Novo-Gloss Glossmeters

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

Manufactured by Rhopoint Instruments in the United Kingdom
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 ASTM D2457 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.

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.

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

On surfaces with haze, halos are visible around the reflections of strong light sources.
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 tolerances outlined in international measurement standards.

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

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

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

\[
\text{logHaze} = 1285 \log_{10}(\frac{\text{Haze}}{20}+1).
\]

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.

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: Often visible as shiny finish on low gloss surfaces

HIGH HAZE

LOW HAZE

MID HAZE

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

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

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

\[
\text{logHaze} = 1285 \log_{10}(\frac{\text{Haze}}{20}+1).
\]
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.

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
Rhoptooint 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.

<table>
<thead>
<tr>
<th>Model</th>
<th>20° Gloss HIGH GLOSS</th>
<th>45° Gloss SPECIALITY ANGLE</th>
<th>60° Gloss ALL GLOSS FINISHES</th>
<th>85° Gloss LOW GLOSS FINISHES</th>
<th>Haze ASTM E430</th>
<th>Haze ASTM D4039</th>
<th>Shop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novo-Gloss 60</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Shop</td>
</tr>
<tr>
<td>Novo-Gloss 45</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Shop</td>
</tr>
<tr>
<td>Novo-Gloss Trio</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>Shop</td>
</tr>
<tr>
<td>Novo-Gloss 20/60/85 with Haze</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Shop</td>
</tr>
</tbody>
</table>
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
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

<table>
<thead>
<tr>
<th>Temperature</th>
<th>RH OPO IN T</th>
<th>IQ-S</th>
<th>RH OPOINT IQ-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°</td>
<td>107.9</td>
<td>102.9</td>
<td>96.2</td>
</tr>
<tr>
<td>60°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85°</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stored Data

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Stored Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°</td>
<td>107.9</td>
</tr>
<tr>
<td>60°</td>
<td>102.9</td>
</tr>
<tr>
<td>85°</td>
<td>96.2</td>
</tr>
</tbody>
</table>
# Specifications

## 20° Gloss

<table>
<thead>
<tr>
<th>Specification</th>
<th>0–100</th>
<th>100–2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range (GU)</td>
<td>0.2 (GU)</td>
<td>0.2%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.5 (GU)</td>
<td>0.5%*</td>
</tr>
<tr>
<td>Resolution (GU)</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Measurement Area</td>
<td>6.0 x 6.4 (mm)</td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>ISO 2813</td>
<td>ASTM D523</td>
</tr>
</tbody>
</table>

## 45° Gloss

<table>
<thead>
<tr>
<th>Specification</th>
<th>0–60</th>
<th>60–1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range (GU)</td>
<td>0.2 (GU)</td>
<td>0.2%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.5 (GU)</td>
<td>0.5%*</td>
</tr>
<tr>
<td>Resolution (GU)</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Measurement Area</td>
<td>8 x 12mm ellipse</td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>ASTM D2457</td>
<td>ASTM C346</td>
</tr>
</tbody>
</table>

## 60° Gloss

<table>
<thead>
<tr>
<th>Specification</th>
<th>0–10</th>
<th>10–100</th>
<th>100–1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range (GU)</td>
<td>0.2 (GU)</td>
<td>0.5 (GU)</td>
<td>0.5%*</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.1 (GU)</td>
<td>0.2 (GU)</td>
<td>0.2%</td>
</tr>
<tr>
<td>Resolution (GU)</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement Area</td>
<td>6.0 x 12.0 (mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>ISO 2813</td>
<td>ASTM D523</td>
<td>ISO 7668</td>
</tr>
</tbody>
</table>

## 85° Gloss

<table>
<thead>
<tr>
<th>Specification</th>
<th>0–100</th>
<th>100–199</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range (GU)</td>
<td>0.2 (GU)</td>
<td>0.2%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.5 (GU)</td>
<td>0.5%*</td>
</tr>
<tr>
<td>Resolution (GU)</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Measurement Area</td>
<td>4.4 x 44.0 (mm)</td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>ISO 2813</td>
<td>ASTM D523</td>
</tr>
</tbody>
</table>

## Haze

<table>
<thead>
<tr>
<th>Specification</th>
<th>0–500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeatability (Log HU)</td>
<td>1</td>
</tr>
<tr>
<td>Reproducibility (Log HU)</td>
<td>10</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1</td>
</tr>
<tr>
<td>Measurement Area</td>
<td>6.0 x 6.4 (mm)</td>
</tr>
<tr>
<td>Standards</td>
<td>ASTM E430</td>
</tr>
</tbody>
</table>

* A mirror gloss calibration standard is required to achieve this reproducibility
Specifications

**Instrument Information**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Type</td>
<td>Rechargeable lithium ion</td>
</tr>
<tr>
<td>Operation (hours)</td>
<td>17+</td>
</tr>
<tr>
<td>Readings per charge</td>
<td>20,000+</td>
</tr>
<tr>
<td>Memory</td>
<td>8MB, 2,000 readings</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>15-40°C (60-104°F)</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>Up to 85%, non condensing</td>
</tr>
<tr>
<td>Languages</td>
<td>English, French, German, Italian, Spanish</td>
</tr>
<tr>
<td>Commodity Code</td>
<td>9027 5000</td>
</tr>
</tbody>
</table>

**Dimensions & Weights**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>65mm x 140mm x 50mm (H x W x D)</td>
</tr>
<tr>
<td>Weight</td>
<td>390g</td>
</tr>
<tr>
<td>Packed weight</td>
<td>1.6kg</td>
</tr>
<tr>
<td>Packed dimensions</td>
<td>110mm x 280mm x 220mm (H x W x D)</td>
</tr>
</tbody>
</table>

**Included Accessories**

- Instrument calibration certificate
- ISO 17025 UKAS tile calibration certificate
- USB data & mains cable
- Instruction manual
- Bluetooth data app
- Example Excel spreadsheets
- Novo-Gloss Multi Gauge software
- Instruction videos
- High gloss calibration standard with cleaning cloth
- Sample positioning template, wrist strap, quick start guide

**Order Codes**

- Novo-Gloss 60: A4000-008.1
- Novo-Gloss Trio 20/60/85: A4000-006.1
- Novo-Gloss 20/60/85 with Haze: A4000-009.1
- Novo-Gloss 45: A4000-011.1
- Mirror gloss calibration standard: B6000-101.1

To ensure accurate and reliable results, Rhopoint Novo-Gloss Instruments are supplied with standards calibrated and certified according to ISO 17025 UKAS.

Free extended 2 year warranty:
Requires registration at [www.rhopointinstruments.com](http://www.rhopointinstruments.com) within 28 days of purchase. Without registration, 1 year standard warranty applies.

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](http://www.rhopointinstruments.com) for detailed information.
TRY BEFORE YOU BUY

We offer two options for you to try out the Novo-Gloss Glossmeters before buying

1. **Online demonstration**: Online presentation of the Novo-Gloss with your samples measured LIVE on Zoom, Microsoft Teams or Skype. Includes a consultation with an application specialist.

2. **Factory sample testing**: Send in samples of your material for testing and receive a comprehensive test report.

Arrange a demo

Ready to receive a quote?  
Click here

---

Rhopoint Instruments Ltd  
Rhopoint House, Enviro 21 Park,  
Queensway Avenue South,  
St Leonards on Sea, TN38 9AG, UK  
T: +44 (0)1424 739 622  
E: sales@rhopointinstruments.com  
www.rhopointinstruments.com

Rhopoint Americas Inc.  
1000 John R Road,  
Suite 209, Troy,  
MI 48083, USA  
T: 1.248.850.7171  
E: sales@rhopointamericas.com  
www.rhopointamericas.com

Rhopoint Instruments GmbH  
Seebauer Office Center,  
Am Weigfeld 24,  
83629 Weyarn, Deutschland  
T: +49 8020 9214-988  
E: info@rhopointinstruments.de  
www.rhopointinstruments.de

All images are for illustrative purposes only

E&OE ©Rhopoint Instruments Ltd. June 2023