RHOPOINT INSTRUMENTS

RHOPOINT AMERICAS

Operating Instructions

Imaging Transmission Appearance Meter Rhopoint ID

RHOPOINT iD
MEASURE WHAT YOU CAN SEE

Thank you for purchasing this Rhopoint product.

Please read these instructions carefully before operating this product and retain them for future reference. The images shown in this manual are for illustrative purposes only.

Manufactured by Rhopoint Instruments in the United Kingdom

This instruction manual contains important information about the setup and use of the Rhopoint ID Imaging Transmission Appearance Meter. It is therefore essential that the contents be read before powering up and using the instrument.

If this instrument is passed to other users you must ensure that the instruction manual is supplied with the instrument. If you have any questions or require additional information about this product, please contact the Rhopoint Authorised Distributor for your region.

The technology and components used in the device are based on state-of-the art optic and electronics. As part of Rhopoint Instruments commitment to continually improving the technologies used in their products, they reserve the right to change information included in this document without prior notice.

Contents

Storage and Handling

To ensure safe and reliable operation of this instrument it should be placed on a rigid, flat, level surface.

Prevent exposure of the instrument to direct sunlight

Do not place the instrument near electromagnetic fields or in an environment with excessive vibrations.

The instrument's metal body and touchscreen are resistant to a variety of solvents; however, the recommended cleaning method is by using a soft damp cloth.

Only use approved accessories and spare parts. All spare parts are available from Rhopoint Instruments Ltd and approved distributors.

Do not attempt to open the instrument. There are no user serviceable parts inside. Please contact Rhopoint Instrument or an approved distributor for your service requirements

About the Rhopoint ID Imaging Transmission Appearance Meter

The Rhopoint ID Imaging Transmission Appearance Meter (IDTX) quantifies the transmission appearance of transparent, semi-transparent and translucent samples such as plastic, films, glass and liquids.

The instrument uses a high specification camera to take images of a specially designed target graticule through the sample to be analysed.

These images are analysed using digital imaging techniques to quantify the appearance qualities of the material in metrics that are highly correlated to human visual perception.

The images can then be analysed using the optional viewer software to compare the transmission characteristics of materials in conditions that replicate the final use of the material.

Uniquely the instrument can quantify the see-through quality of a sample in contact with an object or at variable viewing distances up to 45mm.

Measurement Technology

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.

A sample placed in direct contact (or at the desired separation) with the graticule is photographically imaged and analysed to quantify the reduction in sharpness of the backlit-to-masked (i.e. light-to-dark) transitions of the graticule compared with its reference image.

At a separation distance of 7.86mm (referred to as 8mm) the instrument measures transmission haze by calculating the reduction of contrast in black and white areas of the target graticule.

Measurement Parameters

Haze: Certain transparent materials exhibit an optical property known as haze; light scattered during transmission through the material causes any object viewed through it to have less contrast and appear grey and milky.

- When materials with high haze are observed the material becomes visually intrusive and the viewed object becomes less distinct.

- Samples with low haze have better transmission contrast and are much less visually intrusive, the viewed object has high contrast.

The Rhopoint IDTX measures Haze at any distance, however at 8mm distance using the supplied haze spacer the results conform to specifications written for traditional sphere instrument which comply to ASTMD1003.

Inter-instrument Haze agreement between traditional sphere instruments and Rhopoint ID for commercial plastic films (0-30 HU, <1000 µm) has been verified as <0.5% H (SD).

Inter-instrument Haze agreement between traditional sphere instruments and Rhopoint ID for transparent plastic materials (0-30 HU, <6mm) has been verified as <1.5% H (SD).

Sharpness: Quantifies any reduction in the optical sharpness of an object viewed through the tested material. Poor optical sharpness is often caused by surface roughness or irregularities in the material.

This optical effect is observed as an increase in blurriness when viewing an object through the sample. Sharpness values are expressed as a percentage (0-100%), 100% represents a material with perfect sharpness.

Many materials have optical properties where the amount of blurriness is dependent on the distance between the material and the viewed object.

Anisotropic Sharpness: the process of extruding materials can cause marked optical differences in the direction of extrusion and orthogonal to that direction. These differences can appear as a increased blurring in a single direction or feint lines in the material. The Rhopoint ID software quantifies this effect as sharpness- this can be expressed as an average S or in horizontal SH or vertical Sv directions.

Clarity: Quantifies the blurriness of an object when viewed through a material, results are proportionate with Sharpness, but measurement scale is compressed and 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 measurements conform 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).

Waviness: this is an optical effect caused by large structures (0.1-2mm) on the surface of the material. If the structure is homogeneous it is often described as orange peel- the surface resembles the peel of an orange.

If the effect is anisotropic visible lines can often be seen when looking through the material.

Unlike sharpness these larger structures can cause dynamic distortion when the film is moved over a target image/object which has straight edges- the edges appear to distort and wave as the material is moved.

Waviness measures the visible distortion of the ID graticule edges through the material- W is the standard deviation of the edge deformation in µm.

Waviness homogeneity is assessed by comparing W (average waviness) with WH (horizontal waviness) and Wv (vertical waviness) using Rhopoint ID software.

Transmission: The Rhopoint ID measures Transmission in three ways:

Visible transmission (narrow angle scatter), this is what the camera sees.

Diffuse transmission (Wide angle scatter) and is what the camera doesn't see due to being scattered away from the observer.

Total transmission is a calculation of Visible and Diffuse Transmission with correlation to other haze meters.

The amount of light transmitted to the camera is dependent on the ID of the sample and the separation distance.

Visible transmission is correlated to the perceived intensity of light reflected from a viewed object when viewed through the sample.

Distance Dependence: The Rhopoint IDTX-L (see note) can quantify this relationship between distance and optical performance by measuring in contact or at defined separation distances.

The ability of the IDTX-L to measure at definable separation distances means that the suitability of materials for applications with different air gaps can be directly compared.

Thin films and plastic materials often demonstrate a reduction in sharpness and increase in haze which peak with a separation distance of 2-4mm between the sample and material.

Rhopoint instruments offer bespoke adaptor plates or 3D CAD models for local manufacture of 3-D printed plates.

Accessories

The instrument is supplied as a standard package complete with all accessories required to power and operate the unit.

- RHOPOINT IDTX Imaging Transmission Appearance Meter
- Calibration certificate
- 1 x checking standards
- IDTX Haze 8mm spacer
- 5mm spacer
- DC power supply and mains cable (UK, EU & US)
- USB with operating manual
- Cleaning cloth
- USB 2 to LAN adaptor
- LAN cable
- USB with operating manual and software

Optional Accessories

Distance haze measurement pack (B3100-001): 2 x 5mm spacers and 5 x 2mm spacers

Abrasion tester (B3100-002)

Wet sample adaptor (B3100-003)

Functional Overview

Label No.	Function
1	Display and touch-screen
2	Camera optics
3	Illuminated graticule
4	Levelling feet
5	Power socket
6	USB socket
7	Power button

Measurement Screen Icons

Tabs	Function
	Switch to Home Tab
	Switch to Pass/Fail Tab
	Switch to Alignment Tabb
	Switch to Connection Tab
	Switch to Settings Tab

Metrics	Function
	***H-Haze*** *ASTM* When the ASTM 8mm adaptor plate is in place, measurements comply to ASTM D1003.
	***H-Haze*** the contrast of a viewed object, cloudiness, milkiness.
	***T-Visible Transmission*** the intensity of light from a viewed object.
	***W-Waviness*** is a measure of the wavy distortion of objects viewed through the material.

	***S-Sharpness*** the blurriness of a viewed object (%).
	***C-Clarity*** the blurriness of a viewed object (%). When the ASTM 8mm adaptor plate in place measurements comply to specifications written for Sphere Haze and Clarity Meters (BYK). Pressing the S-Sharpness Icon toggles it.

Buttons	Function
	**Take a single or multiple measurement**
	**Tare**

Power

The Rhopoint IDTX has a supplied low voltage DC power supply. The user must connect this to the appropriate power input connector.

Switching the Unit On/Off

The Rhopoint IDTX has a built in CPU which takes approximately 30 seconds from power up to boot into measurement mode.

It is important that the use follows the power up and power down procedures below.

To power up the instrument press and hold the power button until the target graticule illuminates (3 seconds), release the button and the instrument will continue in the boot up sequence- please note the front screen remains OFF until the boot sequence is complete (25 seconds).

It is not advisable to switch off the power during boot up as the instrument may enter a recovery mode. If this occurs, please contact Rhopoint Service for instructions on re-initializing the instrument.

To power down the unit navigate to the settings tab and then press and hold the power icon 

A prompt will be displayed to confirm power down, select Yes to confirm. The instrument will the begin the power down cycle, indicated by the screen turning off, the LED and fan will power down shortly after signaling the instrument can be safely disconnected from power.

Warming Up the Unit

For highest accuracy measurement it is advised that the instrument light source is left to achieve stability for 4 minutes prior to initial tare.

Keeping the Instrument Clean

The measurement graticule is hardwearing but can scratch with the presence of sharp objects; always place samples and spacers with care.

If moderate levels of grease residues or dust are present on the graticule the measurement may become affected. It is good practice to wipe the graticule before first use daily or more often if used in a high contamination environment. We advise using the enclosed optical cloth or a similar micro-fiber substitute.

For heavy contamination use any commercially available lens cleaning solution on the graticule.

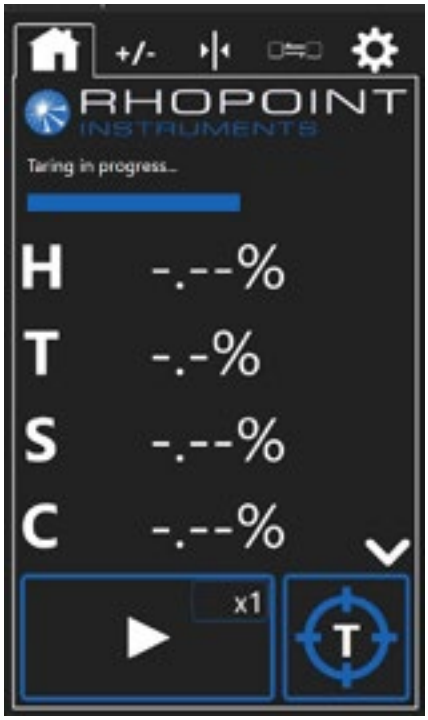
Avoid touching the camera lens if this becomes contaminated, please contact Rhopoint Service for further advice.

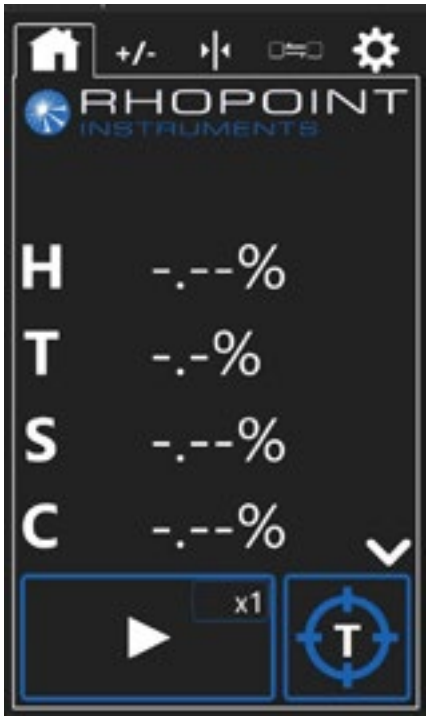
Taring the Unit

After power up it is necessary to tare (zero) the unit. The measurement buttons are unavailable (greyed out) to the user until the unit has completed the tare procedure.

To tare the unit press and hold the tare symbol (3 sec) on the touch screen.

Once taring is complete measurement buttons are available and the instrument is ready for use.





Tolerance on tared values-

After tare, the instrument will measure the graticule as follows. (Average of 5 readings after 4 min warm up period)

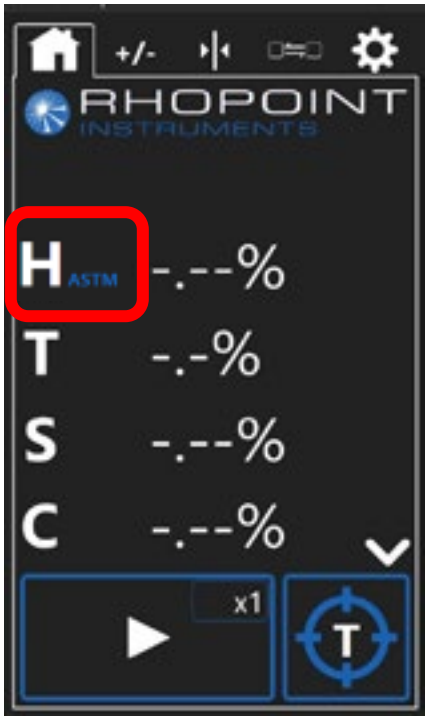
H: 0.0% (+/- 0.1%)

T: 100% (+/- 0.3%)

S: 100% (+/- 0.2%)

Measuring ASTM Haze, Sharpness, Clarity, and Waviness with the Rhopoint IDTX

Place the 8mm Haze spacer on the instrument.



ASTM will be displayed after the H metric on the screen indicating that measurements comply to ASTM D1003.

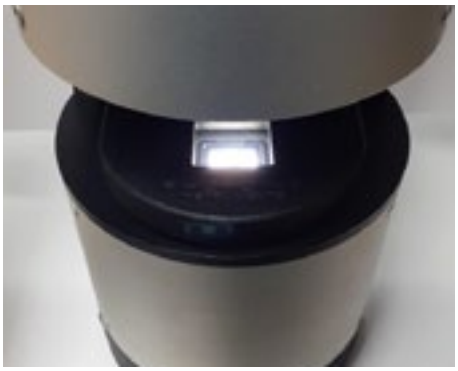
Other metrics are displayed according to the user selection in the settings menu. The touch screen can be used to view the other metrics.

Measuring the Checking Standard

We recommended that the user measures the checking standard weekly or after moving or transporting the unit.

Visually inspect the standard before measurement, it should be free of dust and contamination.

Place the standard on the instrument.



The standard locates in place by magnets; ensure that the standard can locate properly.

Press the  icon.

Compare the measured values with those recorded on the check standard, if the values are within the stated tolerance the instrument is ready to use.

Please note that the Sharpness value is sensitive to positioning, slightly adjust the position of the standard if the value is out of tolerance.

Cleaning of the checking standard is a delicate procedure and so the user should not use any cleaning cloth on the surface. We recommend if there is dust or debris is present on the standard blow the surface with an optical grade dry air aerosol.

If the standard becomes damaged or contaminated, please contact service@rhopointinstruments.com for more advice.

In case of the standard measuring out of tolerance repeat the tare process and re-measure, if the problem persists contact service@rhopointinstruments.com for more advice.

Taking an In-Contact Measurement

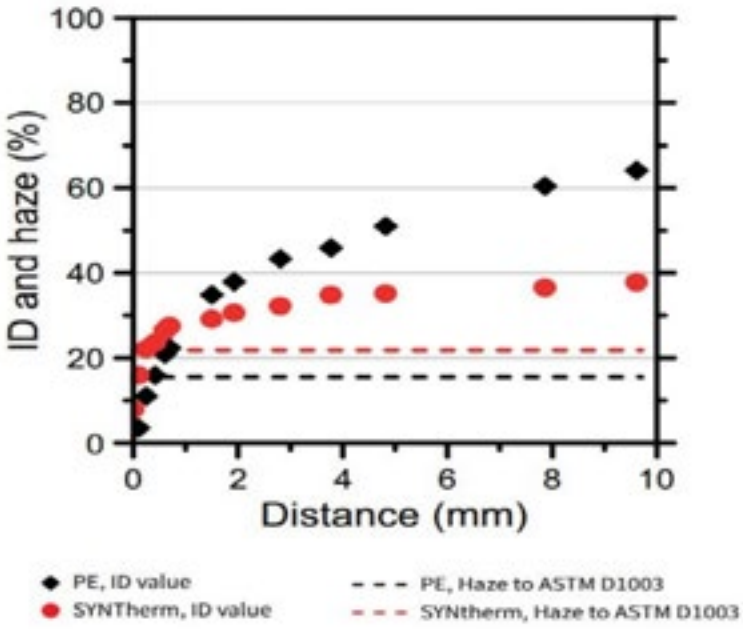
The In-contact measurement method's primary use case is to measure the optical impact on a viewed object when the sample is in direct contact. To perform a measurement, place the sample directly on to the measurement graticule.

For fast easy manipulation high clarity samples with limited distance dependency, the user may manually hold and move the sample.

Wear gloves if it is necessary to avoid contaminating the samples.

Assessing Distance Dependency or Matching End Use Applications

To measure distance dependency the user can place the sample spaced away from the platen. We recommend the use of the optional Rhopoint IDTX spacers. To achieve the distances required, the user can stack multiple spacers together.



To match an end use application the distance between the sample and platen should match a chosen value based on those in the real-world application.

Measuring ASTM Haze & Sharpness

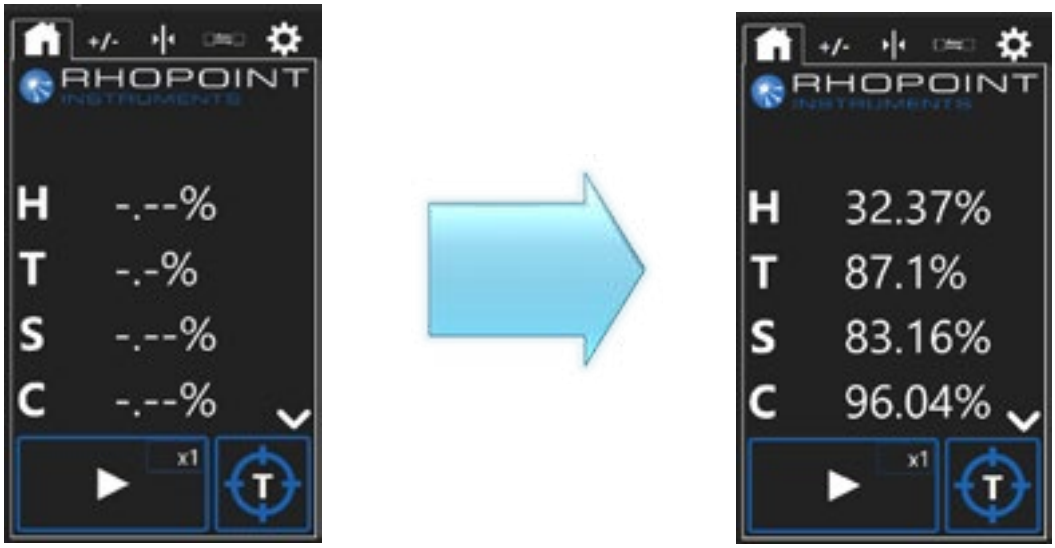
To measure ASTM Haze & sharpness the user should place the ASTM Haze spacer in position and the sample placed on top.

Measuring with the ASTM haze spacer in place is often the default method for most applications.

Starting a Measurement – Single Reading

To initiate a single measurement- press the  button on the touch screen.

The instrument will initiate a reading and report the result.



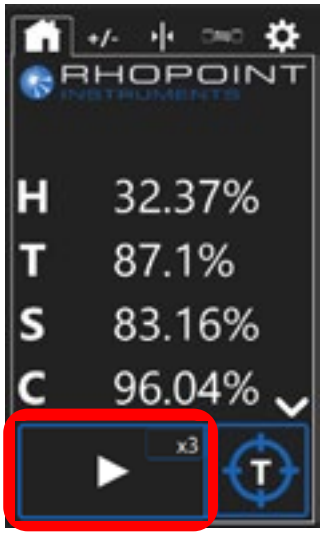
Starting a Measurement – Multipoint Average

The Rhopoint ID can calculate statistics for a measured batch of readings.

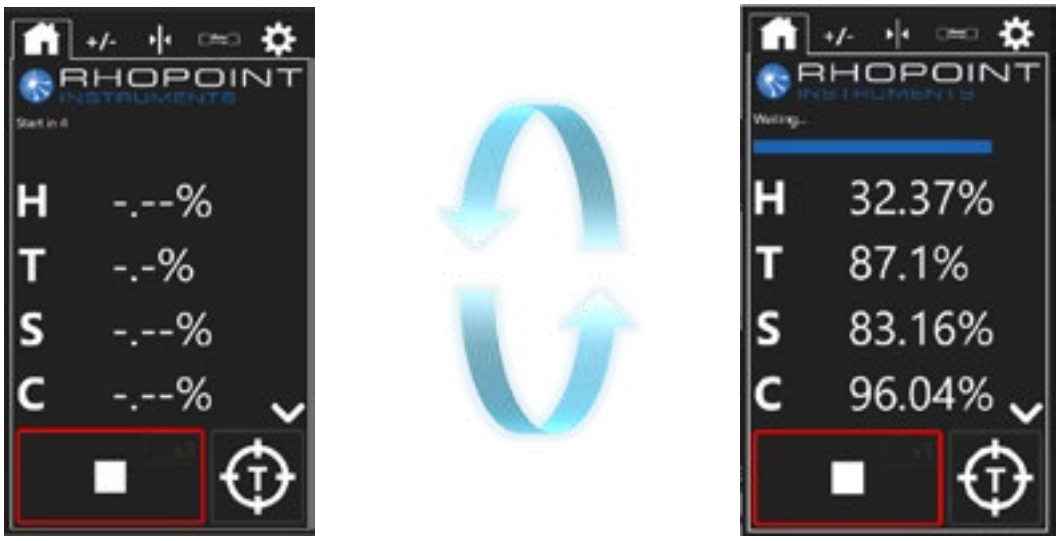
To select the batch size, press on the x1 number in the top right corner of the  button.

Preset batch sizes of 3,4,5,10 or 200 can be selected. 

To initiate a multipoint measurement, press the  button on the touch screen.

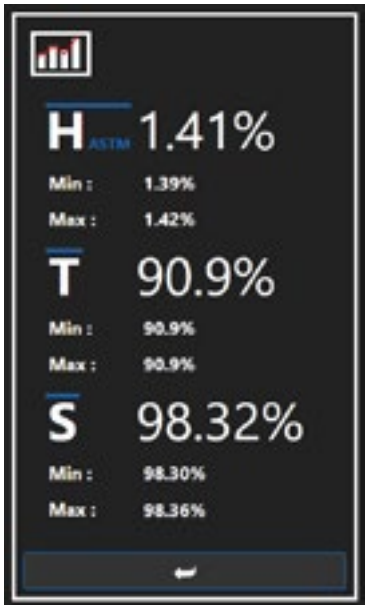


The instrument will initiate a reading and report the result.



The instrument introduces a delay before starting the first measurement and between readings - this allows the user time to manipulate the sample. To finish any batch early press the stop button.

After completion, the instrument will report basic statistics for the measurements. For more complex analysis we recommend the use of the ID-L software.



To Exit the statistics screen, press the  button.

+/- Pass / Fail Tab

The Pass/Fail tab is used to enable/disable on-screen pass/fail indication and set min/max tolerancing. Pressing this tab enters the Pass/Fail menu.

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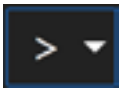
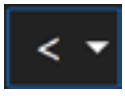
Pass/Fail tolerancing can be set for each/any of the metrics displayed.  selected Pass/Fail is disabled.

To enable Pass/Fail press the  corresponding to the metric required.

There are two options -

 - Pass when greater than the value entered

 - Pass when less than the value entered

Select an option and enter a target value, press  to save.

When a measurement is made, if the value complies with the conditions selected the value will be displayed in Green indicating a PASS, however if the value does not comply with the conditions selected the value will be displayed in Red indicating a FAIL.

If a USB memory device is inserted in the USB port of the instrument (as detailed earlier in Functional Overview) the Pass/Fail tolerancing will be saved to the memory device for future use and recall otherwise they will be held in memory.

To recall the Pass /Fail limits from a memory device press  . If a memory device is not inserted an error message will be displayed.

Pass/Fail limits can be set around a sample measurement which can then be used as a standard when limits are applied.

To do this, place the sample onto the instrument and press 

A measurement will be made and the screen below displayed.

Press Yes to save the values or No to continue.

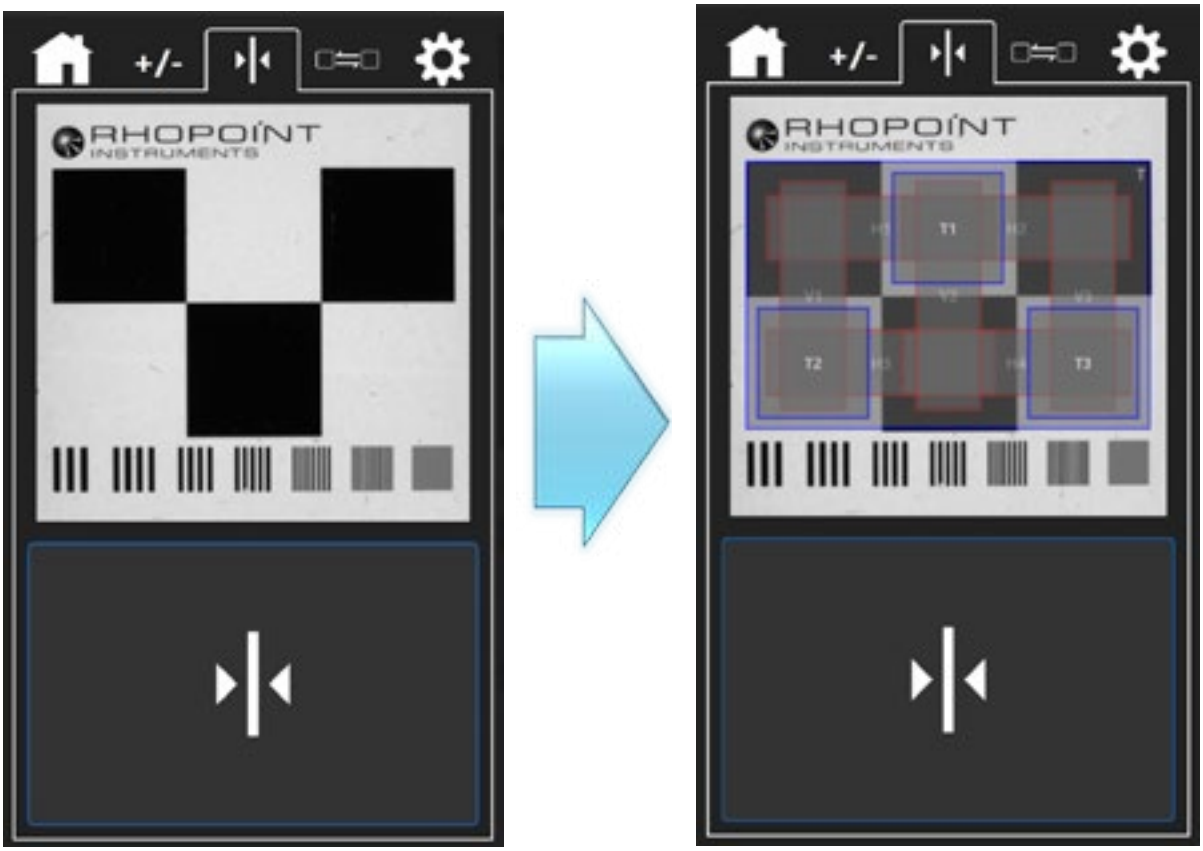
Tolerances can then be enabled and set by pressing  for each metric.

Once set, the tolerances can be saved by pressing 

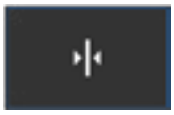
Pass/Fail Tolerancing can also be locked by pressing  to unlock enter the code 8157

Alignment Tab

To access the alignment tab, press the  tab.



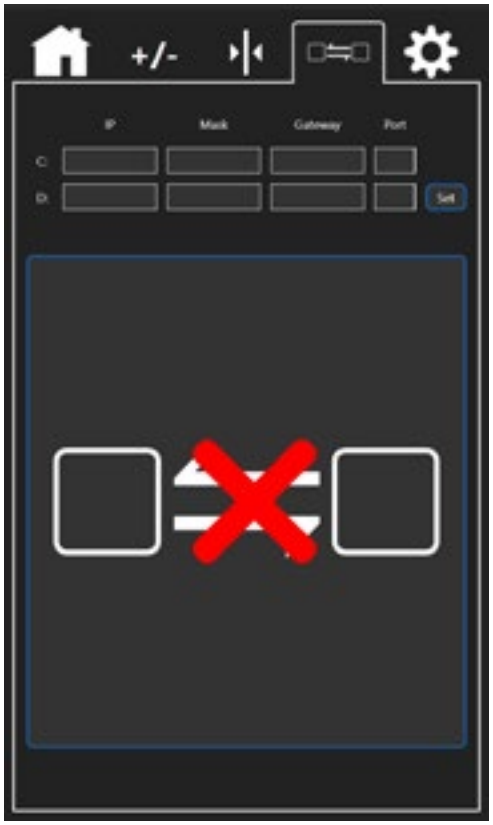
The alignment tab allows the user to see a live view of the graticule to aid in alignment of samples. It also allows the user to align the ROIS of the instrument automatically if the sample used is causing a linear optical offset.

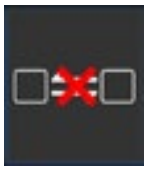
To automatically align the instrument press the  button.

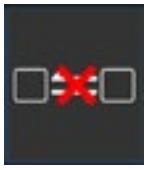
On a successful completion an overlay of the measurement areas will appear.

Connection Tab

To access the connection tab, press the  tab.



To enable remote control mode, press the  button and it will turn into  on success.

To disable remote control mode, press the  button and it will turn into  on success.

The following advanced connection settings should only be attempted by users with knowledge of network connections and adapter settings

Advanced Connection Settings

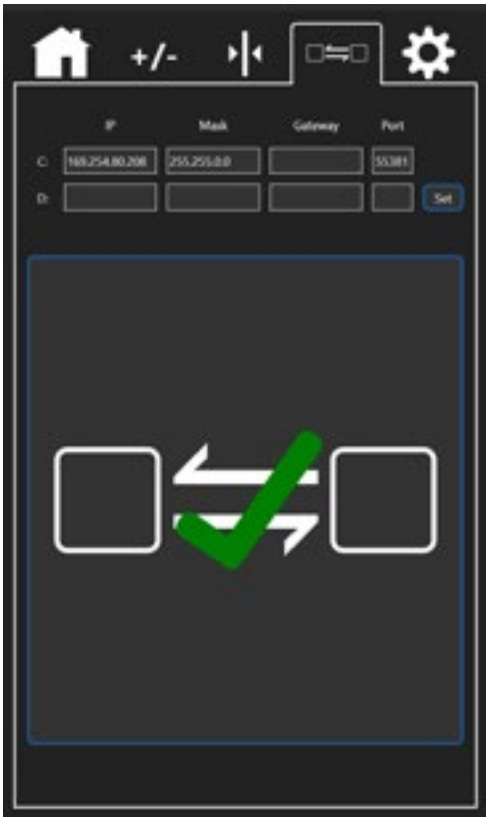
The current network parameters of the device get displayed in the C: (Current) row of the table. These values by default get automatically generated and are of the dynamic network type and so will change with every disconnect and reconnect based on network variables.

Settings a Static Network configuration. This will permanently set the network configuration of the instrument to static, and it will not be able to be put into an automatic network configuration thereafter

To set a Static Network configuration, network details can be entered into the respective

D: (Desired) row and are confirmed with the Set button.

A keyboard is required to enter values into these fields, this can be connected into the instruments USB port (refer to Functional Overview for further information)



Settings Tab

To access the settings tab, press the  tab.

The settings tab provides system configuration and Power Off.

Pressing the information icon provides version information about the instrument its last certified date and serial number.

Select Auto Exposure ON or OFF

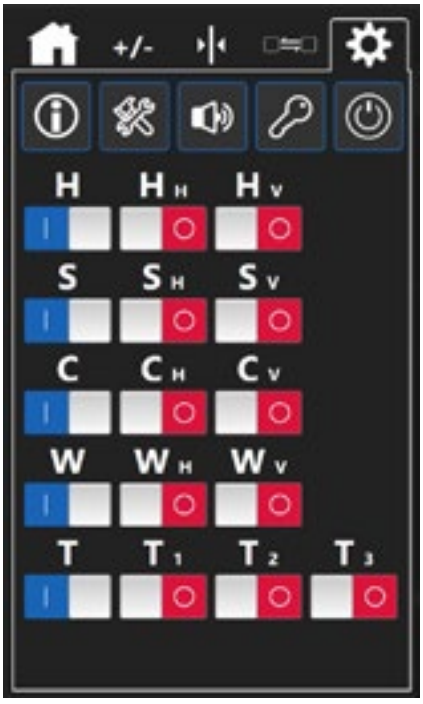
Auto exposure helps improve transmission agreeability between T and T1, T2, T3. It also has a small effect on H values especially in low transmission sample. The instrument should be re-tared every time this setting is changed.

To set the Date and Time press 

A screen wil be displayed as below -

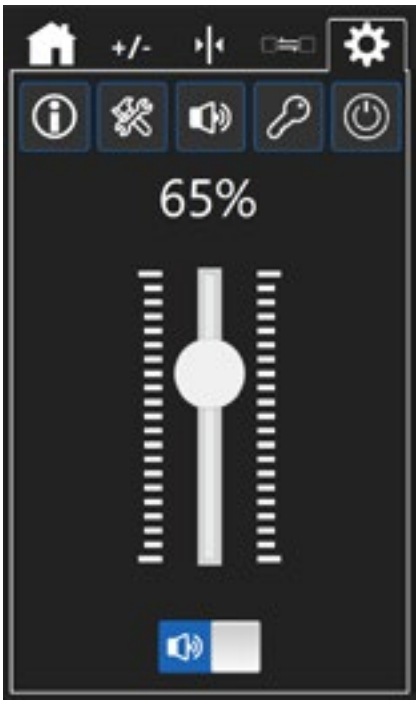
Set the correct Time and Date click on the Day, Month or Year and select using the drop-down numeric value.

Pressing the configuration icon allows displayed metrics to be turned on or off.



Pressing each of the individual metrics enables or disables display.

Pressing the volume icon allows the instrument volume to be increased / decreased or muted.



Factory menu used for firmware upgrades and calibration– not accessible unless Service USB key is inserted.

Pressing the power icon turns the unit off.

To return to measurement screen press the  icon,

Rhopoint ID-L Transmission Appearance Analysis Software

System Requirements

Minimum	Detail
Processor	1 gigahertz (GHz) or faster with 2 or more with a 64 bit processor or System on a Chip (SoC)
RAM	4 gigabyte (GB)
Storage	64 GB or larger storage device
Graphics card	Compatible with DirectX 12 or later with WDDM 2.0 driver
Display	High definition (720p) display that is greater than 9" diagonally, 8 bits per colour channel● Optical Transfer Function

Recommended	Detail
Processor	3 gigahertz (GHz) or faster with 4 or more with a 64 bit processor or System on a Chip (SoC)
RAM	8 gigabyte (GB)
Storage	64 GB or larger storage device
Graphics card	Compatible with DirectX 12 or later with WDDM 2.0 driver
Display	High definition (1080p) display that is greater than 24" diagonally, 8 bits per colour channel

Installation

The software is located on the supplied USB drive, the required files are located in the IDTX_Lab folder.

Copy the IDTX_Lab folder to your desktop.

Open the IDTX_Lab folder.

Double click on the IDTX_Lab.exe to start the installer.

Please follow the installer instructions.

PLEASE NOTE THAT DURING INSTALLATION YOUR PC MAY RESTART WITH NO WARNING, ENSURE ALL WORK IS SAVED BEFORE PROCEDING

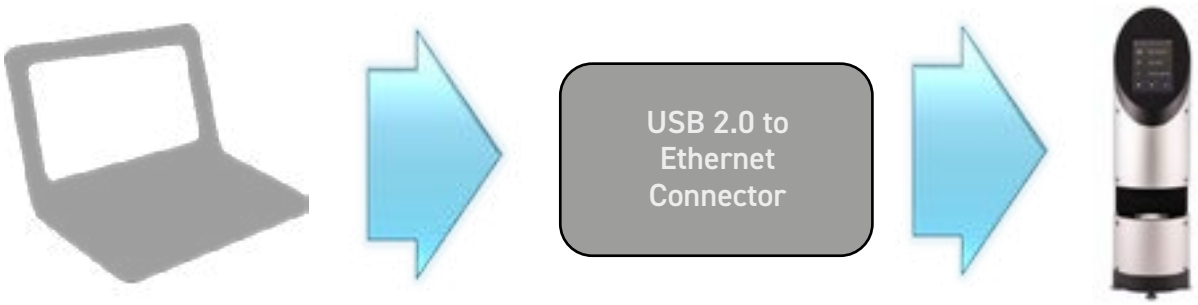
Once installed the software will automatically run and the IDTX_Lab folder can be deleted from the desktop.

Overview

Buttons	Function
	The Home Tab is the main tab of the program, here you can control the instrument to take readings and review results.
	The Graph Tab allows the user to view data that has been selected for graphing.
	The Allignment Tab allows the user to use an auto alignment procedure to attempt to correct linear distortion from materials.
	The Settings Tab allows the user to scan and connect to discovered instruments, as well as change configuration settings within the program.

Connecting the Instrument to the PC

Direct connection: use the provided USB 2.0 (or similar) adaptor to connect the Rhopoint ID to the PC using the provided ethernet cable.



LAN connection: the software can operate multiple instruments which are connected to a local network.

Connect the instrument directly to the required network using the provided ethernet cable (or similar).

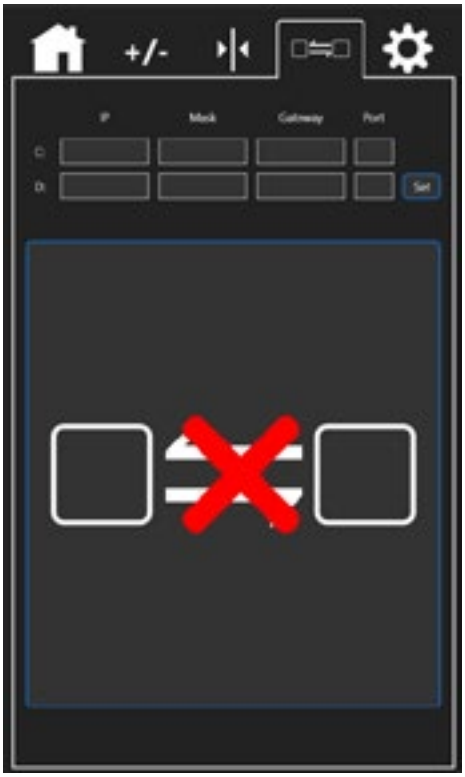
Using the IDTX Software on Multiple Screens

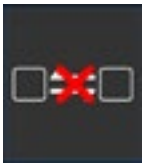
Rhopoint IDTX Software supports the use of multiple screens for operation, viewing and manipulating data, comparing images, and viewing graphs.

For effective data analysis it is preferable to run the software on a PC with multiple monitors.

Setting Up the Connection

Power up the ID instrument and click the  tab on the instrument touch screen.



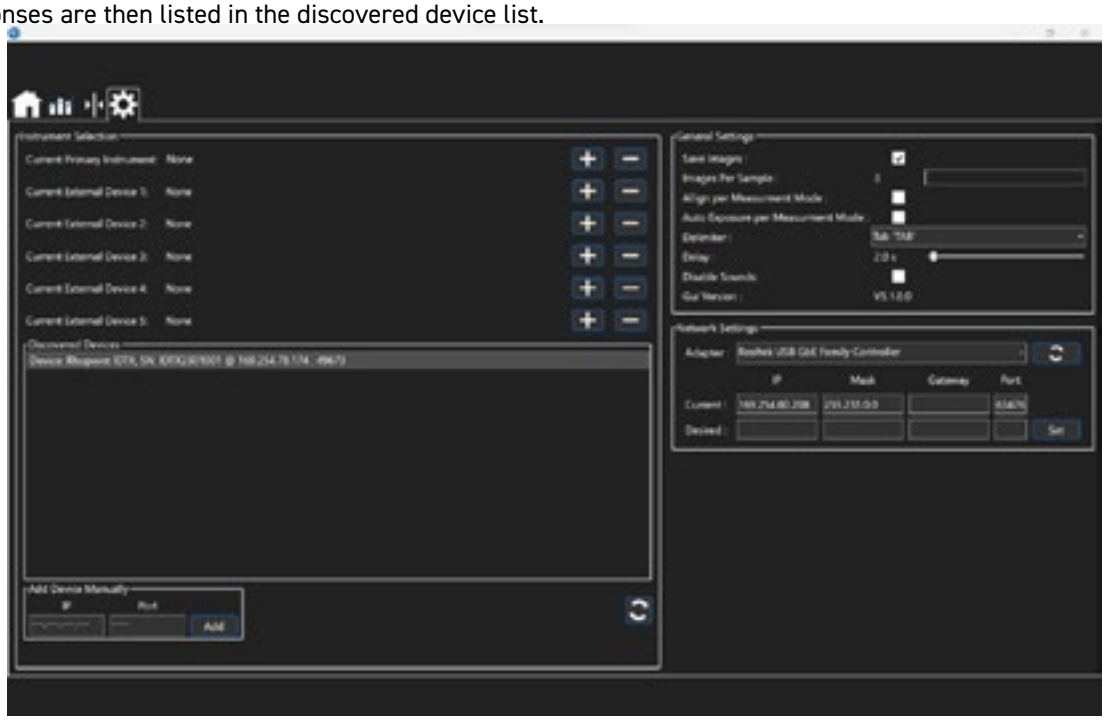
Click on the  button it will turn to  when a connection is established.

Now navigate to the  tab **on the PC software.**

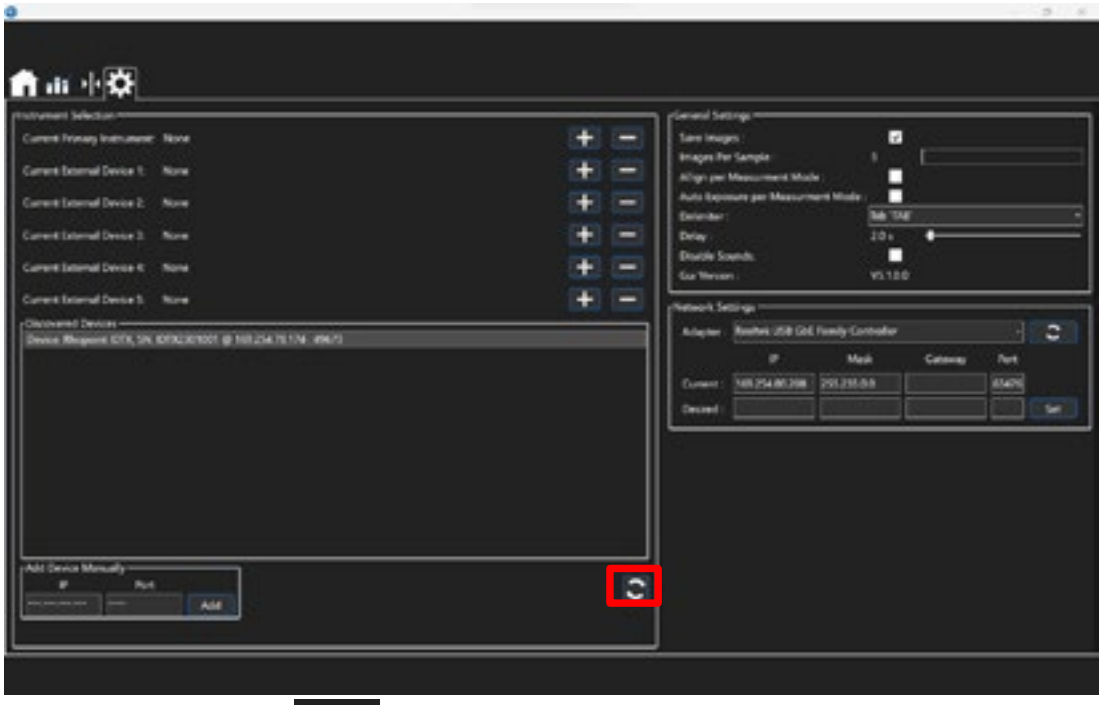
There are two methods of discovering an instrument, they are Automatic discovery and manual discovery.

Method 1: Automatic Discovery

Automatic discovery will probe the network adapters on the computer using UDP packets. Any compliant responses are then listed in the discovered device list.



Press the  button to begin automatically scanning for compliant instruments. The button should animate for the duration of the scan.

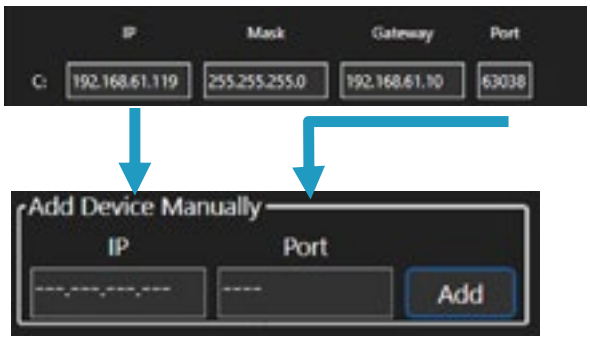


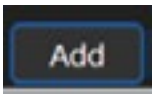
When the scan is complete the  will stop animating.

Method 2: Manual Discovery

Manual discovery will only send a UDP packet to the input address allowing for a connection to be made faster or large networks where **Method 1** may take a while to complete.

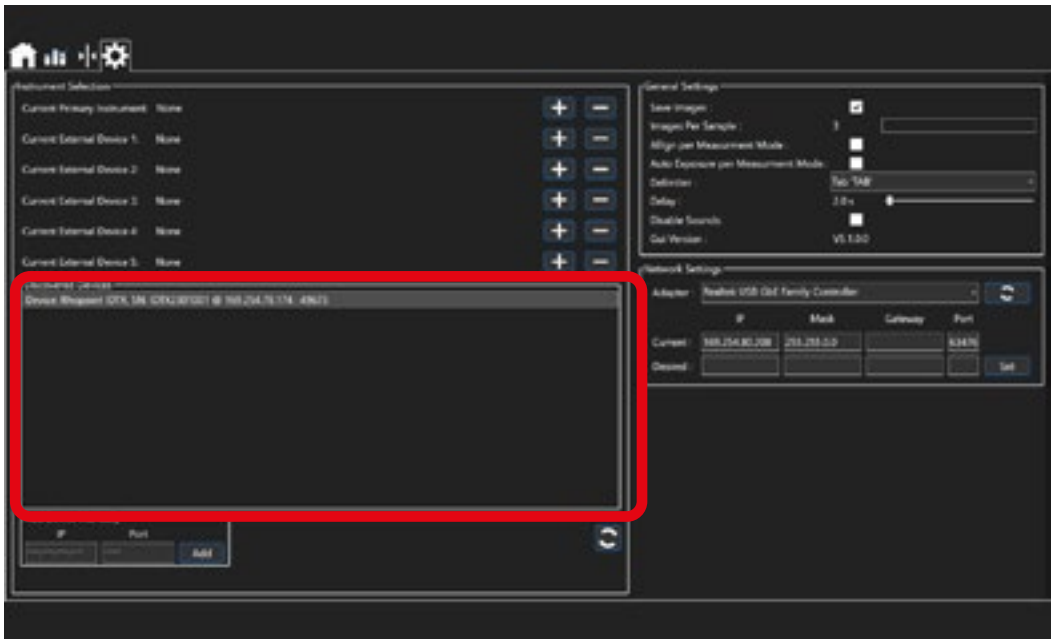
The user can add an instrument manually using its network information found on the  tab of the instrument.



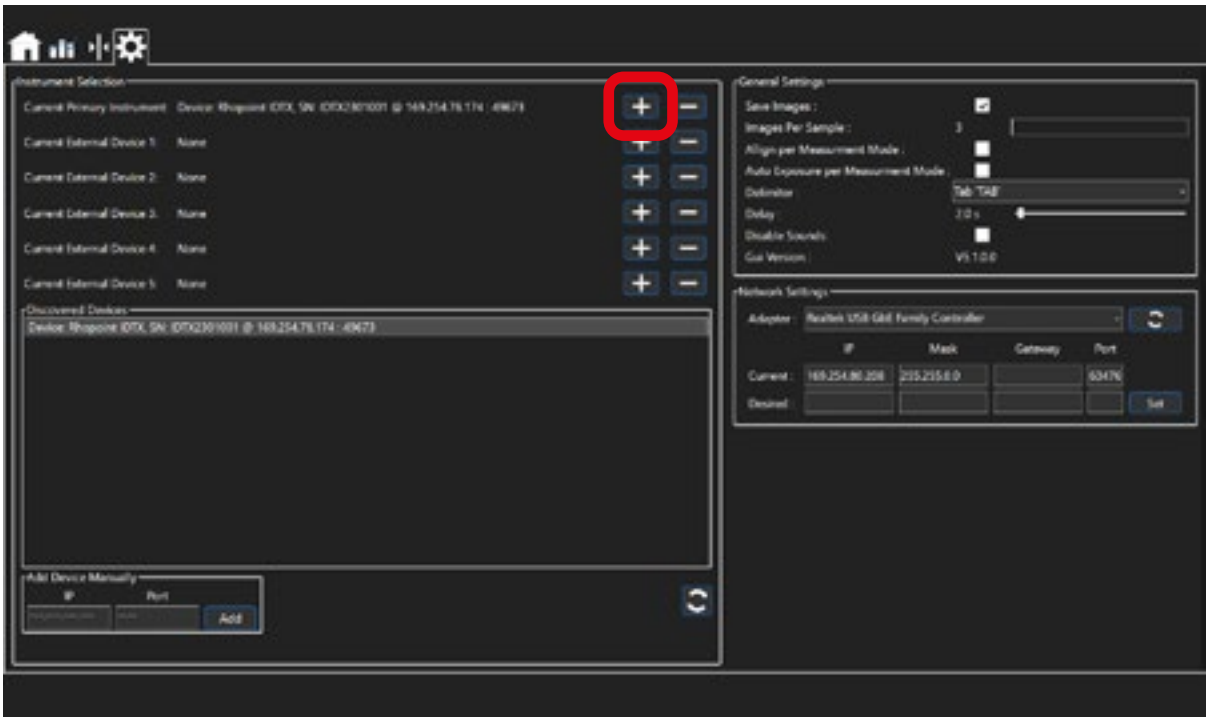
Press the  button to confirm the entry.

Adding a device

On a successful discovery of either of the above methods the instrument will be displayed in the discovered device list as shown below. If no instruments appear in the discovered device list, please check your connection.



To establish a connection with the Instrument, Click the desired instrument row in the list and then click the  button as shown below to add the device to the Primary Instrument slot.



To remove the instrument from the Primary slot, press the  button.

Once the instrument and software connect, the TARE button on the instrument and software will turn from grey to blue.

Navigating the ID Software

ID Instrument View

The left panel in the instrument software replicates the touch screen of the instrument and has similar functionality. Interacting with software instrument view screen will change the on-screen display and vice-versa, the information remains synchronized during operation.

1. Buttons

a. Click the  buttons to begin single or multiple measurement operations, respectively.

b. Click the (X5) on the top right of the  button to change the auto-measurement batch size, this value can be typed and is any value between 1 and 200 as the batch limit is two hundred measurements.

c. Click and hold the  button to tare the instrument (wait until the button has stopped spinning before releasing the mouse button).

2. Measurement Parameters

a. Click on the T or W icon to switch between transmission and waviness values.

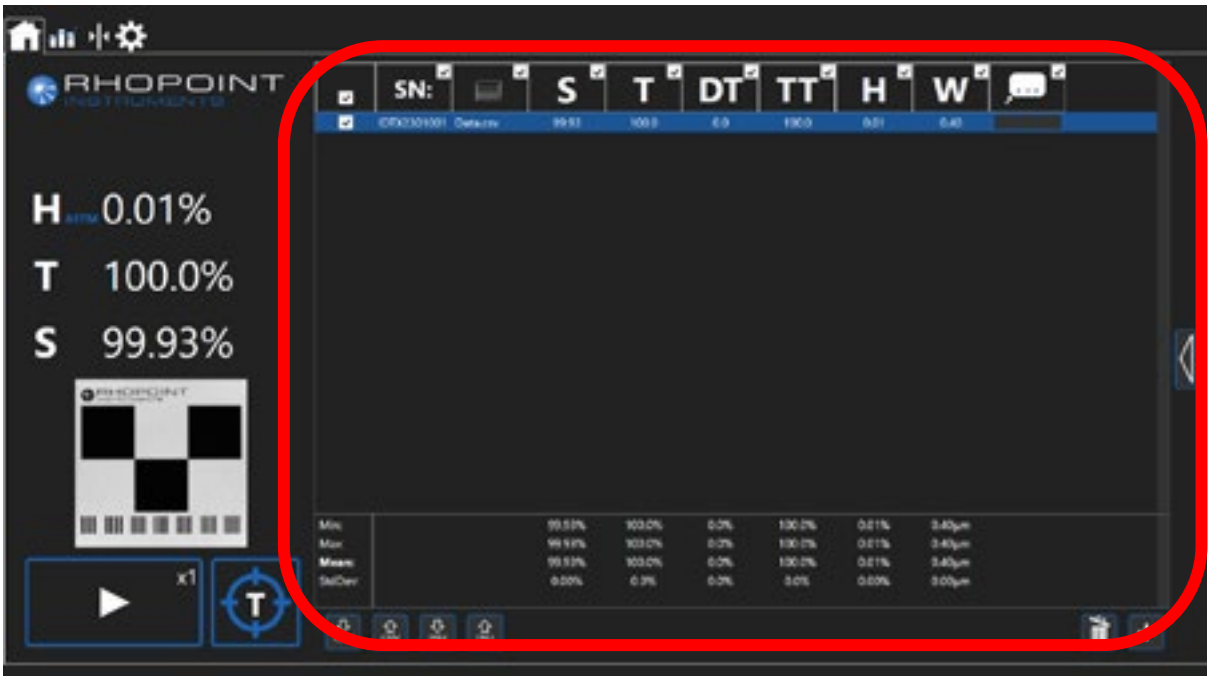
b. Click on the S or C icon to switch between sharpness and clarity values.

3. Live view/measurement image

The Instrument View includes a live view from the camera or an image from the selected/last taken measurement.

To select a measurement, see **ID Results Table View a measurement.**
To switch on/off live view see **ID Settings & Live View Console Toggle Live View.**

ID Results Table



The center Panel of the software contains the results for all measurements taken in the current batch. The bottom section contains statistics for all the results listed in the table.

View a Measurement

Clicking a previously taken measurement in the table will update the **ID Instrument View** and the **ID Setting and Live View** with the results and image for the selected measurement. If the instrument is in Live View mode, the results will update but the camera will continue to show a live view of the graticule.

Deleting a Measurement

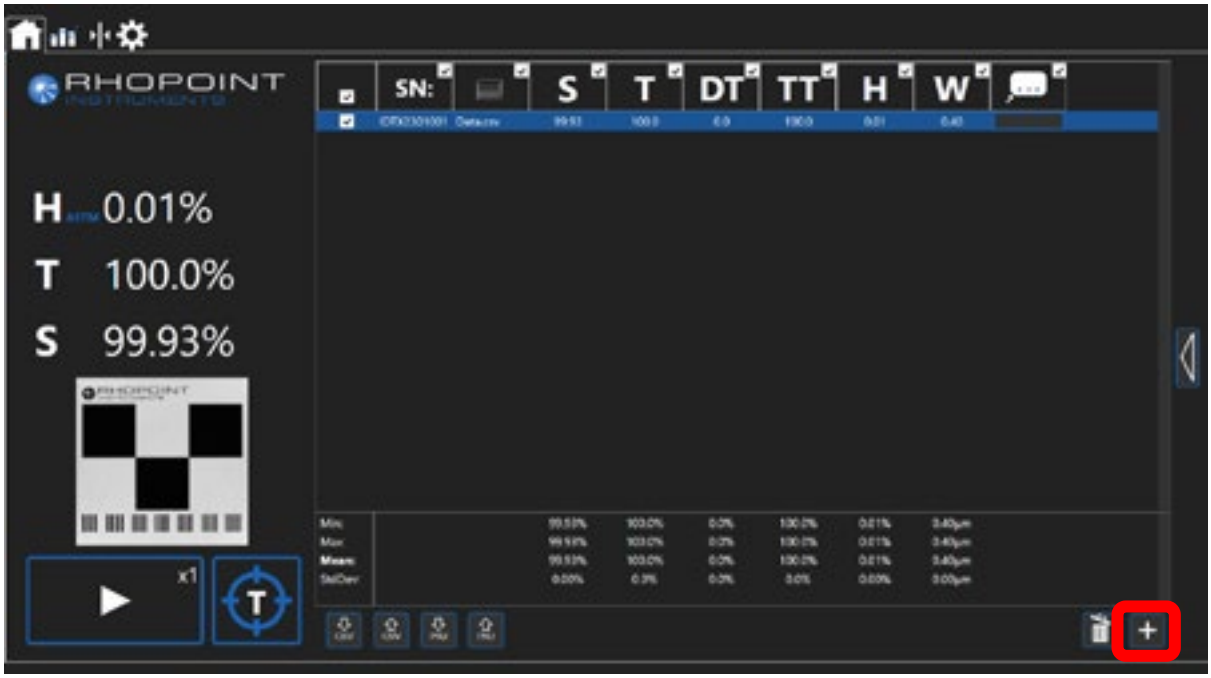
Pressing delete on a keyboard will delete the currently highlighted measurement.

Click in the tick box for each measurement will select it for global deletion, clicking the  button will delete all “ticked” measurements.

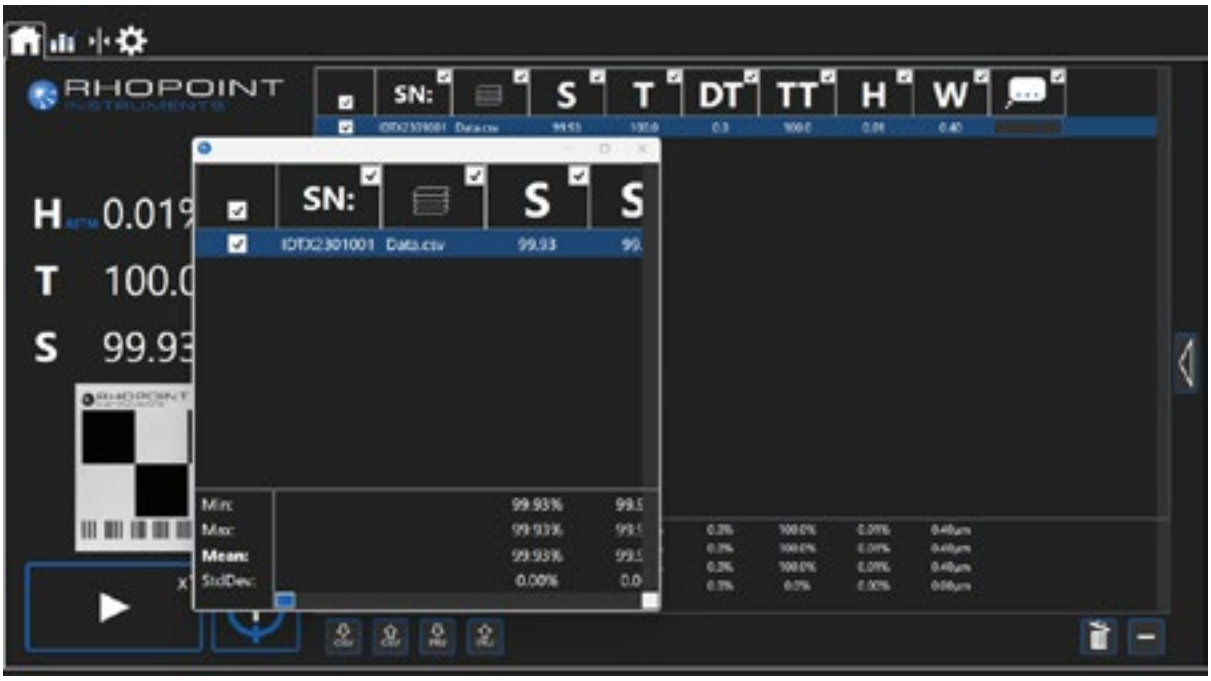
Customize the Results Table Parameters

The **Results Table** can be customized to any selected results or comments from the **Full Data Table**.

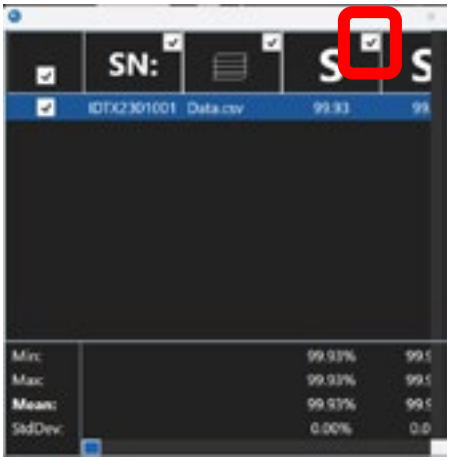
To view the Full Data Table, click on the  button.



This will bring up the expanded table window for use with multiple screens and the ability to add hidden columns back to the main table.



Clicking on the tick box in the top corner of any parameter will include/exclude it from the **ID Results Table.** Parameters can be dragged and dropped to rearrange columns as required and results can be copied to the clipboard by pressing Ctrl + C. This is available in both tables



Parameter Description

S - ***Sharpness*** the blurriness of a viewed object (%).

H - ***Haze*** the contrast of a viewed object, cloudiness, milkiness.

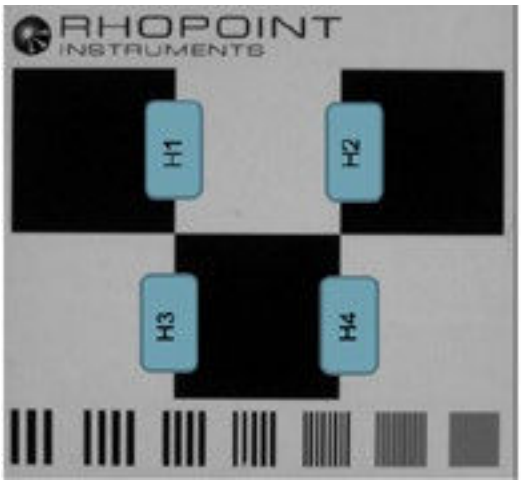
T - ***Visible transmission*** VT (narrow angle scatter) and is what the camera sees

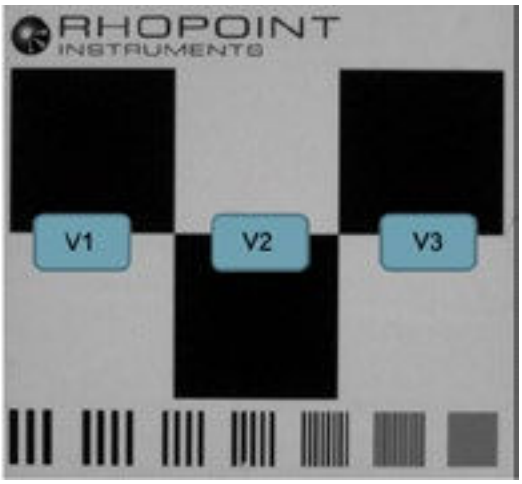
DT - ***Diffuse transmission*** (Wide angle scatter) and is what the camera doesn't see due to being scattered away from the observer.

TT - is a calculation of ***Total transmission*** to be compared to other haze meters and is the sum of **VT** and **DT**

Paremeter Description

Sharpness, Clarity & Haze parameters are calculated from image analysis of seven areas of the target graticule.

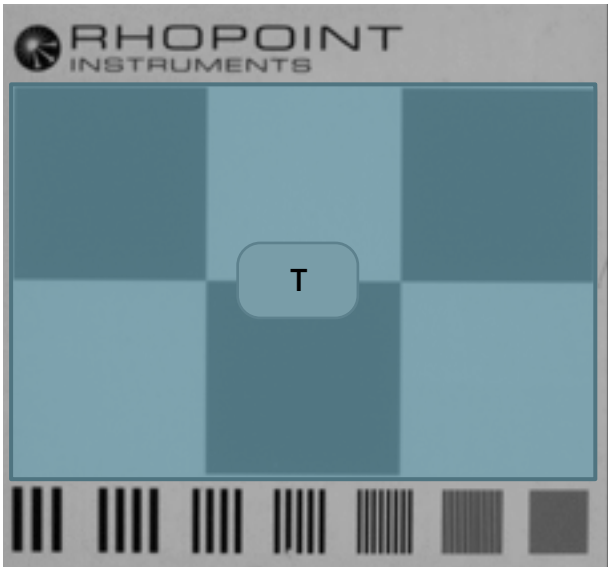


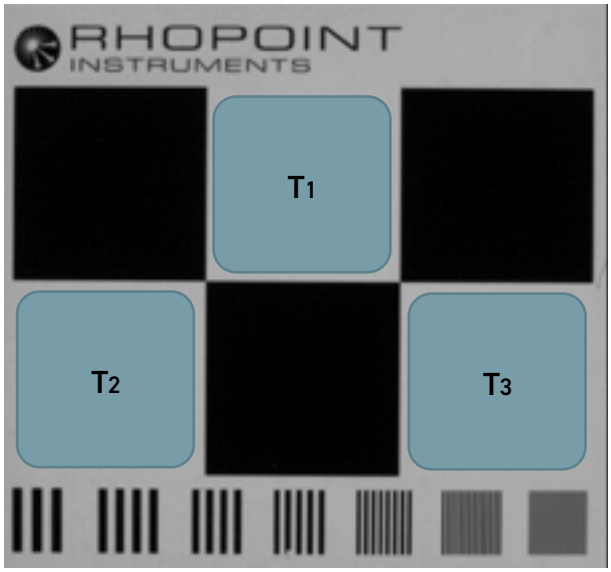


Symbol	Parameter	Calculation
H	Haze	Average of H_H & H_V
H_H	Horizontal Haze	Average of H_{H1} H_{H2} H_{H3} H_{H4}
H_V	Vertical Haze	Average of H_{V1} H_{V2} H_{V3} H_{V4}
H_{H1} H_{H2} H_{H3} H_{H4}	Horizontal Haze H1, H2, H3, H4	Calculated using Michelson contrast of B/W zones adjacent to edge transition
H_{V1} H_{V2} H_{V3} H_{V4}	Vertical Haze V1, V2, V3	Calculated using Michelson contrast of B/W zones adjacent to edge transition
S	Sharpness	Average of S_H & S_V
S_H	Horizontal Sharpness	Average of S_{H1} S_{H2} S_{H3} S_{H4}
S_V	Vertical Sharpness	Average of S_{V1} S_{V2} S_{V3} S_{V4}
S_{H1} S_{H2} S_{H3} S_{H4}	Horizontal Sharpness H1, H2, H3, H4	Calculated using edge spread function of vertical graticule edges
S_{V1} S_{V2} S_{V3} S_{V4}	Vertical Sharpness V1, V2, V3	Calculated using edge spread function of horizontal graticule edges
W	Waviness	Average of W_H & W_V
W_H	Horizontal Waviness	Average of W_{H1} W_{H2} W_{H3} W_{H4}
W_V	Vertical Waviness	Average of W_{V1} W_{V2} W_{V3} W_{V4}
W_{H1} W_{H2} W_{H3} W_{H4}	Horizontal Waviness H1, H2, H3, H4	Calculated using edge deformation analysis
W_{V1} W_{V2} W_{V3} W_{V4}	Vertical Waviness V1, V2, V3	Calculated using edge deformation analysis
C	Clarity	Average of H_H & H_V
C_H	Horizontal Clarity	Average of C_{H1} C_{H2} C_{H3} C_{H4}
C_V	Vertical Clarity	Average of C_{V1} C_{V2} C_{V3} C_{V4}
C_{H1} C_{H2} C_{H3} C_{H4}	Horizontal Clarity H1, H2, H3, H4	Calculated using regression analysis- C% (BYK) vs. ID Sharpness
C_{V1} C_{V2} C_{V3} C_{V4}	Vertical Clarity V1, V2, V3	Calculated using regression analysis- C% (BYK) vs. ID Sharpness

Transmission

Transmission values are calculated using the following zones.





Symbol	Parameter	Calculation
T	Transmission	Pixel intensity full graticule area/ Pixel intensity tare image
T_1	Transmission zone 1	Pixel intensity area T_1/ Pixel intensity T_1 tare image
T_2	Transmission zone 2	Pixel intensity area T_2/ Pixel intensity T_2 tare image
T_3	Transmission zone 3	Pixel intensity area T_3/ Pixel intensity T_3 tare image

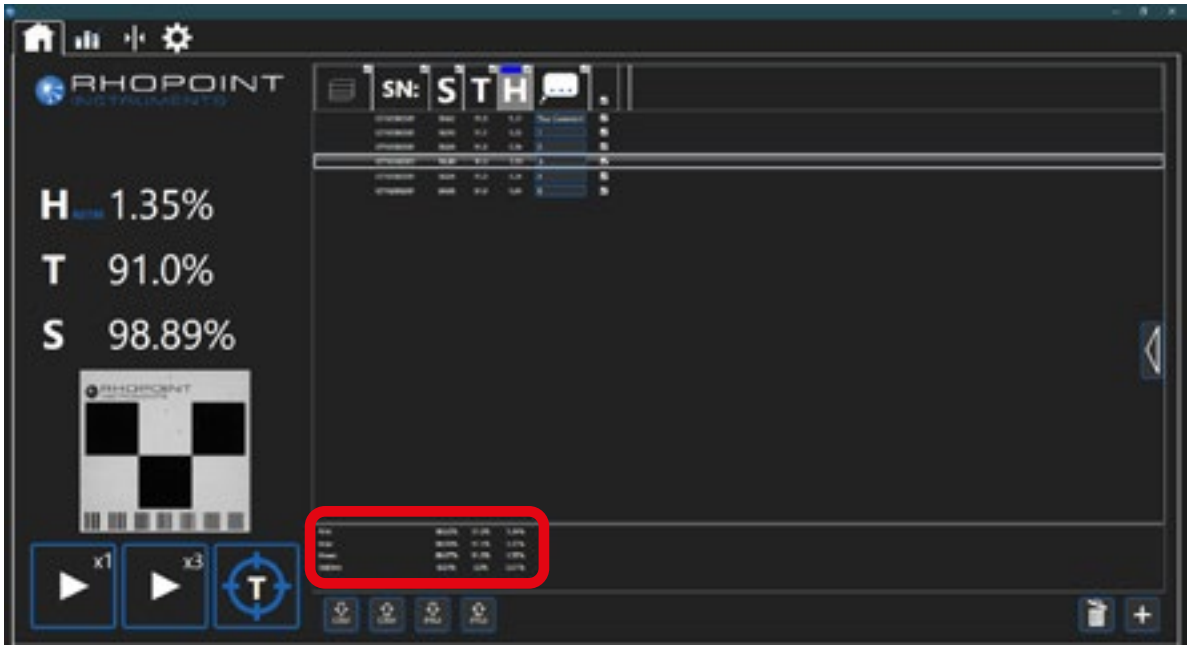
User Defined Columns

The Rhopoint ID software has eleven fields where customers can input their own process data to improve traceability during data analysis.

The first column has a fixed name “Comments” all other fields can be named by the user- these names will be transferred to the data output .csv.

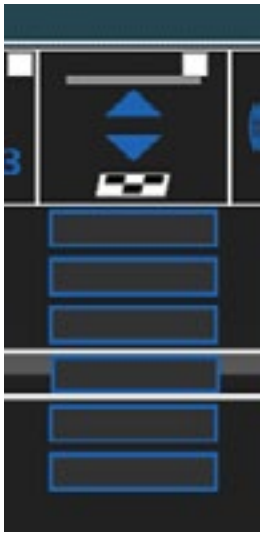
Click into the small blue box under the speech bubble to input a field name.

Statistics are shown for all measurements in the data table.



Add measurement distance to add a measurement distance to the measurement data the distance text box should be used.

Add Measurement Distance



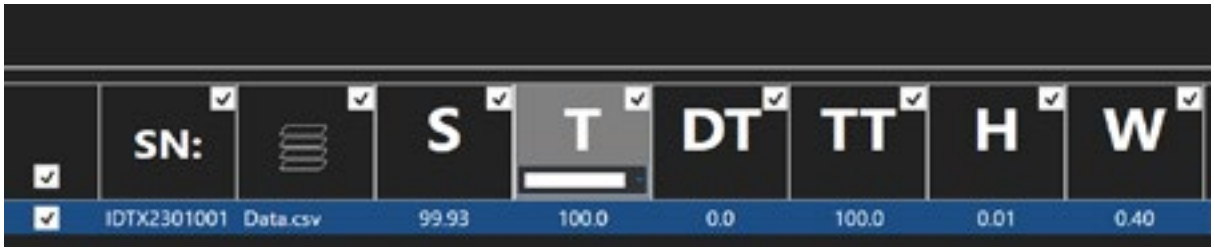
To add a measurement distance to the measurement data the distance text box should be used.

As each new measurement is taken it is added to the bottom of the table.

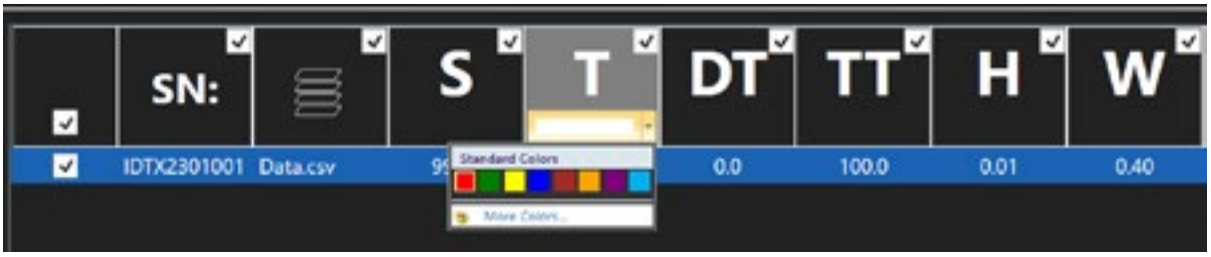
Display Graph

Select the parameters for graphing by clicking the header in either of the results tables.

The Header should highlight as shown below and its color is displayed in the header.

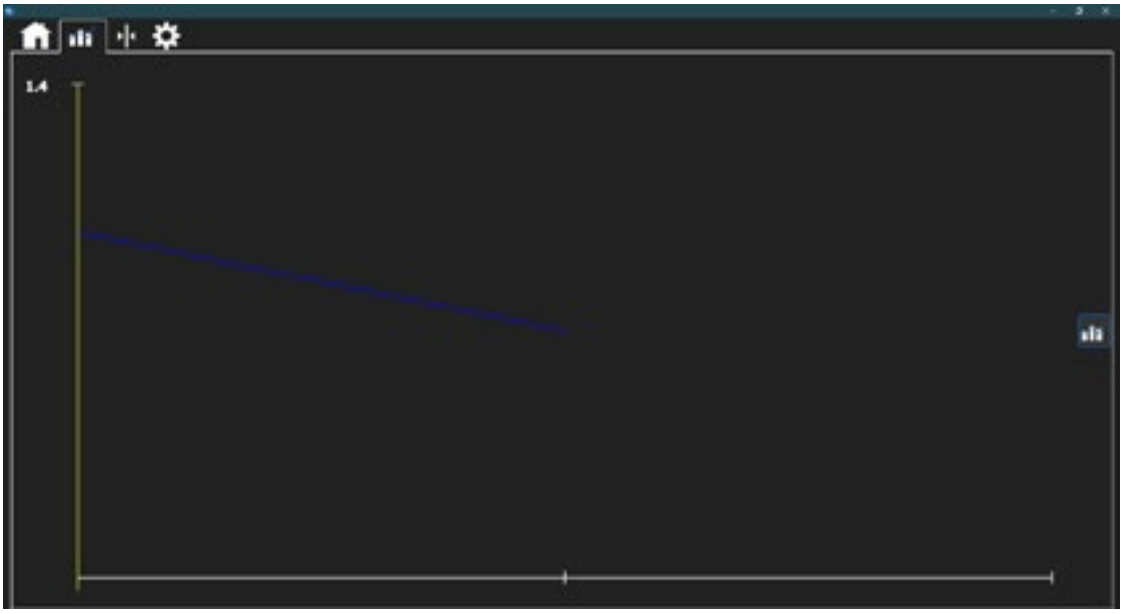


To change the color of the column, click the colored rectangle and a color picker will appear. You can select your color here and it will be applied.



Click on the Graph tab.

A graph of the selected parameters is displayed



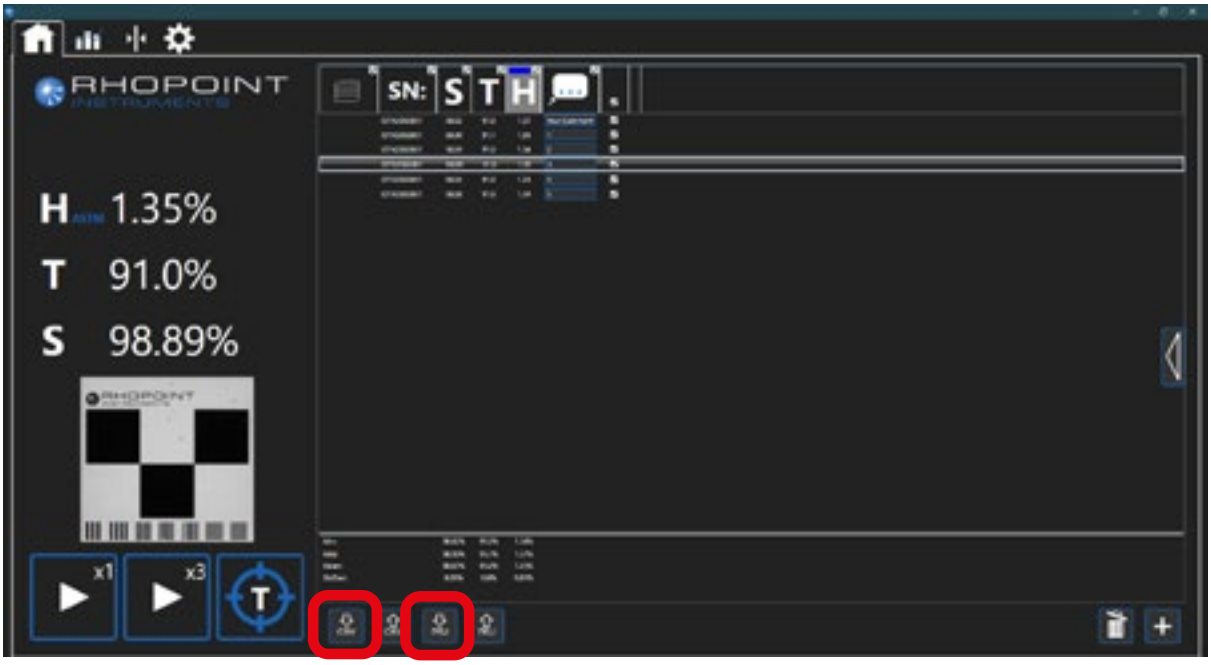
The yellow indicator displays the current selected result row in the table.

The  button will bring out a window containing the graph for multiple screen use.

Save/Export Data To save the readings and all associated images, click the SAVE Project

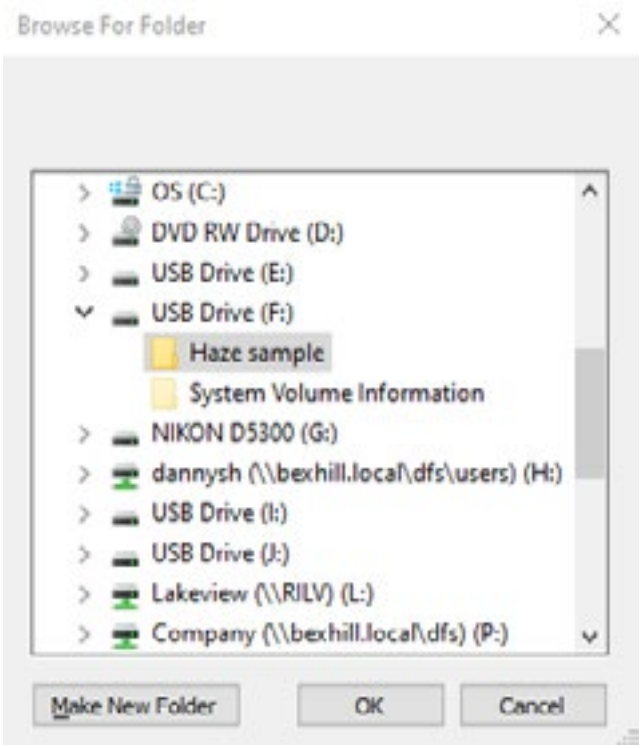
button (PRJ) or to save the data only press the 

SAVE CSV button.



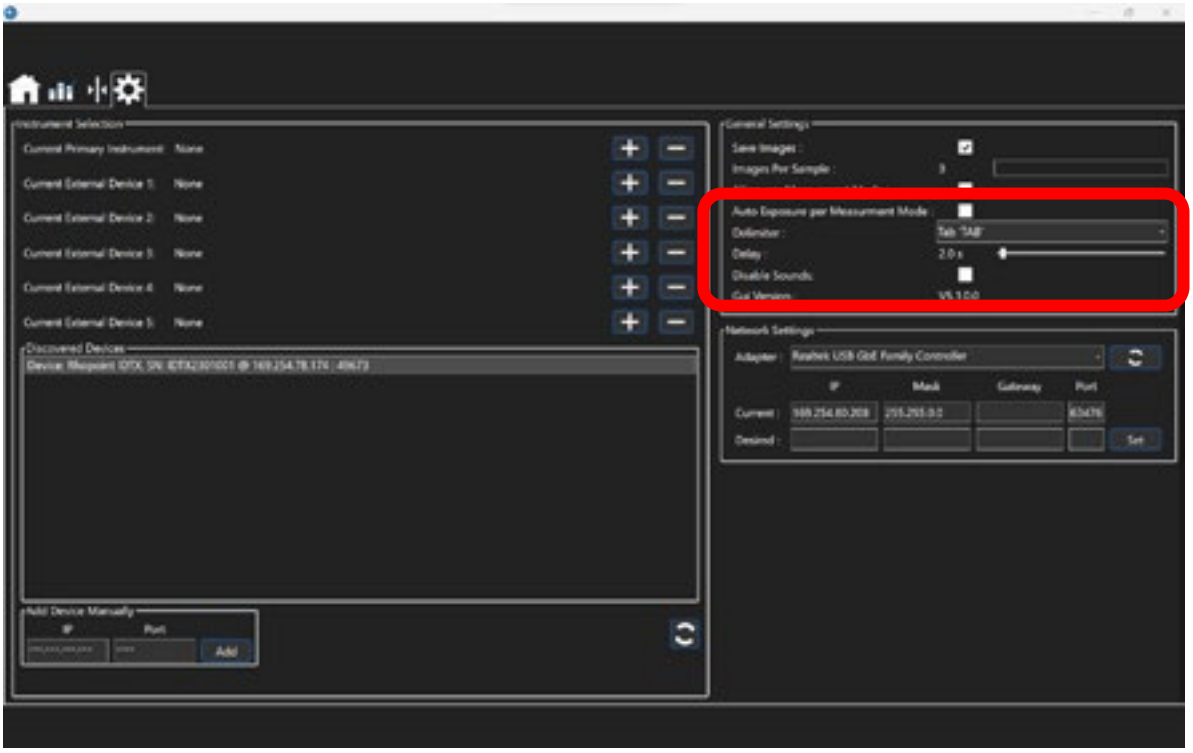
When Saving a CSV use the file explorer to select a location and type your file name as normal.

When saving a project (Images and data) you will be presented with a create new folder window, simply name the new folder, click the folder icon, and then press OK. The folder will contain all of the images and the data in csv format.



When successfully saved there will be an image folder and a data.csv within please do not alter the names of these as the project will fail to load.

Delimiter The data will be saved with the selected delimiter this can be changed using the drop-down menu in the settings tab to suit regional PC settings.

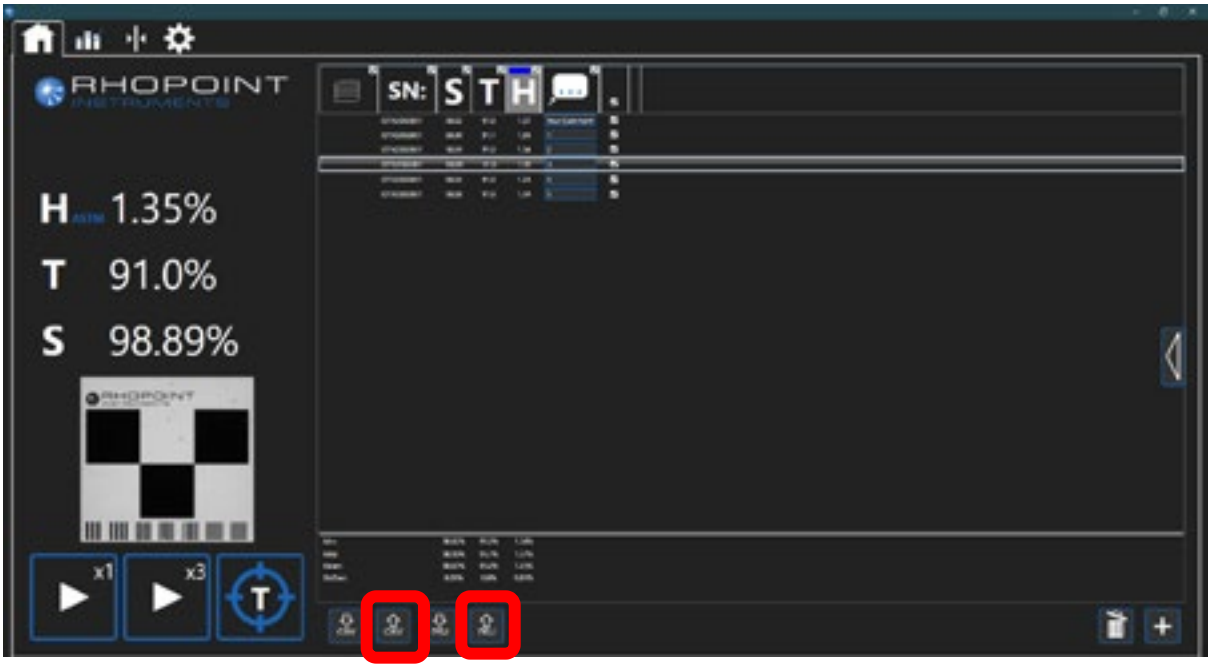


Load measurements - To load additional data into the table, press the LOAD Project 

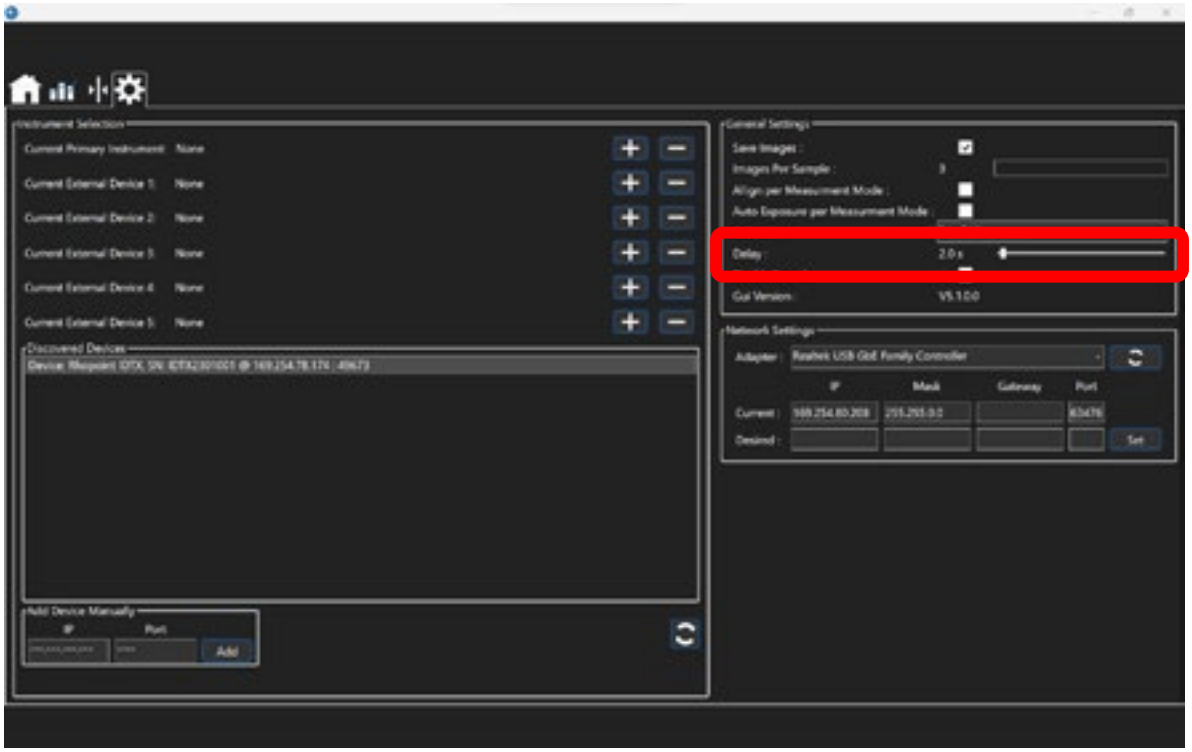
button or Load CSV 

button, this data is added to the bottom of the data table, use this feature to combine and compare batches.

To view saved data in isolation first clear the table.



To adjust the delay between readings, adjust the slider in the viewing window.



IDTX Software – Live-view and Captured Images

To Access the Live view buttons, click the  button, to close the panel just click the  button.

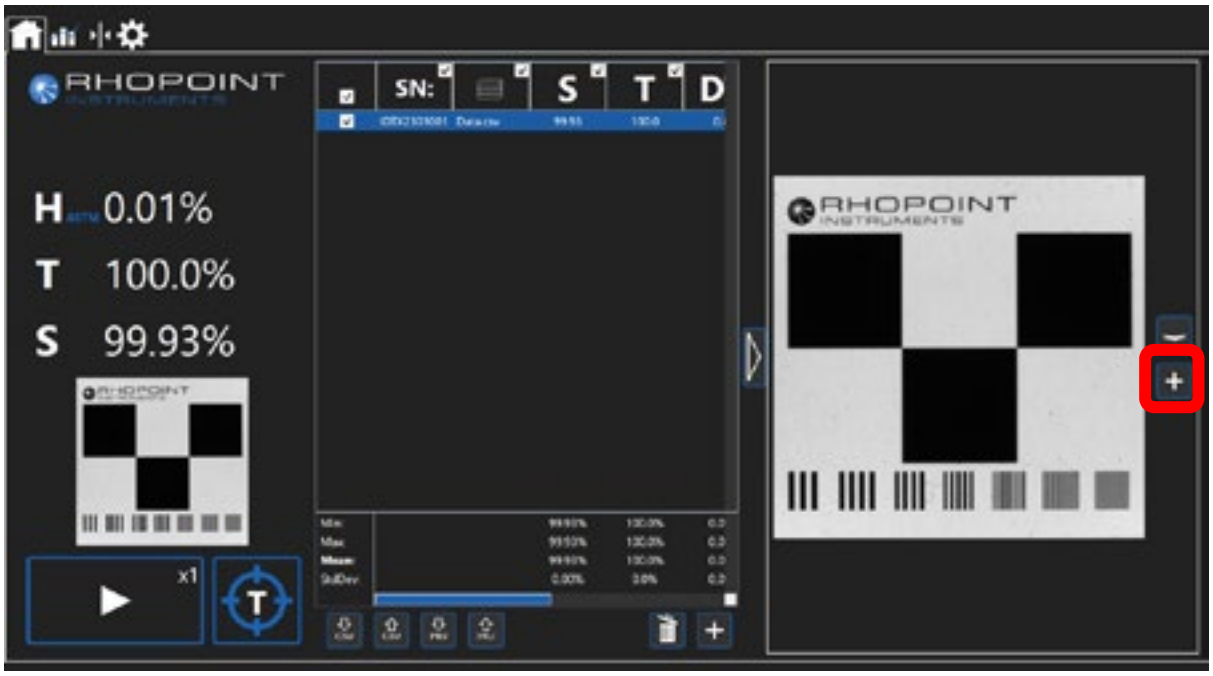
The Home Tab should transform into the below, click the  button to start the live view.

To disable the live view, click the  button.

The live view is useful for positioning samples before measurement.

Note: With live view switched on it is not possible to view images of saved measurements.

Click on the  button to expand the image window for use with multiple screens.



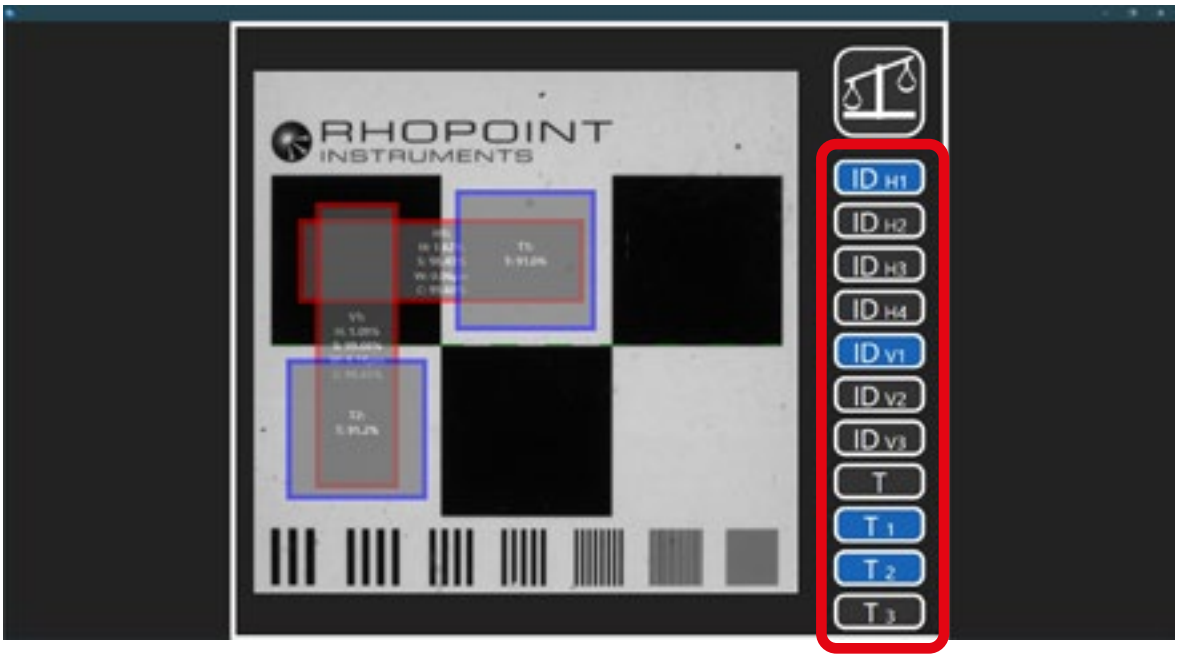
This will expand the image attributed to the measurement selected in the data table.

Note: With live view switched on it will display the live image instead.

Haze, sharpness, and waviness are calculated from the average of seven individual zones.

It is possible to view the individual regions using the toggle buttons on the right.

If horizontal values are different from vertical values, it is an indication of anisotropy (visible directionality) in the material



The on-instrument T value are calculated using the transmitted light through all black and white areas, this area can be viewed by toggling the T button.

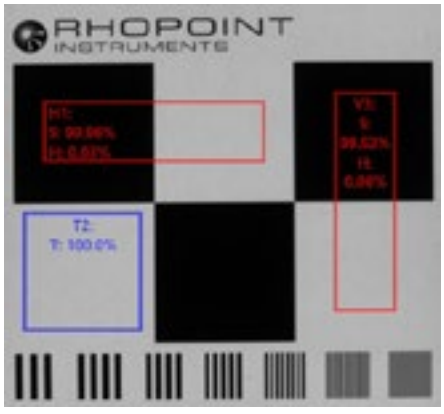
Three smaller white only transmission areas are also available by toggling T1-T3.

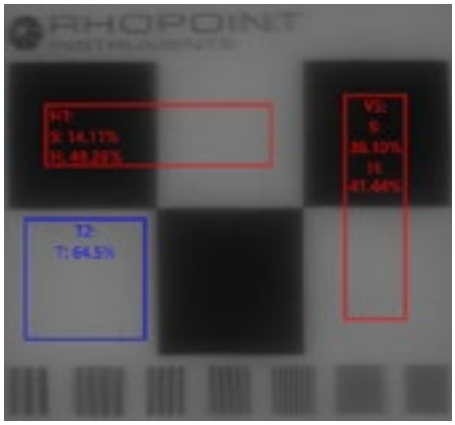
Comparing Multiple Images

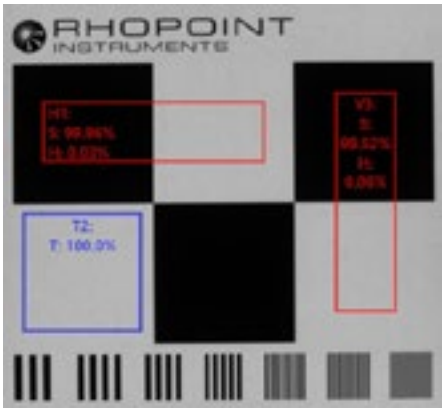
Click on the  button in the expanded image window.

The software will replicate and fix the current view.

Multiple windows can be opened to visually compare different materials.



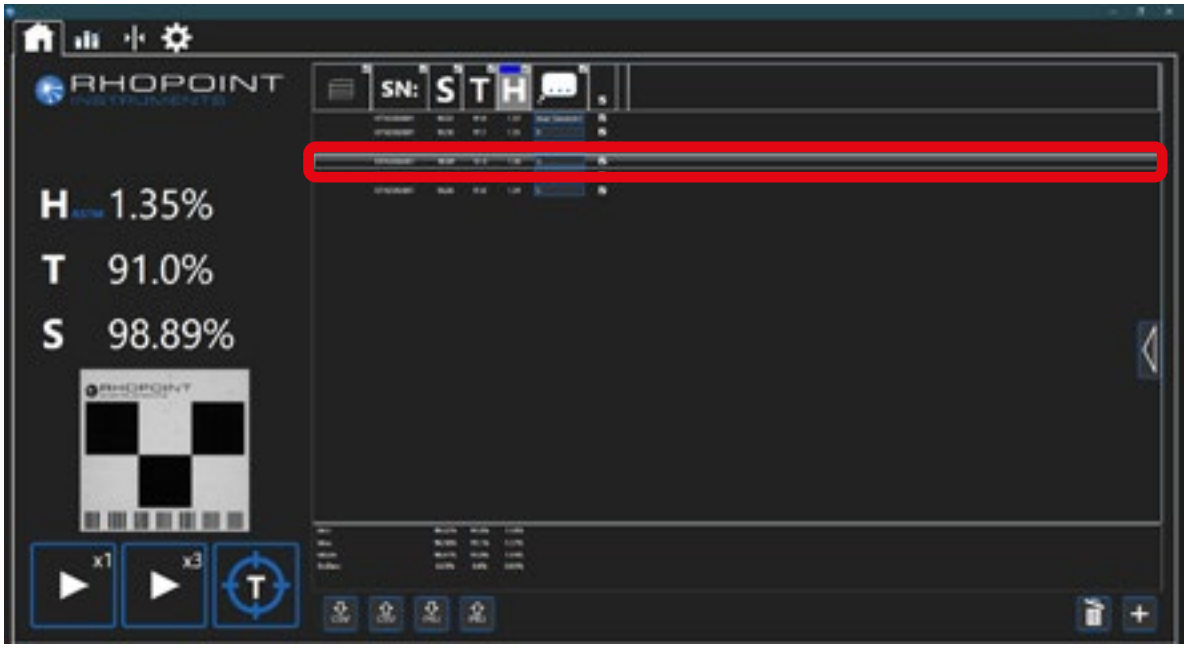




IDTX Software – Visual Analysis of Results: Sharpness

Click in the data table to select images of previous measurements.

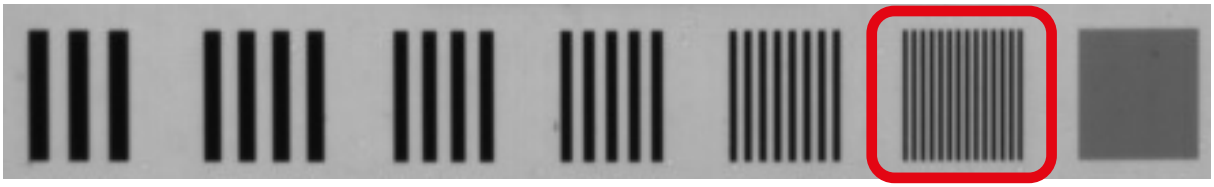
Once a measurement is selected the keyboard arrow keys can be used to quickly review all the images and measurements.



The images recorded by the IDTX meter are correlated to the viewing sensation when observing an object through the test material.

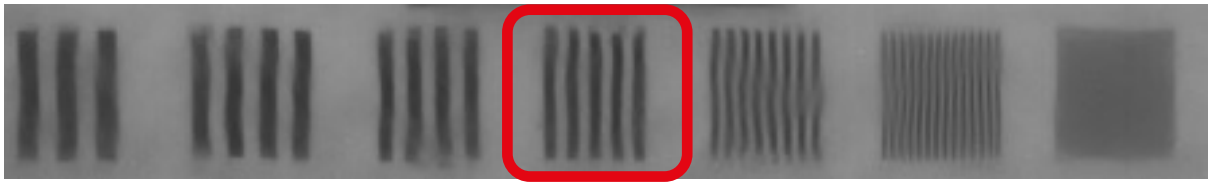
Sharpness - The graticule has a visual scale for comparison and visualisation of Sharpness.

High Sharpness - Sharp view of object (S-95%)



In the (above) captured image the lines in frequency pattern 6 are visible and undistorted.

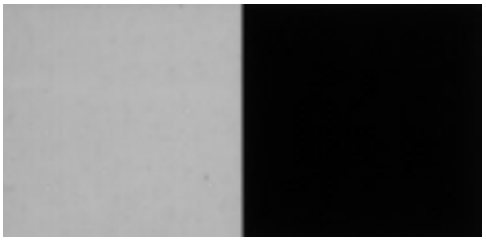
Low Sharpness - Fuzzy- out of focus object. (S 30%)



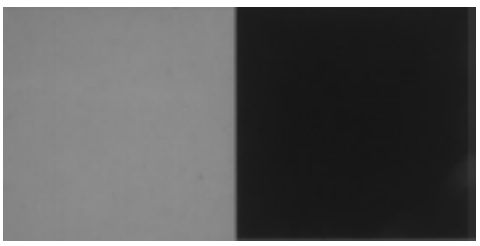
In the (above) captured image the lines in frequency pattern four are visible and undistorted.

IDTX Software – Visual Analysis of Results: Haze

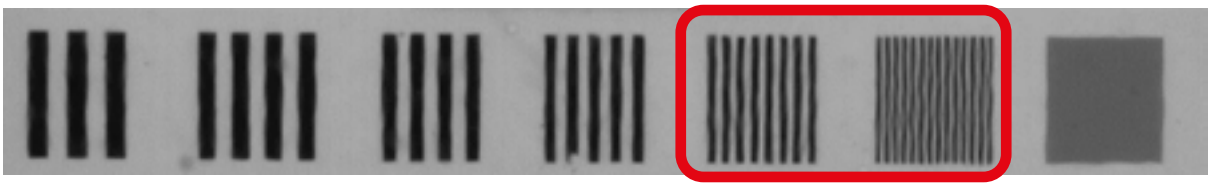
Low HAZE (1.2%)- Material is less visible, viewed object has high contrast.
The black and white squares of the graticule have high contrast when compared.



High Haze (28.35%)- The material has a white or milky appearance; the viewed object has low contrast. The black and white graticule squares have less contrast and appear greyer.



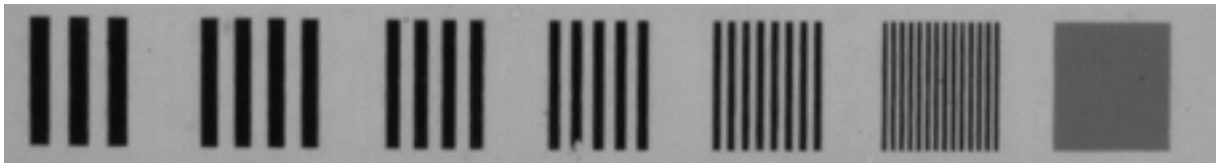
IDTX Software – Visual Analysis of Results: Waviness



Plastic materials can exhibit local surface effects such as orange peel which can be seen as small waves when a pattern or object is viewed through the material.

The picture above shows the visual evaluation line pairs on the graticule- orange peel is causing the graticule to appear wavy (19µm SD waviness).

The picture below shows the visual evaluation line pairs on the graticule- there is very little waviness for this sample- (3.5µm SD waviness).



Notes

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