RHOPOINT
INSTRUMENTS

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RHOPOINT NOVO-GLOSS™



Novo-Gloss Glossmeters

- 60° Glossmeter
- 20/60/85° Glossmeter
- 20/60/85° Glossmeter with Haze
- 45° Glossmeter

Why measure gloss?



The gloss level of an object is one of the visual attributes used by a consumer to determine whether or not that object is fit for purpose.

Gloss has been defined as 'The attribute of surfaces that causes them to have shiny or lustrous, metallic appearance.'

Manufacturers design their products to have maximum appeal: from highly reflective car body panels to glossy household appliances or matt finish automotive interior trim.

This is especially noticeable where parts may be produced by different manufacturers or factories but will be placed adjacent to one another to create the finished product.

It is important therefore that gloss levels are achieved consistently on every product or across different batches of products.





Gloss can also be a measure of the quality of the surface, for instance a drop in the gloss of a coated surface may indicate problems with its cure, leading to other failures such as poor adhesion or lack of protection for the coated surface.

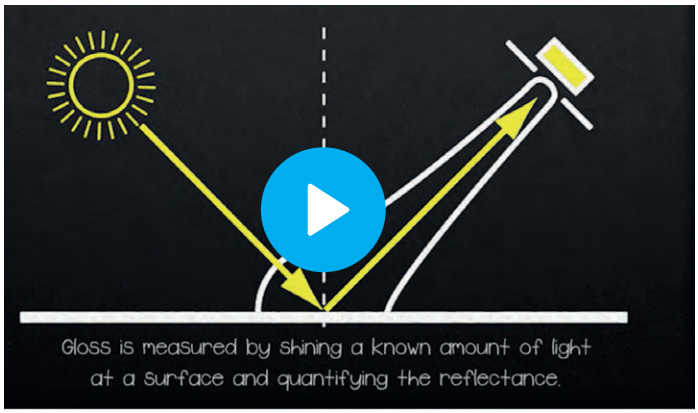


The gloss of a surface can be greatly influenced by a number of factors, for example the smoothness achieved during polishing, the amount and type of coating applied or the quality of the substrate.

It is for these reasons that many manufacturing industries monitor the gloss of their products, from cars, printing and furniture to food, pharmaceuticals and consumer electronics.

How is gloss measured?

Gloss is measured by shining a known amount of light at a surface and quantifying the reflectance.



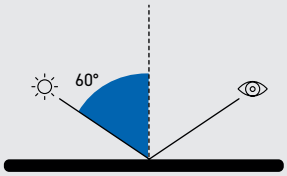
The angle of the light and the method by which the reflectance is measured are determined by the surface material and which aspect of the surface appearance is to be measured.

Which angle should I use for my application?

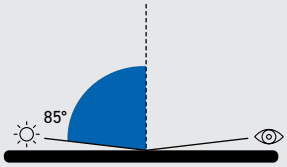
ISO 2813 and ASTM D523 (the most commonly used standards) describe three measurement angles to measure gloss across all surfaces.

Gloss is measured in gloss units (GU) and is traceable to reference standards held at NIST (USA).



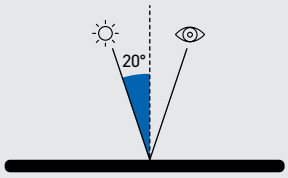


Universal Measurement Angle: 60°
All gloss levels can be measured using the standard measurement angle of 60°. This is used as the reference angle with the complimentary angles of 85° and 20° often used for low and high gloss levels respectively.



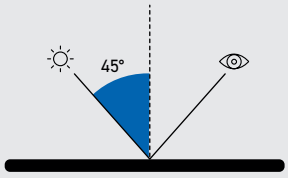
Low Gloss: 85°
For improved resolution of low gloss a grazing angle of 85° is used to measure the surface. This angle is recommended for surfaces which measure less than 10GU when measured at 60°.

This angle also has a larger measurement spot which will average out differences in the gloss of textured or slightly uneven surfaces.



High Gloss: 20°
The acute measurement angle of 20° gives improved resolution for high gloss surfaces. Surfaces that measure 70GU and above at the standard angle of 60° are often measured with this geometry.

The 20° angle is more sensitive to haze effects that affect the appearance of a surface.



Speciality measuring angle: 45°
This measuring angle is in accordance with the ISO 2457 standard for the gloss measurement of plastic films and solid plastic parts as well as according to the standard ASTM C346 for the gloss measurement of ceramics

To quantify haze, distinctness of image, reflected image quality and other surface texturing please consider the Rhopoint IQ.

Why measure haze?

Haze can be described as *near specular* reflection. It is caused by a microscopic surface structure which slightly changes the direction of a reflected light causing a bloom adjacent to the specular (gloss) angle. The surface has less reflective contrast and a shallow milky effect.

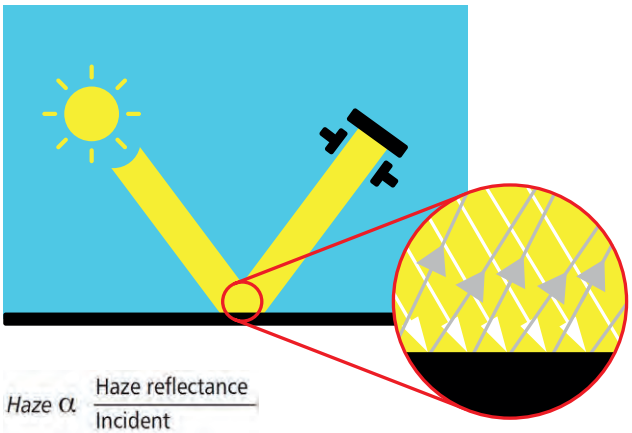


In the coatings industry, this microscopic surface texture is often due to poorly dispersed raw materials, incompatible raw materials or oxidisation and weathering. For polished metal surfaces, haze is often associated with polishing marks or chemical residue.

Haze

Haze is light that has been reflected by small surface structures adjacent to the main specular component.

Reflectance haze – An optical effect caused by microscopic texture or residue on a surface.



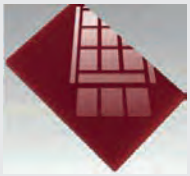
$$\text{Haze } \alpha \frac{\text{Haze reflectance}}{\text{Incident}}$$



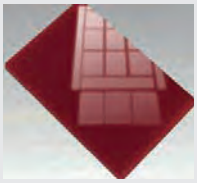
Reflection haze

Reflection haze is an optical phenomenon usually associated with high gloss surfaces.

It is a common surface fault that reduces appearance quality. A hazy surface has a visibly shallower reflection with a milky finish and halos appear around reflections of strong light sources.



Sample 1
No Haze, deep reflection



Sample 2
High Haze, 'shallow' finish

A high gloss finish with haze exhibits a milky finish with low reflective contrast, reflected highlights and lowlights are less pronounced.



Sample 3
Low Haze



Sample 4-
Higher Haze

On surfaces with haze, halos are visible around the reflections of strong light sources.

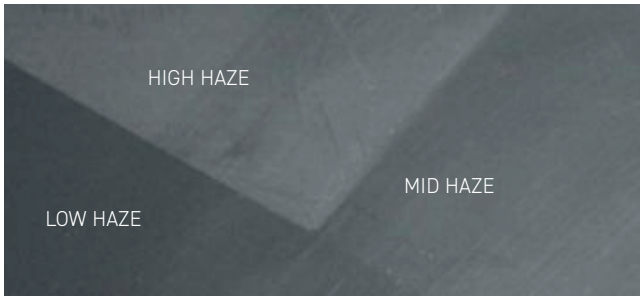


Causes of Haze

Coating & Raw Materials
- Dispersion
- Pigment properties
- Particle size
- Binder compatibility
- Influence and migration of additives
- Resin types and quality

Curing
- Drying conditions
- Cure temperature

Post Coating
- Polishing marks
- Cleanliness
- Ageing and oxidisation



Haze: Often visible as milky finish on high gloss surfaces

Gloss and haze measurement with array technology

The Novo-Gloss 20/60/85 version with haze uses a 512 element linear diode array which profiles reflected light in a large arc from 14° to 27°.

The instrument processes this high resolution data, selecting individual elements within the array that equate to the angular tolerences outlined in international measurement standards.

In a single 20° measurement, the following calculations are made:

$$\text{Gloss} = \frac{\sum \text{Pixels between } 20° \pm 0.9° \text{ (sample)}}{\sum \text{Pixels between } 20° \pm 0.9° \text{ (standard)}}$$

$$\text{Haze} = 100 * \frac{\sum \text{Pixels from } 17° \text{ to } 19° \text{ (sample)} + \sum \text{Pixels from } 21° \ 23° \text{ (sample)}}{\text{Specular Gloss (standard)}}$$

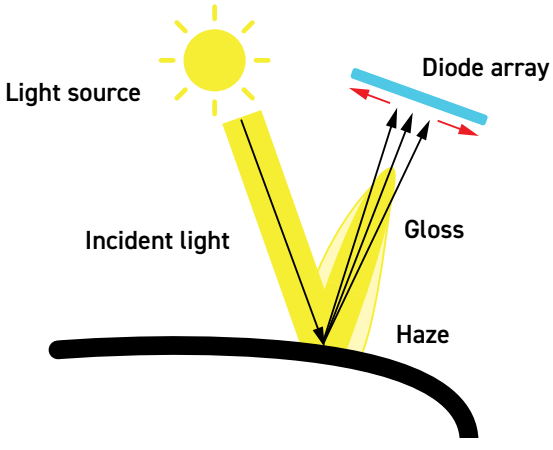
$$\text{logHaze} = 1285\ (\log10((\text{Haze}/20)+1))$$

Curved surface adjustment

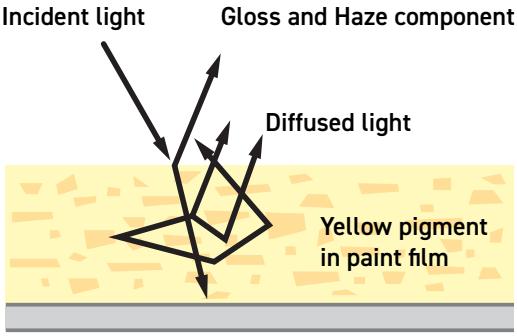
A major advantage of the Novo-Gloss 20/60/85 version with haze is that it automatically compensates for curved or textured sample surfaces by virtually adjusting the measurement position.

Conventional gloss-hazemeters have fixed optics which can make measurement unreliable as any sample curvature will reflect light away from the centre of the measurement sensor causing errors.

The Novo-Gloss 20/60/85 version with haze automatically adjusts the sensor position by detecting the peak of the reflected light. The laws of reflection state that the incident angle is equal to the reflection angle thus the peak equates exactly to the 20° gloss angle.



The Novo-Gloss 20/60/85 version with haze automatically adjusts for non-flat surfaces by sensing the reflected peak and virtually adjusting the position.



The Novo-Gloss 20/60/85 version with haze 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.

Diffuse corrected measurement with array technology*

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.

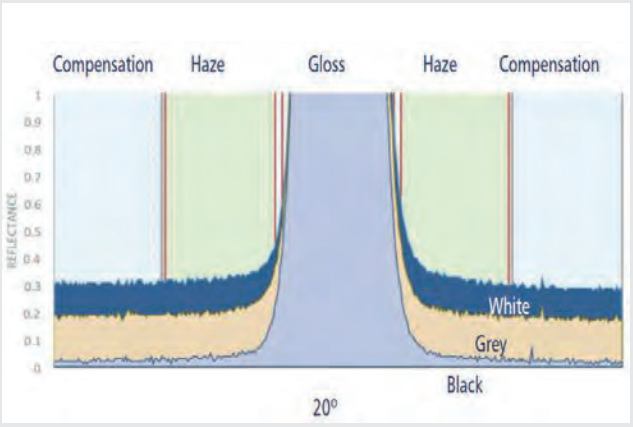
For white surfaces, bright colours and metallics, a certain amount of diffuse light, reflected from within the material, is also present in this region.

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

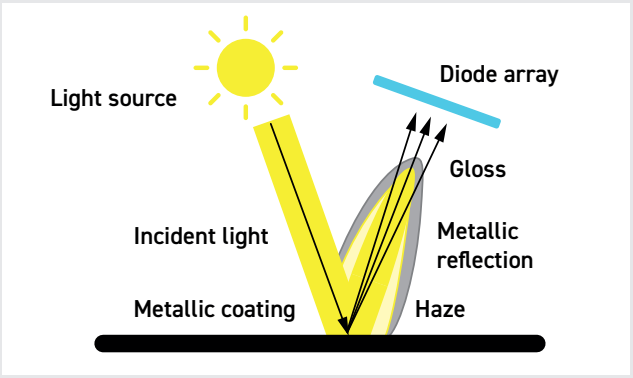
* Only enabled when the instruments is set to haze measuring mode of ASTM E430

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 to be measured independently of their colour.



Goniophotometric information profiling the reflection from white, grey and black panels with an identical topcoat.



The Novo-Gloss 20/60/85 version with haze captures compensation information from a region adjacent to the haze measurement angle. This means it can be used on metallic coatings which reflect light.

An advantage of the Novo-Gloss 20/60/85 version with haze is that unlike a conventional instrument, compensation is calculated using a region adjacent to the haze angle. This technique gives compatible readings on solid colours but also compensates for directional reflection from metallic coatings and speciality pigments.



Rhopoint Novo-Gloss range of glossmeters

Single 60°, Single 45°, Trio 20/60/85° and Trigloss 20/60/85° with haze versions for maximum accuracy and resolution in all gloss applications.



Novo-Gloss 60



Novo-Gloss 45



Novo-Gloss Trio



Novo-Gloss 20/60/85 with Haze

Model	20° Gloss HIGH GLOSS	45° Gloss SPECIALITY ANGLE	60° Gloss ALL GLOSS FINISHES	85° Gloss LOW GLOSS FINISHES	Haze ASTM E430	Haze ASTM D4039	
Novo-Gloss 60	-	-	✓	-	-	-	Shop
Novo-Gloss 45	-	✓	-	-	-	-	Shop
Novo-Gloss Trio	✓	-	✓	✓	-	-	Shop
Novo-Gloss 20/60/85 with Haze	✓	-	✓	✓	✓	✓	Shop

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RHOPOINT NOVO-GLOSS™



The Rhopoint Novo-Gloss

Applications

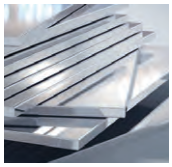

Paints and Coatings


Yacht Manufacturers


Automotive Re-finish


Smart devices, PC & Laptop Covers

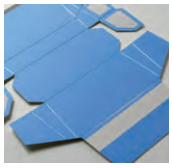

Furniture


Metal Polishers


Polished Stone


Wood Coatings


Automotive

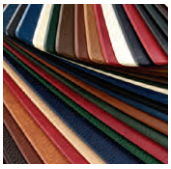

Printed Cartons


Plastics Industry


Printing Ink


Aerospace


Detailing

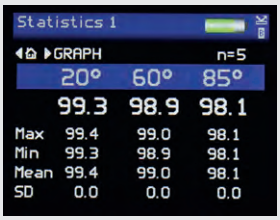

Textile


Powder Coating

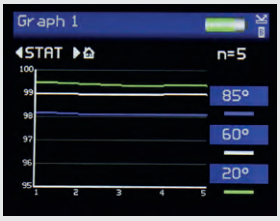
Features



Measurement
Simultaneous measurement of all parameters in GU or % reflectivity, date and time stamped.



Statistics
Displays full statistics for the readings in the current batch.



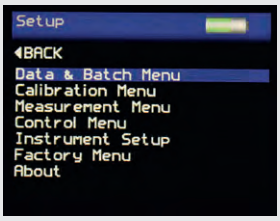
Graphical
Graphical reporting for quick trend analysis.



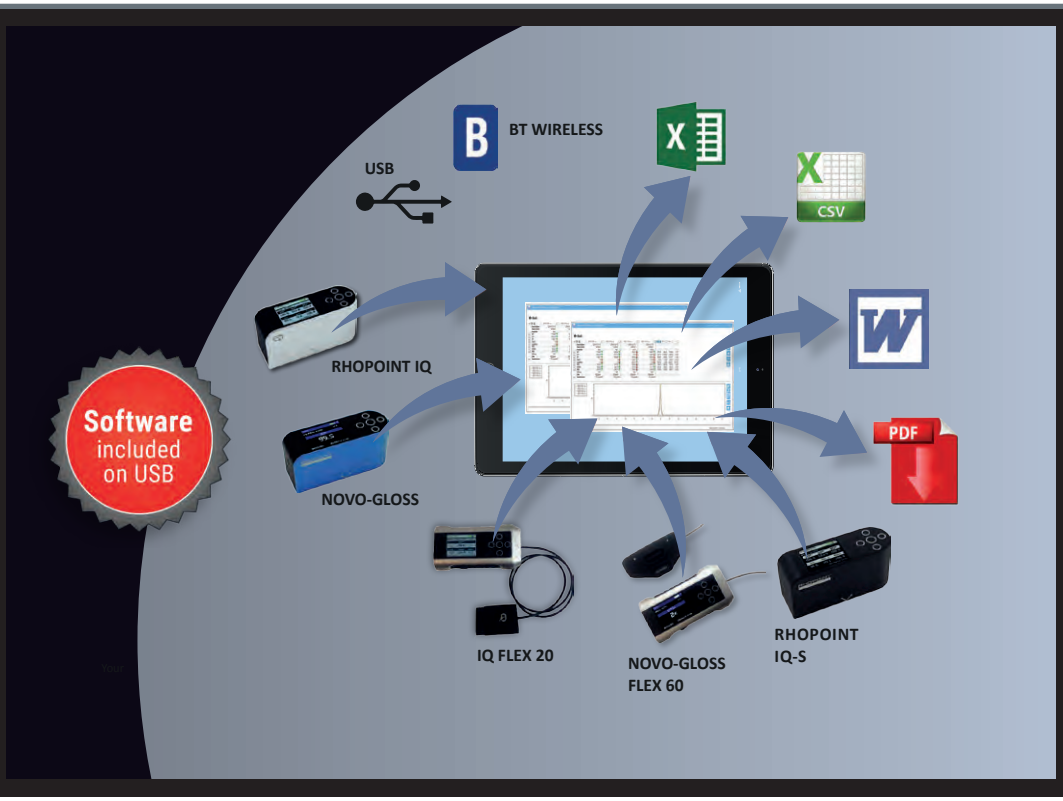
Parameters
Pass / fail parameters can be defined for instant identification of non-conformances.



Automatic Measurement
Automatic measurements at pre-defined intervals for easy checking of large surface areas.



Batch Names
User definable batch names and batch sizes for quicker and more efficient reporting.



Data analysis and transfer

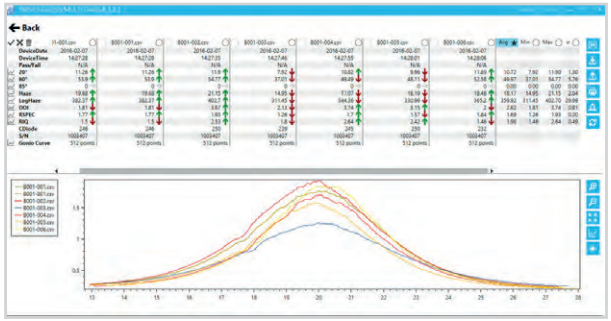
Software-free data transfer
USB connection to PC instantly recognises the device as a drive location which facilitates the quick transfer of .CSV files using Windows Explorer or similar.



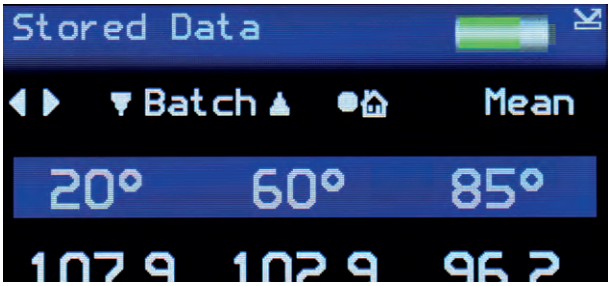
Direct data input via BT wireless
Instantly transmit measured readings directly to programs such as MS Excel on your PC / tablet to greatly simplify the reporting process.



Statistical analysis via Novo-Gloss Multi Gauge software
The included software provides an easy means to measure, import and compare data and export the measurements into several other file formats, e.g. PDF, Excel® or CSV.



View and inspect data saved on the instrument



Specifications

20° Gloss		
Range (GU)	0–100	100-2000
Repeatability	0.2 (GU)	0.2 %
Reproducibility	0.5 (GU)	0.5 %
Resolution (GU)	0.1	
Measurement Area	6.0 x 6.4 (mm)	
Standards	ISO 2813 ASTM D523 ISO 7668 ASTM D2457 IN 67530 JIS Z 8741	

Recommended product

- Novo-Gloss Trio
- Novo-Gloss 20/60/85 with Haze

45° Gloss		
Range (GU)	0-100	100-1000
Repeatability	0.2 (GU)	0.2%
Reproducibility	0.5 (GU)	0.5 %
Resolution (GU)	0.1	
Measurement Area	8 x 12mm ellipse	
Standards	ASTM D2457 ASTM C346	

Recommended product

- Novo-Gloss 45

60° Gloss			
Range (GU)	0–10	10–100	100–1000
Repeatability	0.1 (GU)	0.2 (GU)	0.2%
Reproducibility	0.2 (GU)	0.5 (GU)	0.5 %
Resolution (GU)	0.1		
Measurement Area	6.0 x 12.0 (mm)		
Standards	ISO 2813 ASTM D523 ISO 7668 ASTM D2457 IN 67530 JIS Z 8741		

Recommended product

- Novo-Gloss 60
- Novo-Gloss Trio
- Novo-Gloss 20/60/85 with Haze

85° Gloss		
Range (GU)	0–100	100–199
Repeatability	0.2 (GU)	0.2 %
Resolution (GU)	0.1	
Measurement Area	4.4 x 44.0 (mm)	
Standards	ISO 2813 ASTM D523 ISO 7668 ASTM D2457 IN 67530 JIS Z 8741	

Recommended product

- Novo-Gloss Trio
- Novo-Gloss 20/60/85 with Haze

Haze	
Range (Log HU)	0-500
Repeatability (Log HU)	1
Reproducibility (Log HU)	10
Resolution	0.1
Measurement Area	6.0 x 6.4 (mm)
Standards	ASTM E430 ASTM D4039

Recommended product

- Novo-Gloss 20/60/85 with Haze

Specifications

Battery Type	Rechargeable lithium ion
Operation (hours)	17+
Readings per charge	20.000+
Memory	8MB, 2,000 readings
Operating Temperature	15-40°C (60-104°F)
Operating Humidity	Up to 85%, non condensing
Commodity Code	9027 5000

Dimensions & Weights

Dimensions	65mm x 140mm x 50mm (H x W x D)
Instrument Weight	390 g
Packed weight	1.6 kg
Packed dimensions	110mm x 280mm x 220mm (H x W x D)

Order Codes

Novo-Gloss 60	A4000-008
Novo-Gloss Trio 20/60/85	A4000-006
Novo-Gloss 20/60/85 with Haze	A4000-009
Novo-Gloss 45	A4000-011

Free extended warranty
please register your product at **www.rhopointinstruments.com/instrument-registration**

Free light source warranty
Guaranteed for the life of the instrument.

Calibration and service
Fast and economic service via our global network of accredited calibration and service centres. Please visit **www.rhopointinstruments.com/authorised-service-centres/** for detailed information.

Languages:

BRITISH COATINGS FEDERATION

Included accessories

- Certified calibration tile with certificate
- USB data cable
- Wrist strap
- Novo-Gloss Multi Gauge software
- Instructional videos
- USB data stick
  - Instruction manual
  - BT wireless data app
  - Example Excel spreadsheets







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