

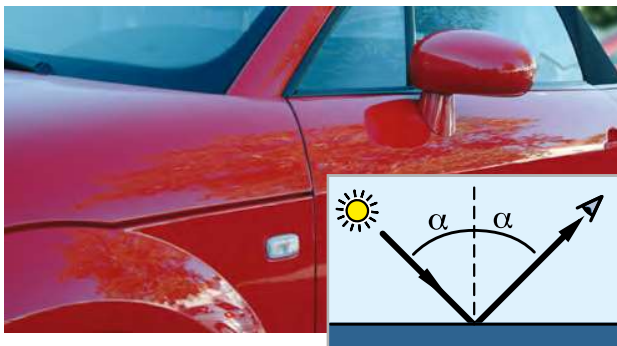
Introduction

Gloss Measurement

Gloss is a visual impression resulting from surface evaluation. The more direct light is reflected, the more obvious the impression of gloss will be.

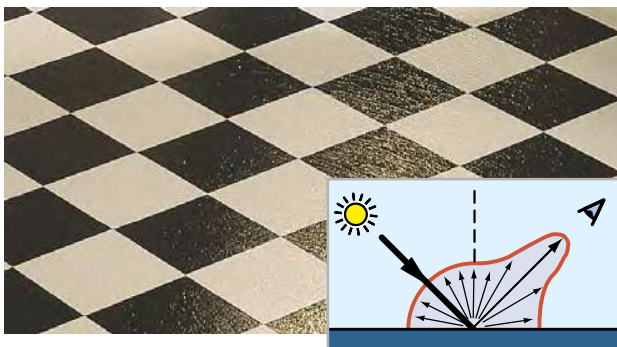
High Gloss

Smooth and highly polished surfaces reflect images distinctly. The incident light is directly reflected on the surface, i.e. only in the main direction of reflection. The angle of incidence is equal to the angle of reflection.



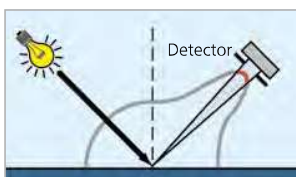
Matte to Semi Gloss

On rough surfaces the light is diffusely scattered in all directions. The image forming qualities are diminished: A reflected object no longer appears brilliant, but blurred. The more uniform the light is scattered, the less intense the reflection in the main direction and the surface will appear duller.



Glossmeter

A glossmeter measures the specular reflection. The light intensity is registered over a small range of the reflection angle.



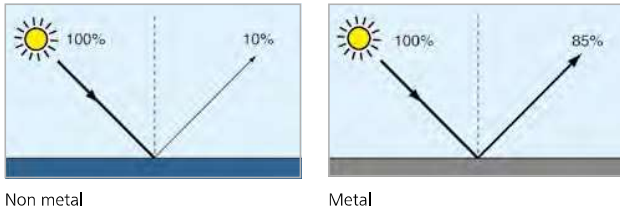
Measurement of specular reflection

GLOSS



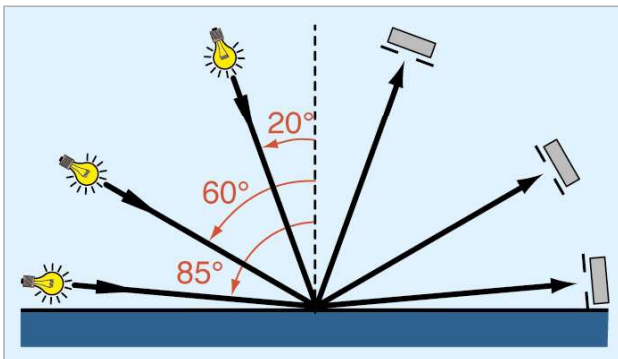
The intensity is dependent on the material and the angle of illumination. In case of non-metals (coatings, plastics) the amount of reflected light increases with the increase of the illumination angle. The remaining illuminated light penetrates the material and is absorbed or diffusely scattered dependent on the color. Metals have a much higher reflection and are less angle dependent than non metals.

Example:



The measurement results of a glossmeter are related to the amount of reflected light from a black glass standard with a defined refractive index, and not to the amount of incident light. The measurement value for this defined standard is equal to 100 gloss units (calibration).

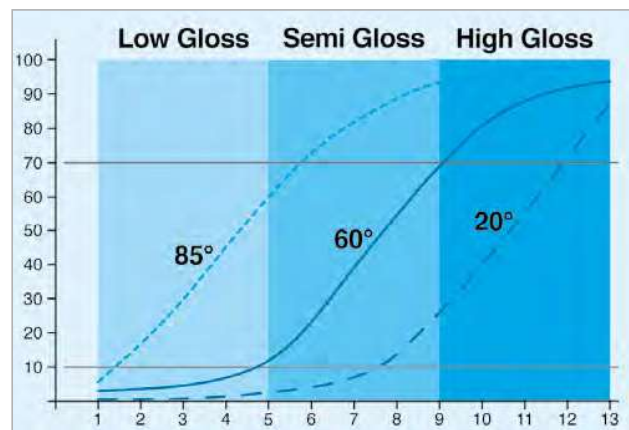
Materials with a higher refractive index can have a measurement value above 100 gloss units (GU), e.g. films. In case of transparent materials, the measurement value can be increased due to multiple reflection in the bulk of the material. Due to the high reflection capabilities of metals, values of up to 2000 GU can be reached. For these applications it is common to document the measurement results in % reflection of the illuminated light.



Glossmeters and their handling procedures had to be internationally specified to allow comparison of measurement values. The angle of illumination is of high influence. In order to obtain a clear differentiation over the complete measurement range from high gloss to matte, 3 different geometries, i.e. 3 different ranges, were defined:

Gloss Range	60° value	To be measured with
Semi Gloss	10 to 70	60° geometry
High Gloss	> 70	20° geometry
Low Gloss	< 10	85° geometry

In addition, there are industry specific applications for 45° and 75° measurement geometry.



In this case study 13 samples were visually ranked from matte to high gloss and measured with the 3 specified geometries. In the steep slopes of the curves, the differences between the samples can be clearly measured, while in the flat part, the measurement geometry no longer correlates with the visual.

Gloss measurement for any application - whether you are dealing with specific applications or need a universal solution for matte to high gloss samples, BYK-Gardner offers a complete line of glossmeters:

- Reference laboratory instrument - haze-gloss
- Portable micro-gloss family

Their unique features and benefits have made them the industry standard for gloss measurement.

Application	20°	60°	85°	45°	75°
	Coatings, plastic and related materials			Ceramic, Film	Paper, Vinyl
	High Gloss	Semi Gloss	Low Gloss	Semi Gloss	Low Gloss
ISO 2813	■	■	■		
ASTM D 523	■	■	■		
ASTM D 2457	■	■		■	■
DIN 67530	■	■	■		
JIS Z 8741	■	■	■	■	■
ASTM C 346				■	
Tappi T 480					■
	Brightened Metal				
ISO 7668	■	■	■	■	

micro-gloss

Intelligent gloss measurement with smart communication

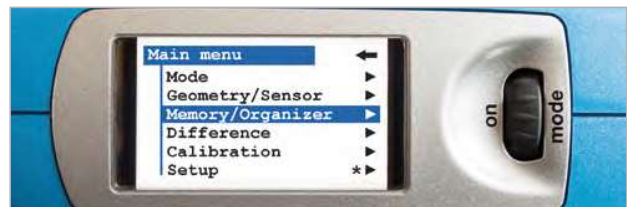
The micro-gloss has been the unsurpassed industry standard in gloss measurement for many years. It is the only glossmeter combining the highest accuracy, ease-of-use and multiple functionality – essential for today's testing requirements. In addition, the smart-chart software is the ideal tool for smart communication with professional documentation and efficient data analysis.

Brilliant color display: easy to read – easy to use

Ergonomics and easy handling were the main focus for the design. The micro-gloss is not too large and not too small – it feels just right in your hand. The scroll wheel operation and new color display with an easy-to-navigate menu make gloss measurement easier than ever before.

Auto diagnosis: Standard OK - Calibration OK

Accurate readings require reliable calibration. The gloss meter and calibration holder make a perfect couple – the calibration standard is always protected in the holder of the micro-gloss. The intelligent auto diagnosis of the gloss meter is a unique feature which guarantees long-term calibration stability and tells you when to calibrate. It even checks whether the standard is clean. Operator friendly. Safe.



Autodiagnosis	
20°	OK
60°	OK
85°	OK



Gloss of paint or metal - from matte to mirror gloss

With the micro-gloss gloss meter you can measure any material - paints, plastics or brightened metals. Its expanded range measures from very matte to mirror like reflection of up to 2000 gloss units, automatically and without additional calibration. Always reliable results – according to international standards.

Smart functions for any task

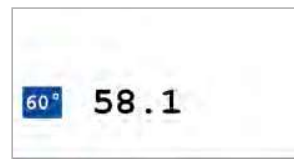
Different tasks require different tools. The easy to turn-scroll wheel of the glossmeter quickly shows you all needed functions – even without a PC:

The **Basic mode** is your tool to quickly check the gloss of a few samples.

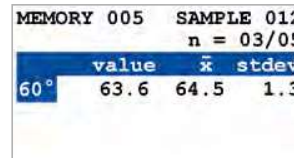
The **Statistic mode** not only shows the average, but all statistical data needed to judge whether the measured difference is significant or how uniform the surface gloss is on your sample. You define what you want to see: mean, standard deviation, range, min/max, ...

The **Difference mode** allows you to define a reference with Pass/Fail limits and will compare all of the following measurements to the selected reference. The Pass/Fail indication is colorfully shown on the high resolution display – ideal for production control.

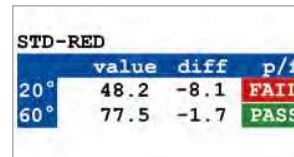
The **Continuous mode** is the most efficient way to quickly check the uniformity of a large sample surface. You define the measurement interval and are now ready to continuously measure the gloss by sliding the micro-gloss over the surface. When finished, the average with min – max range are displayed.



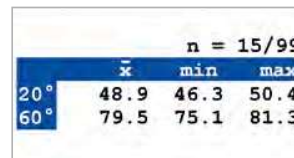
Basic mode



Statistic mode



Difference mode



Continuous mode

Technical Performance: Unsurpassed in the industry

No matter how harsh your production are or how tight your limits may be, accuracy and reliability of the micro-gloss are proven by thousand of users to guarantee always the highest quality.

The long-term stable LED light source of the glossmeter provides not only highly repeatable results for many years, but also will never burn out. A 10 year warranty on the lamp life is guaranteed. Due to advanced temperature control, the micro-gloss assures the highest stability of the gloss readings – if you are in the lab or move to a "hot spot" on the line.

Our patented calibration procedure during the production of the glossmeters enables an excellent inter-instrument agreement. No matter how far your customer may be away, if he is one of the thousands of micro-gloss users, he will read the same values as you.

