

NOVO-GLOSS™

60°

20/60°

20/60/85° Trio

20/60/85° with Haze



Operating Instructions

Thank you for purchasing this Rhopoint product.
Please read these instructions carefully before operating this product and retain them for future reference.

English

 **RHOPOINT**
INSTRUMENTS

This instruction manual contains important information about the setup and use of your [Rhopoint Novo-Gloss™](#). It is essential that the contents be read before powering up and operating 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 the Rhopoint Novo-Gloss™ 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.

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*Not available on Novo-Gloss Trio

Storage and Handling

- This instrument contains precision optics and electronics. You should avoid knocking or dropping the device as the resulting impact could cause serious damage.
- In some circumstances the optical components in the instrument could become misted as a consequence of temperature change. It is recommended that the instrument is not used until it has stabilised to ambient temperature.
- Ensure that the instrument is not exposed to moisture, chemicals or to any corrosive vapours.
- Do not interfere or place any objects inside the measuring aperture as damage to the measuring system could occur.
- The instrument housing and screen are normally resistant to a variety of solvents however it is not possible to guarantee resistance to all chemicals, therefore the surfaces of the instrument should only be cleaned using a soft, moist cloth.
- Prevent exposure of the instrument to direct sunlight for prolonged periods and to continuous humidity and condensation.

Accessories

The instrument is supplied as a standard package complete with all accessories required to calibrate and recharge the unit including:

Rhopoint Novo-Gloss / Novo-Gloss Trio 2 - 60°, 20/60° or 20/60/85° Glossmeter

High gloss calibration tile including certificate

Cleaning cloth for calibration tile

NIST traceable instrument certificate

USB Mains Charger with four selectable mains input connectors (UK / Europe / US / Australia)

USB PC cable

Quick Start Operating Instructions

Protective instrument carry case

Optional items

Mirror gloss calibration tile including certificate

Functional overview



<u>Label No.</u>	<u>Function</u>
1	USB Connector
2	High Resolution Graphic Display
3	Up/Down/Left/Right Buttons
4	Operate / Enter Button
5	Calibration Tile (magnetised)
6	On / Off Button

The instrument is controlled by pressing the relevant touch sensitive button. Functionality is dependent on whether the instrument is in menu or operate mode as detailed in the operation sections that follow.

Power

The Novo-Gloss is powered by an integrated high capacity lithium ion cell.

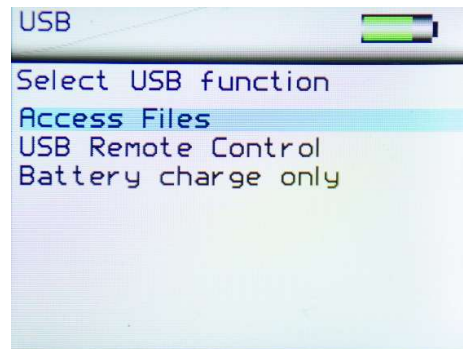
Fully charged the instrument will operate continuously for >17 Hours or >20,000 readings.

A mains powered USB charger is provided with the unit, this will fully charge the unit when connected to the units USB input (6) using the USB cable provided in under 3 hours.

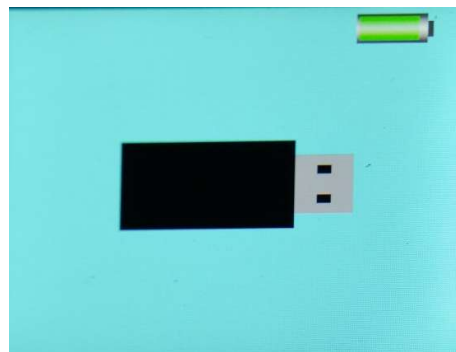
Do not operate the instrument whilst it is charging.

USB Connectivity

Three functions are available when the Novo-Gloss is connected to a computer using the USB cable supplied –



Access Files – Allows access to measurement and configuration files on the instrument. The instrument appears as a USB drive named NG-METER. When selected the display on the instrument shows a USB memory key as shown below –



USB Remote Control - Allows control of the Novo-Gloss remotely by sending ASCII commands from a computer or PLC. In this mode the instrument displays “REMOTE CONTROL ACTIVE” on the main measurement screen.

Battery Charge Only – Allows USB charging of the instrument – all instrument functions are available however do not operate the instrument whilst it is connected via USB and/ or charging.

Switching on the unit



To switch on the unit touch the On/Off button located above and to the right of the USB socket.

The instrument will display the Rhopoint logo and then enter into the home screen displaying measurement parameters according to the instruments default settings or those previously configured.

Similarly the instrument is powered off by pressing the On/Off button for three seconds. The power Off feature of this button can be disabled in the setup menu.

Operation

With the unit switched on and initialised the instrument will display the home screen as shown below.



In this mode, measurements can be made by simply pressing the operate button (4) on the instruments keypad.

Should the Auto Calibration option be set to ON in the settings menu (detailed later in the Instrument Settings section of this manual) a dialogue box will appear when the operate button is pressed as shown below



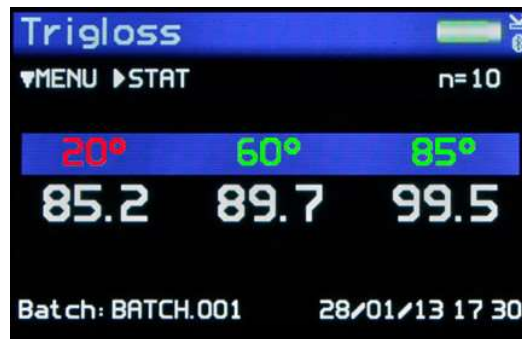
Two options are available: either to “Calibrate” the instrument on the calibration tile before making the measurement or to “Measure” without performing a calibration. Using the Left/ Right (3) and Enter (4) buttons on the keypad the required option can be selected.

By selecting “Calibrate” the instrument will perform a calibration and display a confirmation dialogue box when completed. Selecting the “Confirm” option will save the calibration information to the instruments memory, which will also be confirmed by the calibration tile Gloss and IQ readings appearing on the instruments display. Alternatively, if “Cancel” is selected the display will return to the home screen.

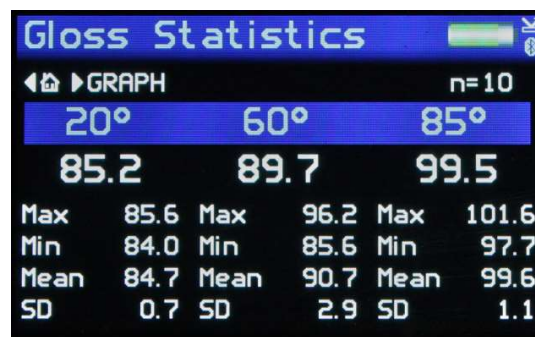
By selecting “Measure” the instrument will perform a measurement and after 3 -4 seconds display the results.

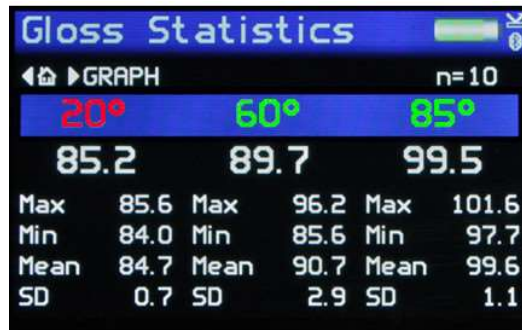


With the pass / fail feature enabled, the Novo-Gloss will compare each measurement angle to user defined tolerances, if the gloss reading is within specification the angle header will be displayed in green. If the reading falls outside the tolerances the header is marked in red.



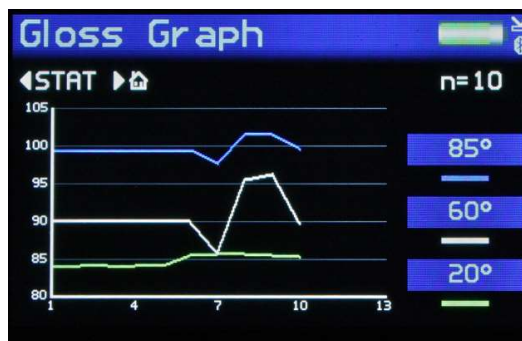
Pressing the Right button in the home screen will access the gloss statistics screen for the current batch for all three angles. Measurements can be taken whilst in this screen and the statistics will be updated.





If the pass / fail feature is enabled, the colour of the angle header indicates if the last reading is within the user defined tolerances.

Pressing the Right button in the gloss statistics screen will access the gloss graph screen providing a graphical representation of the statistics data.



Pressing the Up / Down buttons gloss data can be displayed either all together or individually.

Measurements can be taken whilst in this screen and the graph will be updated after each reading. Pressing the Left button returns the display to the statistics screen.

Pressing the Right button the instrument returns the display to the home screen.

Menu Screen

The Menu Screen is used for quick access to often used options. Pressing the Up and Down buttons navigates through the options, pressing the Enter button selects that option.



Selectable settings in the menu screen are:-

Memory – Set to ON, enables storage and batching of measurement results. The amount of available storage memory is also displayed.

Set to OFF – disables result storage.

With Memory ON:

Delete Last Reading – Delete last measurement, no. of measurements and statistics data updated to previous values.

Start New Batch – Start new batch of readings, Batch name is incremented by 1.

Clear Current Batch – Delete entire batch of measurements for current batch.

Delete All Batches – Delete all batches and measurements stored.

Batch Name – Default name is BATCH, a maximum of 8 user defined batch names can be used as detailed in the “Batching Options” section.

Calibrate Instrument – Perform a calibration of the instrument as detailed under “Operation”.

Switch Off – Turn off the instrument.

Pressing the Left button returns the display to the home screen.

Pressing the Right button will access the Setup screen.

Batching Options

The batching feature allows the user to group measurements together in batches. Each batch has associated statistics; the data for each batch can be accessed by connecting the instrument to a PC.

The current batch name is displayed on the home screen in the bottom left corner, the sample number within that batch is shown in the top right of the screen indicated with n=(sample number).

A new batch is started using the Start New Batch option in either the Menu screen or the Data menu, note that the batch name will increment as will the 'n' indicator.

The current batch can be cleared in either the Menu screen or the Data Menu, the batch name will remain the same but the 'n' indicator will reset to zero.

Auto batch size is user defined using the Auto Batch option in the Data Menu. When the number of readings in the current batch reach the number set by the user the instrument will automatically increment the batch name and set the 'n' indicator to zero.

Viewing Batch Data

To access the stored batch information connect the instrument to a PC using the USB data cable supplied.

A new device name "IQ-METER" can be viewed and accessed via "MY COMPUTER", in this device open the DATA folder. This folder contains subfolders which contain the data for each individual saved batch. Each reading is saved as an individual comma separated value (.csv) that contains Gloss, Haze, DOI/RIQ, RSpec, Time and Date of Reading, Serial Number and Full Goniophotometric data for all 512 diode elements.

Each reading also contains the statistics for the batch up to and including that reading. To access the STATISTICS for the whole batch, the last reading in the batch should be examined.

User Defined Batch Names

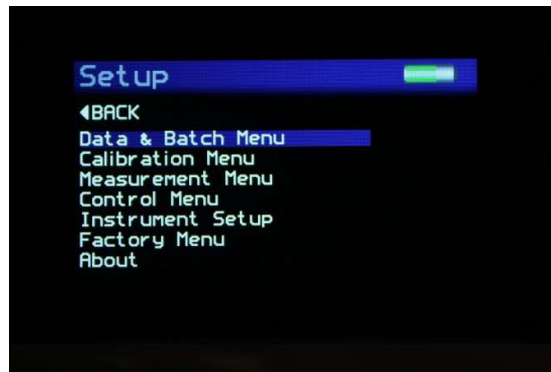
Batch names are user definable. With the instrument connected to a PC, open the folder named "CONFIG". Within this folder there is a document named "batches". This is a .csv file that can be opened in Notepad, Excel or Wordpad.

User defined names should be saved in this document each name listed on a separate line. Ensure that the final line is terminated with a carriage return.

The format of these names should only contain letters, no numbers, spaces or other characters can be used.

Once completed save the file then switch the instrument off and on again to initialize the new batch names.

Setup Screen



The Setup Screen is used to customise the instrument to the user's preference. Pressing the Up and Down buttons navigates through the options, pressing the Enter button selects that option.

Data and Batch Menu - Batch / Data options (See Data & Batch Menu Screen)

Calibration Menu - Calibration options (See Calibration Menu Screen)

Measurement Menu - Geometry setup (See Measurement Menu Screen)

Control Menu - Bluetooth setup (See Control Menu Screen)

Instrument Setup - Language, Date / Time and Power options (Setup Menu Screen)

Factory Menu - Pin locked menu options for Rhopoint authorised service centres

Pressing the Left button returns the display to the home screen.

Data & Batch Screen



The Data & Batch Screen is similar in functionality to that of the menu screen but also allows the selection and setting of the Auto Batch size.

By selecting Auto Batch to ON the batch size can be selected between 1 - 999 by pressing the Left and Right buttons to select the relevant digit and the Up and Down buttons to increment / decrement the value. Pressing the Enter button saves the batch size.

If Batch names have been user defined, as detailed under Batching Options, selection of the Batch Name required is achieved by repeatedly pressing the Enter button with Batch Name selected.

Pressing the Left button returns the display to the home screen.

Calibration Screen



The Calibration Screen is used to setup the instrument calibration to the user's preference. Pressing the Up and Down buttons navigates through the options, pressing the Enter button selects that option.

Selectable settings in the Calibration screen are:-

Calibrate Instrument - Performs an instant calibration of the instrument; a dialogue box being displayed upon completion to either "Cancel" or "Confirm".

Auto Calibration - Set to ON, a dialogue box appears each time a measurement is taken as detailed under Operation.

Set to OFF, the dialogue box is disabled; measurements are made.

Calibrate to - Set to Black - a traceable gloss tile is used as the calibration standard

Set to Mirror - a traceable mirror tile is used as the calibration standard

Tile Value 20, 60, 85 - Set the calibration values for either standard being used for calibration. Pressing the Enter button selects the value. Pressing the Left and Right buttons selects the relevant digit and the Up and Down buttons increment / decrement the value. Pressing the Enter button again saves the value.

Error Detection - The instrument detects the condition of the calibration standard being used.

Set to OFF - Values are still checked against the stored reference but no other error checking is carried out.

Set to CAL - A check is made to see if an appropriate hardware channel is wildly different to what it should be, indicating that the calibration is being attempted on the wrong tile type.

Set to Hz - A check is carried out on the haze value, if this is higher than expected the tile could be dirty.

Set to CAL + Hz - A combination of the two above.

Measurement Screen



The Measurement Screen is used to configure the instruments measurement parameters to the user's preference. Pressing the Up and Down buttons navigates through the options, pressing the Enter button selects that option.

Selectable settings in the Measurement screen are:-

Auto Measure – Enables or disables automatic measurement mode, used for monitoring surfaces for changes over a period of time. Pressing the Enter button selects the required measurement frequency of either 2, 5 or 10 seconds. When auto measure mode is activated a dialogue box is displayed after the Enter button is pressed and before the beginning of the measurement sequence indicating that it is activated. To stop auto measure simply press the Enter button once again at any time during the sequence.

Pass/Fail- Enters the Pass/Fail set up screen.

Range - Selects gloss measuring range to:

Auto – Full range

Black – Standard gloss scale

Mirror - Extended scale for highly reflective materials, polished metals, requires calibration using Mirror standard.

Geometry - Displays the measurement angle either:

60 Single angle mode

20/60 Dual mode

20/60/85 Tri mode (Configurable as 20, 60, 85 individually, 20/60 or 60/85 dual or 20/60/85)

***IQ** - Selects haze information to be either displayed (ON) or not displayed (OFF) on screen-

*Haze – Selects either Haze or logHaze (a more sensitive measurement)

*Haze Compensation – Selects either ON or OFF. Further details of Haze Compensation can be found in the Appearance Theory section of this manual.

Pressing the Left button returns the display to the home screen.

*These options are only available in the Novo-Gloss 20/60/85 with Haze.

Pass/Fail Setup Screen



The pass fail set up screen is used to enable/disable on screen pass/fail indication and set measurement criteria.

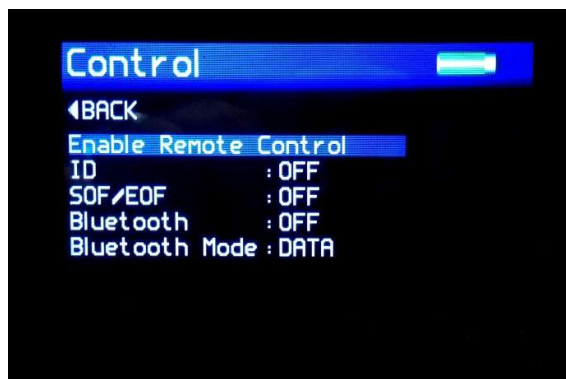
The down key should be used to navigate to the Pass/Fail option and the center button pressed to toggle the feature on and off.

Pressing the right navigation button allows the user to edit pass & fail criteria.

Once the Pass/Fail feature is enabled, any measurement which falls between the max and min values will be considered a pass and its header text will be coloured green. Readings above the max value or below min value will be deemed a fail and header text will be coloured red. Saved data and data transmitted by Bluetooth will also contain a pass/fail field.

Selecting the done option will complete this process.

Control Screen



The Control Screen is used to configure the instruments Bluetooth parameters to the user's preference. Pressing the Up and Down buttons navigates through the options, pressing the Enter button selects that option.

Enable Remote Control is not presently user configurable

Selectable settings in the Control screen are:-

ID - Measurement definition header

SOF / EOF - Start / End of file markers for use in analysis software

Bluetooth – Enables or disables Bluetooth

Bluetooth Mode – Selects Bluetooth data mode:

RC – Remote Control

Data – Basic data transfer mode (transmits On-Screen Parameters)

Data + - Not currently used (for future use)

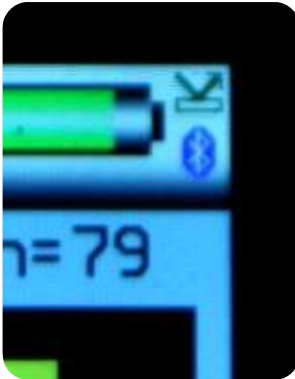
Pressing the Left button returns the display to the home screen.

Bluetooth Communication and Pairing

The Novo-Gloss has a Bluetooth function that allows readings to be instantly transmitted to a compatible PC.

20/60/85° Gloss, Haze & instrument serial number and service/calibration data can be instantly accessed by many PC applications including Excel, Word, Wordpad, OpenOffice or SPC packages.

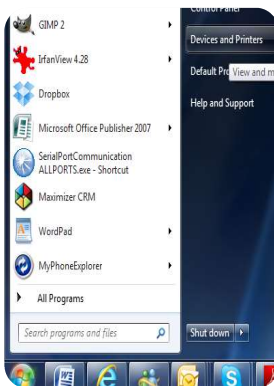
Pairing Procedure



1. Switch on the Novo-Gloss.
2. The Bluetooth icon must be visible to allow pairing.



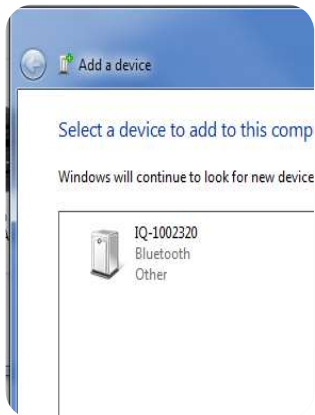
3. If the Bluetooth icon is not visible, enable it as detailed in Control Screen.
Ensure that Bluetooth mode is set to either Data or Data+



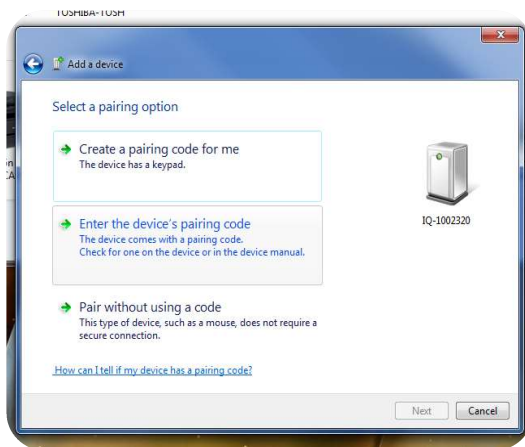
4. In Windows, go to START menu and select "Devices and Printers."

5. In Devices and Printers screen Click "Add a device"





6. Windows will now search for available Bluetooth devices, double click on the icon that corresponds to the Novo-Gloss instrument.

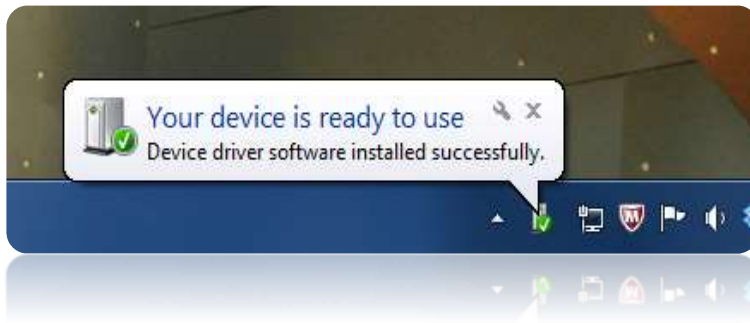


7: Click "Enter the device's pairing code" in the "Add a device" screen.



8: Enter the pairing code "0000".

Make sure the Novo-Gloss remains switched on throughout this process, to disable or extend auto power off refer to instructions detailed in Instrument Setup Screen that follow.



9. The Novo-Gloss is now installed on your PC and ready for connection to the Bluetooth Data Widget.

It is important to wait until windows displays the “Your device is ready to use” message before starting the data widget.

Bluetooth Data Widget Installation Instructions

The Bluetooth (BT) Data Widget software supplied with the instrument is a mini program that converts transmitted measurement data into keystrokes that are automatically input into any open PC program.

1. Install the BT Data Widget software (BTdatawidget.exe) found on the cd supplied with the instrument.



2. Check Bluetooth is switched on and that the instrument has been paired correctly



3. On the desktop click on the “Data Widget” icon to start

4. Click on the blue "refresh" "arrow" to search for paired Novo-Gloss & IQ(s).



5. The buttons are greyed out while the DATA widget searches for SWITCHED ON IQ(s) that have been PAIRED to the PC.



6. Look in the data widget drop down box to see discovered instruments.



7. Select the instrument required.

8. Click the green tick to connect the instrument.



The transmitter icon now appears on the Novo-Gloss.

All readings will now be automatically transferred to any open windows package.

Download example EXCEL spreadsheets from Rhopoint's website.

Instrument Setup Screen



The Instrument Setup screen is used to configure the instruments basic operating environment to the user's preference. Pressing the Up and Down buttons navigates through the options, pressing the Enter button selects that option.

Selectable settings in the Instrument Setup screen are:-

Language – Set instrument language to English (default), Spanish, Italian, French, German, Chinese

Screen View – Set the orientation of the screen as NORMAL, or INVERTED

Backlight – Set screen intensity to either 20%, 40%, 60%, 80% or 100% brightness

Power Off – Set instrument to automatically power off after either 30sec, 60sec, 90 sec or 120 sec or inactivity or DISABLE this feature

Power Switch – Set On/Off button to switch the instrument ON ONLY or to switch it ON & OFF

Sound – Enable or disable button press sound

USB Charge – Set the USB charge current to either 500mA or 100/500mA

Set Date & Time – Set the date and time on the instrument. Press the DOWN button to set time. Pressing the Left and Right buttons selects the date or time and the Up and Down buttons increment / decrement the value. Pressing the Enter button again saves the value.

Pressing the Left button returns the display to the home screen

Maintenance Screen

The Maintenance screen is used by Rhopoint Approved Service Centres.
It is PIN locked to prevented unauthorised access.
There are no user configurable settings available in this menu.

Pressing the Enter button returns the display to the home screen

About Screen

The About screen is for information only.
It provides information relating to the instruments software, the instrument serial number and last date of Factory Calibration.
It also shows the amount of free memory available and battery power status.

Appearance Theory

Rhopoint Novo-Gloss Glossmeter

Why is reflected appearance important?

A crucial factor in assessing the appearance of any manufactured product is the “glossiness” of its finish.

Gloss finishes are often used make products visually appealing. Highly reflective, extremely smooth finishes are used to enhance the aesthetics of cars, luxury yachts and high end consumer electronics. Matt finishes are used for contrast or on furniture and architectural features.

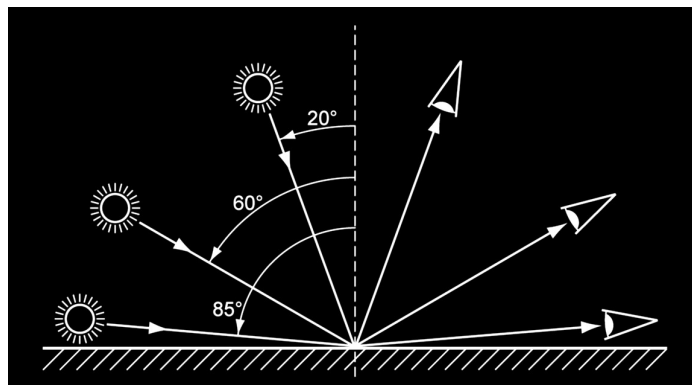
Gloss

Gloss is the visual sensation associated with the brightness of direct light reflected in a surface. Surfaces with high reflectance are determined as glossy; less reflective surfaces are semi-gloss or matt.

Glossmeters quantify this effect by measuring light reflection from a sample at defined angles.

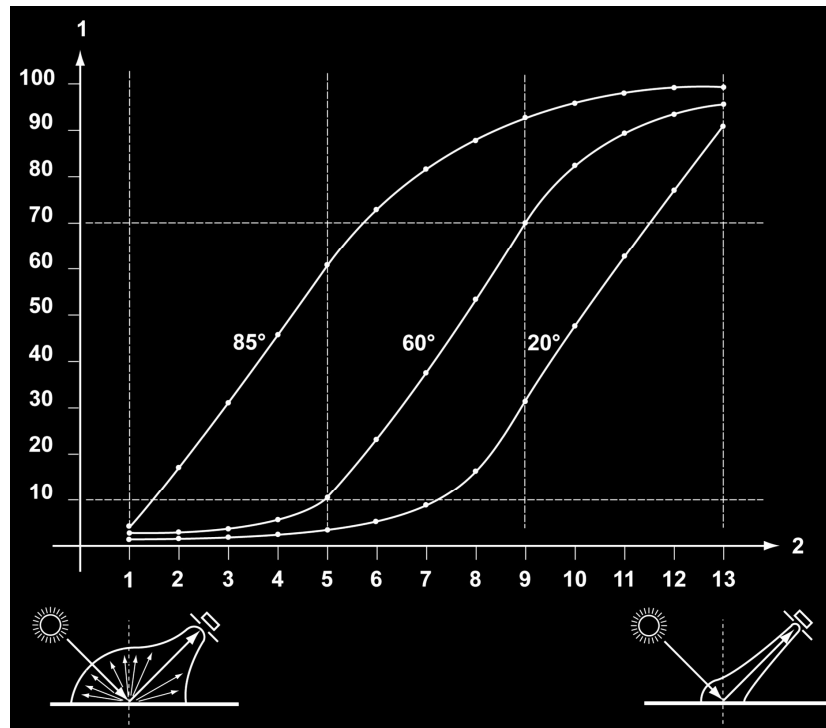
The Gloss Unit (GU) is defined in international standards including ISO 2813 and ASTM D523. It is determined by the amount of reflected light from a glass standard of known refractive index.

Calibration tiles supplied with Rhopoint instruments are traceable to master glass standards held at NIST (USA).



The measurement angles most commonly used for gloss are 20°, 60° and 85°.

- The most appropriate angle should be selected dependent on the glossiness of the sample surface.
- Using the correct measurement geometry increases resolution and improves the correlation of results with human perception of quality.



Graph showing 13 painted panels visually assessed and ranked for gloss, the measured values show 85° has improved resolution for low gloss, 60° is best suited for mid gloss and 20° should be used for high gloss.

To determine the correct measurement angle the surface should be assessed with the 60° geometry-

- Matt surfaces which measure below 10 GU @ 60° should be re-measured with the 85° angle.
- High gloss surfaces which measure above 70 GU @ 60° should be assessed using the 20° angle.
- The 60° angle is suitable for use on mid gloss samples 10-70 GU.

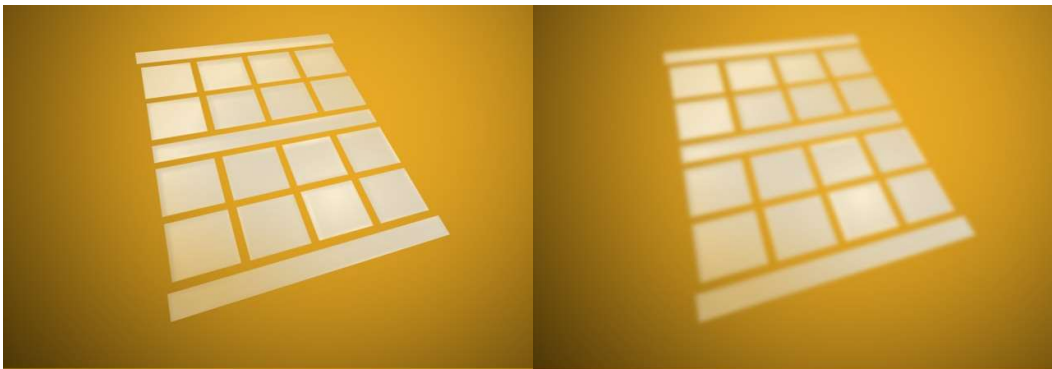
Haze*

Haze describes the milky halo or bloom seen on the surface of high gloss surfaces.

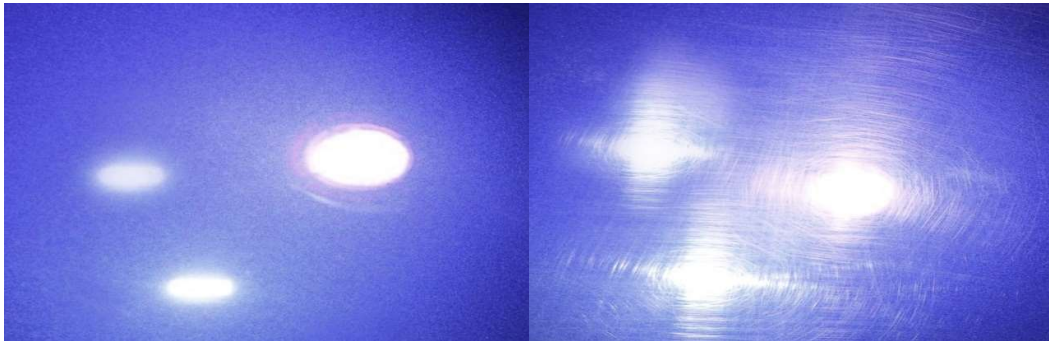
Surface haze can be problematic in most coating applications including automotive manufacture, powder coatings and other high gloss coatings. It can be attributed to a number of causes including incompatible materials in a formulation, poor dispersion and problems encountered during drying/curing/stoving.

Coatings without haze can be seen to have a deep reflection and have high reflected contrast. Those with haze exhibit a slight “milky” finish which can be seen over the highly glossy surface.

Haze is caused by microscopic surface texture which diffuses light adjacent to the main component of the reflected light.



When viewing the reflection of a strong light source in a surface with high haze the image “blooms” and has a bright halo around it.



Haze is an important measure for highly polished metals and is often associated with polishing marks and machining direction.

Gloss-haze meters are traditionally used to measure this parameter and use a standard glossmeter design with additional light stops and diodes to measure the haze component 2° either side of the specular component.

Measuring Haze with the Novo-Gloss

Gloss Haze values are calculated using the angular tolerances described in ASTM E430. The instrument can display the natural haze value (HU) or Log Haze Value (HU_{LOG}).

When measuring haze values, higher numbers indicate a lower quality surface.

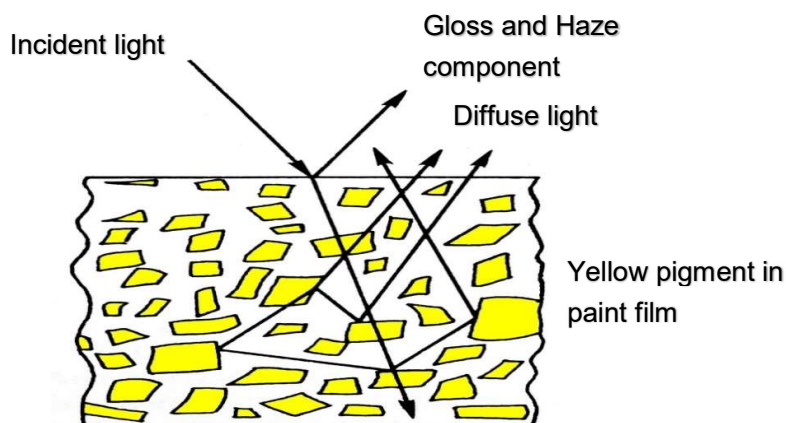
A high gloss surface with zero haze has a deep reflection image with high contrast.

Log Haze Values are commonly quoted for paints and coatings as this scale has better corroboration with human perception of surface quality.

Haze Compensation

Reflection haze is caused by micro texture on a surface which causes a small amount of light to be reflected adjacent to the gloss angle. For white surfaces, bright colours and metallics, a certain amount of diffuse light, reflected from within the material, is also present in this region.

This diffuse light exaggerates the haze signal for these surfaces causing higher than expected readings.

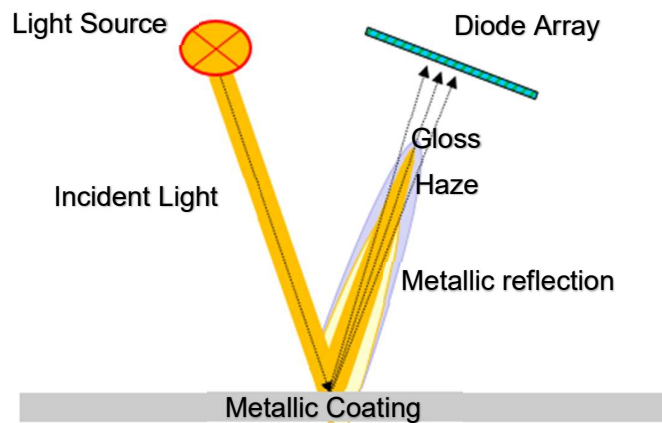


The Novo-Gloss compensates for reflection from within the coating for highly reflective pigments, metallic coatings and speciality pigments, allowing the haze of any painted surface to be measured.

Corrected haze measurement on metallic coatings

For non metallic surfaces, the diffuse component is lambertian- it is equal in amplitude at all angles in relation to the sample surface. Conventional gloss-hazemeters measure diffuse reflection using a luminosity sensor positioned away from the gloss angle. Luminosity is subtracted from the haze signal allowing non metallic surfaces measured independent of their colour.

Conventional gloss-haze meters do not work correctly on metallic coatings as metallic flake within the coating reflects the light directionally around the specular angle. As little or no metallic reflection is present at the angle at which the luminosity is measured, metallic coatings and specialiy pigments have an unexpectedly high haze reading.



The Novo-Gloss captures compensation information from a region adjacent to the haze measurement angle, this means it can be used on metallic coatings which reflect light directionally

An advantage of the Novo-Gloss is that unlike a conventional instrument, compensation is calculated using a region adjacent to the haze angle. This techniques gives compatible readings on solid colours but also compensates for directional reflection from metallic coatings and speciality pigments

*This is option only available in the Novo-Gloss 20/60/85 with Haze

Technical Specification

GLOSS MEASUREMENT SPECIFICATION

60°, 20/60°, 20/60/85° and 20/60/85° with Haze Versions Available

Resolution 0.1 GU

STANDARDS: ISO 2813, ASTM D523, ASTM D2457, DIN 67530, JIS 8741, ISO 7668

GLOSS CALIBRATION STANDARD

BAM Traceable

Uncertainty: 0.1 GU.

HAZE MEASUREMENT SPECIFICATION

Near Specular Reflectance measured at 17-19°, 21-23°

Switchable between Haze Units (HU) and Log Haze Units (LogHU)

Resolution: 0.1 HU • Repeatability: 0.2 HU • Reproducibility: 0.5 HU

STANDARDS, ASTM E430, ISO 13803

Instrument Specification

Colour Screen

- Adjustable Brightness 6 Button Touch Sensitive Interface

Construction

- Aluminium soleplate & standard holder.
- Aluminium Optic chassis (20/60/85°), Injection moulded chassis (60° & 20/60°) standard holder.
- Integrated calibration holder with in position detector

Statistical Analysis

- Max, Min, Mean, S.D.
- All measured Parameters

Graphical Analysis

- On board trend analysis- Gloss Values

Power

- Rechargeable Lithium Ion
- >8 Hours operation
- >10,000 Readings/Charge

Recharge Time

- 4 Hrs.

Memory

- 8 MB– >999 Readings
- User definable batching

Data Transfer

- Bluetooth
- PC compatible
- USB Connection
- No software install required

Dimensions & Weight

- 65 x 140 x 50mm (H x W x D)
- 790g

EU DECLARATION OF CONFORMITY

WE Rhopoint Instruments Ltd, Beeching Road, Bexhill on Sea, East Sussex, TN39 3LG

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS

Rhopoint NG 60, 20/60, 20/60/85, NG Trio 2

**TO WHICH THIS DECLARATION RELATES ARE IN CONFORMITY WITH THE
FOLLOWING STANDARDS**

EN 61326-1 2006

EN 301 489-1 v1.9.2

EN 301 489-17 v2.1.1

EN 61010-1: 2010

FOLLOWING THE PROVISIONS OF DIRECTIVES

2004/108/EC EMC Directive

1999/5/EC R&TTE Directive

2006/95/EC Low Voltage Directive

Rhopoint Instruments Ltd

01th September 2013



Tony Burrows, Managing Director