

## Applications Note

$$\Delta = 2t + \frac{\lambda}{2} \text{ (must equal a whole number of } \lambda \text{ for a bright fringe or } 2m\lambda \text{)}$$

$$n\lambda = 2t + \frac{\lambda}{2}$$

$$t = \frac{n\lambda - \frac{\lambda}{2}}{2} = \frac{\lambda}{2} \left( n - \frac{1}{2} \right)$$

$$D^2 = 2r \left[ \frac{\lambda}{2} \left( n - \frac{1}{2} \right) \right]$$

AN 1063



## Measuring Gloss

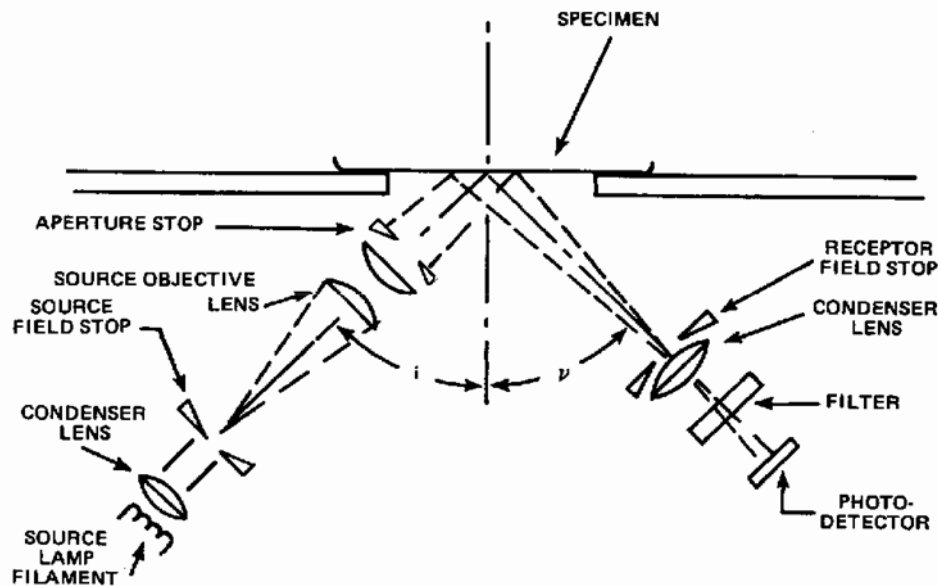
**The glossmeter is adopted by many industries, from paper mills to automotive and is used at each stage of the manufacturing process from goods receipt through to final inspection.**

Gloss measurements quantify the amount of light reflected at the specular angle from an object's surface. The specular is the angle equal to but opposite the angle of incidence. This specular light is responsible for the high-lights visible on shiny materials. Therefore, gloss measurements quantify how shiny an object is.

Glossmeters are configured so that the light generated is incident on the material at a particular angle relative to normal (the perpendicular). The detector is then placed at that same angle on the other side of normal so that only the light reflected at the specular angle is collected.

Generally, a green filter corresponding to the CTE Luminosity Function is placed in front of the detector to enable the instrument to better simulate the human visual situation.

A glossmeter has a configuration similar to that shown below. The diagram is taken from Richard S. Hunter and Richard W. Harold, *The Measurement of Appearance*, New York: John Wiley and Sons, 1987, page 283.



ASTM Designation D523-89, "Standard Test Method for Specular Gloss," specifies how gloss is to be measured. Generally, glossmeters provide light at one angle or a combination of three angles. The most common angles are 20°, 60°, and 85°. ASTM Designation D523 specifies that a 60° angle may be used for most materials. The test method recommends the use of a 20° angle when the 60° gloss value is greater than 70 (which would be a highly reflective material). The use of an 85° angle is recommended when the 60° gloss value is less than 10 (which would be a matte material)

TAPPI gloss for paper is specified by TAPPI T480 and is measured at a 75° angle.

## Conditions for Measurement

**Instrumental:** HunterLab Agera measures 60° suitable for most materials.

A GU is a measurement used for gloss. A standard GU measurement scale of gloss meters is determined by a reference black glass standard. This black glass is highly polished and features a defined refractive index that, when placed at a specific angle, has a 100GU specular reflectance. GUs are determined through this standard, as 100GU establishes an upper point calibration on a matte surface that can then be used to find how many GUs a product's surface has.

These 100GU gloss meters are appropriate for most non-metallic coatings and materials, such as plastics and paints. For more reflective materials, like mirrors or plated metal parts, companies use gloss meters with a higher upper calibration, regularly going up to 2,000GU.

## Typical Applications

Many materials such as car parts, table tops, flooring, paints, and paper are measured to determine the amount of gloss present.

The first step in controlling gloss levels is being able to measure them. The gloss appearance of an object can be affected by several factors, such as the texture of the substrate, the smoothness of the material itself, and even film thickness of coatings applied to an object or surface. With all the factors that can affect gloss's appearance, companies regularly measure gloss to ensure all their products have a consistent look.

Not measuring gloss on a product can lead to several problems. For example, coatings manufacturers typically use gloss additives to achieve specific levels of gloss. Too much or too little can affect not only the coatings appearance when dried but also the coatings flow and leveling, curing times, adhesion, and long-term durability. Gloss levels also change the visual perception of the color of the surface or object. Coating a smooth surface and a textured surface with the same coating will result in the smooth-coated surface appearing much darker than the textured coated surface.

## About HunterLab

HunterLab is the technology leader in color measurement solutions, providing instruments, software, knowledge and service to a wide variety of industries. With over 5 decades of experience in more than 65 countries, HunterLab applies our leading edge technology to your products helping you measure and communicate color simply and effectively.

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