by:

Raw material choice: For example, a plastic with an incorrect melt viscosity for a particular process.

Process parameters: Cooling a plastic material too quickly can introduce micro textures onto the surface of the film or structures in the bulk which reduce optical quality.

Machine wear: Wear and tear in moulds, chill rollers and slip dies can induce visible surface defects in the material.


Haze = 0%


Haze = 30%

- ✓ Haze is measured directly by evaluating contrast of black and white areas on graticule
- ✓ Measurements made with the Rhopoint ID-Inline are fully comparable with those made on an ASTM D1003 hazemeter
- ✓ Factory calibrated to ASTM standards for a quantitative match

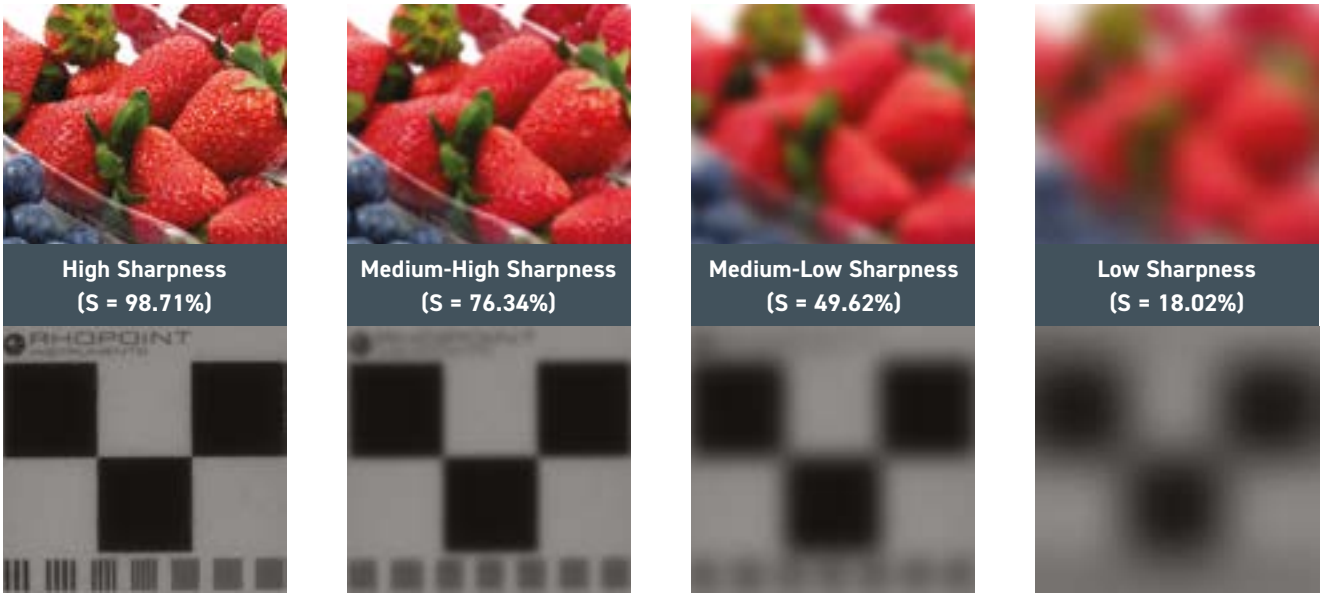
MEASURED PARAMETERS:

Sharpness

Sharpness: Quantifies the loss of perceived detail for objects viewed through a material.

What are the effects of reduced Sharpness?

When viewed through a material with high sharpness, an object appears sharp and distinct. As material sharpness decreases, the object appears blurry and obscured.



Anisotropic Sharpness

A material can often exhibit optical effects which are *directional*. These phenomena are often induced in plastic parts by specific processing faults.

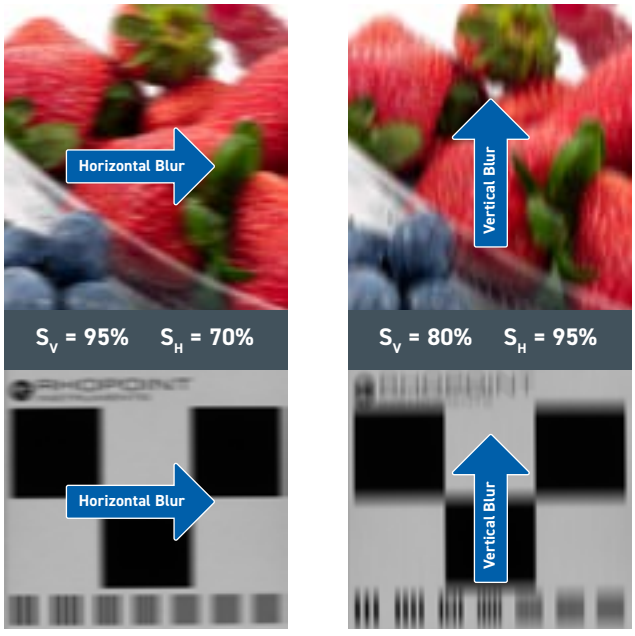
Visible texture is a common feature of plastic films and causes a significant reduction in their see-through quality.

Directional Effects

The Rhopoint ID is the only product that can measure directional effects in materials using the ID laboratory analysis software.

The images to the right show the visual impact of different ID Sharpness (S) values in vertical and horizontal directions.

Measuring directional effects can be used in advanced optical quality control and for adjusting processing parameters to obtain optimal transparency.



MEASURED PARAMETERS:

Clarity

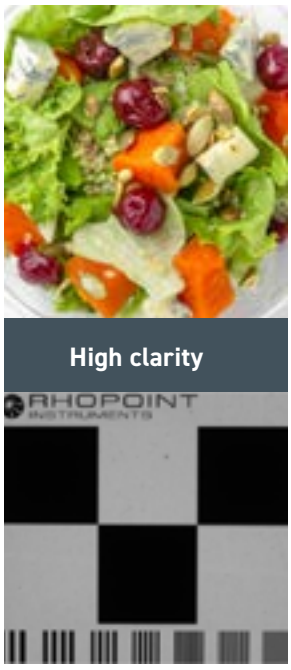
Clarity: Quantifies the blurriness of an object when viewed through a material.

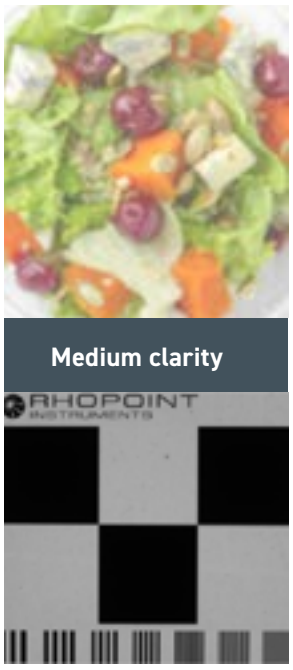
Results are proportionate with Sharpness, but the measurement scale is compressed and the measurement resolution is reduced.

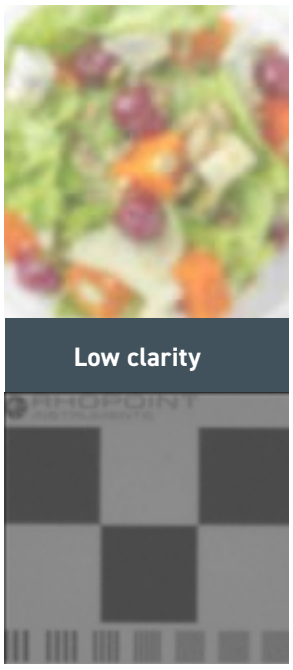
Clarity is a scale used by traditional haze and clarity meters. When measured using the 8mm adaptor plate, Rhopoint ID Clarity data conforms to specifications written for these meters.

Inter-instrument clarity agreement between Rhopoint ID and traditional sphere instruments for commercial plastic films (<1000µm) is typically <0.4% C (SD).

Inter-instrument clarity agreement between traditional sphere instruments and Rhopoint ID for thick transparent plastic materials (<6mm) is typically <0.5% C (SD).



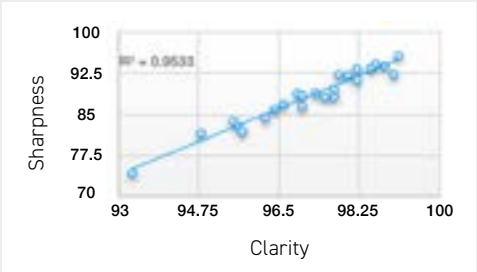




- ✓ ID Sharpness gives improved measurement resolution compared with clarity
- ✓ ID Clarity is fully compatible with existing instruments

Note: Clarity and Sharpness do NOT capture poor optical characteristics associated with wavy/orange peel surfaces

ID Sharpness vs ID Clarity



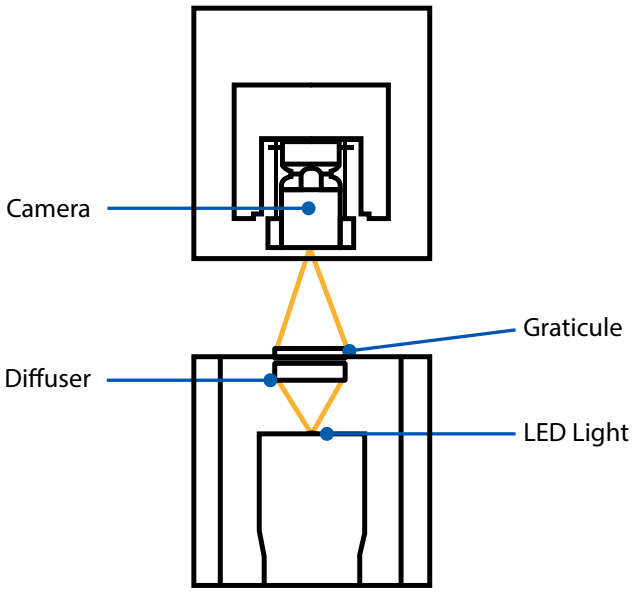
ID Sharpness measurement
Better measurement resolution than clarity.

ID Clarity
Compatible measurement with existing measurements.

MEASURED PARAMETERS:

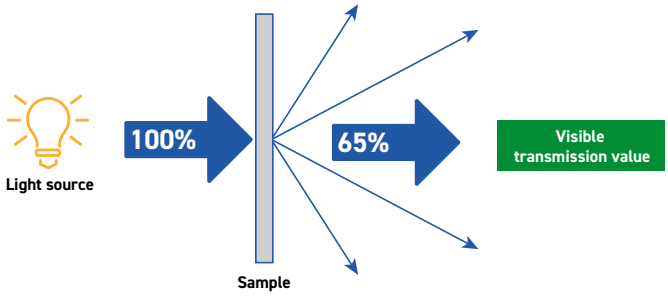
Visible Transmittance

When considering how material is perceived by a consumer it is important to consider how bright an object viewed through it will appear.*



Visible transmittance to human observer

- Rhopoint Transmittance (TID) quantifies the amount of light passing through the material and reaching the camera/eye of the observer.
- This measurement describes the brightness/ luminosity of the viewed object and is correlated to how one perceives the quality of the material.
- In the short focal distance version; the Visible Transmittance readings are compatible with the desktop Rhopoint ID.



Visible Transmittance

96%

Visible Transmittance

56%

*Traditional hazemeters measure total transmission which is related to light absorption not visual perception

Applications

Rhopoint ID-Inline Sensor

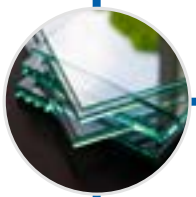
Continuous measurement of in-line process including:

Blown films

The Rhopoint ID-Inline can be used for contactless measurement of transparency at multiple points around the film bubble

Cast or extruded films

A single Rhopoint ID-Inline sensor can be translated across a film web or multiple sensors placed at intervals



Glass sheets

Rhopoint ID-Inline sensor and light source are independent and can be placed over a large measurement area

Tubes or pipes

Glass, plastic or silicone tubes can be measured with an inline Rhopoint ID-Inline

Rhopoint ID-Inline Inspection Station

Recommended for large object measurements including:

Windscreens

The large separation distance of the Rhopoint ID-Inline extended clearance sensor allows large 3D objects to be manoeuvred into position for measurement

Large sheets of material

The IDTX sensor can be built into a large bespoke measurement station allowing large sheets of plastic or glass to be measured easily

3D objects

3D objects such as visors or transparent trays that are too large to be easily measured on the bench-top ID can be measured using a bespoke inspection station

Sensor features

The Rhopoint ID has been designed to measure samples for haze, transmittance and sharpness quickly and safely.

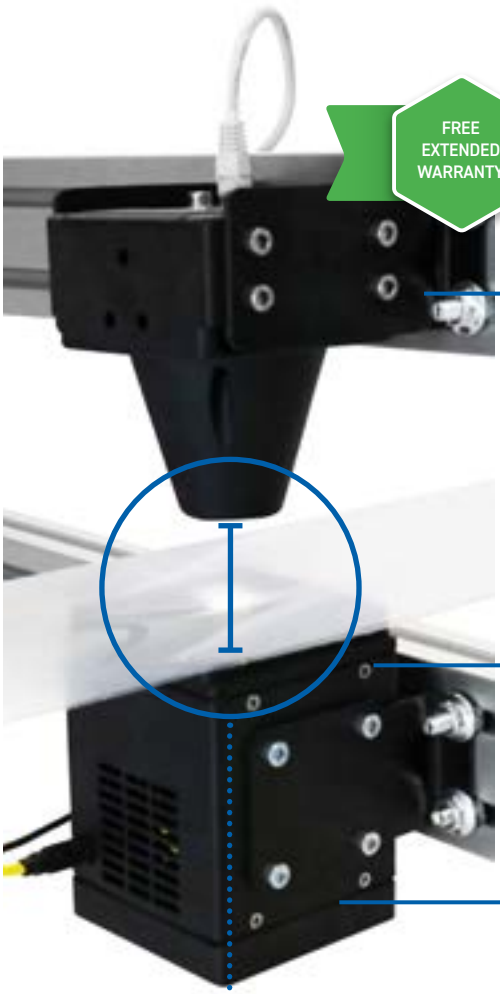
No moving parts
Eliminates risk of mechanical failure

Sampling rate up to 3/s
Highly representative measurement throughout production run

Fully sealed light source
No chance of dust/dirt contamination

Single or multiple sensors
Flexible installation options allow multiple sensor installation

Easy Installation
Can be fitted by an in-house engineering team



Short focal distance - 45mm

Long focal distance - 170mm

Run as a laboratory system
Single or multiple Rhopoint ID-Inline sensors can be used with IDTX-L software with image analysis and project saving capabilities.

Connect to SAP/PLC
Connect to internal systems for full product control - ready for industry 4.0.

Networkable
Connect to Rhopoint ID-Inline sensors from any PC on the same network - access live images using Rhopoint ID software.

Specifications

	Sharpness	Haze		Clarity	Transmission
Range	0-100%	0-10%	10-100%	0-100%	
Resolution	0.01	0.01	0.01	0.01	0.01
Repeatability SD	0.1	0.05	0.05	0.03	0.05
Reproducibility SD	1	0.2	0.5	0.3	

Instrument Specifications	Details
Material Thickness	< 30mm
Software	ID Analysis or TCP/IP Client
Connection	POE LAN
Spatial Resolution	9µm/pixel
Measurement Image	12.5mm x 12.5mm
Minimum Measurement Area (Haze, Sharpness)	12mm x 8mm
Minimum Measurement Area (Transmittance)	12mm x 8mm
Image Format	16-bit .TIFF
Image Size	1400 x 1400 pixels
Operating Temperature	10°C - 40°C
Dimensions	Short focal distance - 270mm (H) x100mm (W) x100mm (L) Long focal distance - 440mm (H) x 100mm (W) x 100mm (L)
Weight	1.1kg
Packed Weight	5.0kg
Light Source Unit Power	12V DC/2A
Camera Unit Power	Power Over Ethernet (POE)

Product	Included accessories	Order code
Rhopoint ID In-line Short Focal Distance, 45mm	Haze check standard, USB stick with software and licence, power connector, value = 10%	A3100-101
Rhopoint ID In-line Long Focal Distance, 170mm	Haze check standard, USB stick with software and licence, power connector, value = 10%	A3100-100
Individual check standards	10% or 20%	10% - B3100-005 20% - B3100-006
Calibration standards set	1, 5, 10, 20, 35	B3100-007
Transmission check standard	70%	B3100-008

Rhopoint ID Integration design pack

- Integration instructions
- Sensor CAD drawing
- Example fixing bracket CAD file
- Example inspection table CAD file
- Example inspection table parts list with supplier information

Download design pack

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TRY BEFORE YOU BUY

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

1. **Online demonstration*:** Online presentation of the Rhopoint ID technology with your samples measured LIVE on Zoom, Microsoft 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

*Online demonstrations with the Rhopoint ID-Inline aren't available due to practicality purposes, however we can offer a presentation using it's desktop equivalent; the Rhopoint ID.

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

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