

## Measurement Method

Change of phase of  $\lambda/2$  at  $n=2$   
 $\Delta = 2t + \frac{\lambda}{2}$  (must equal a whole number of wave length for a bright fringe or  $n\lambda$ )

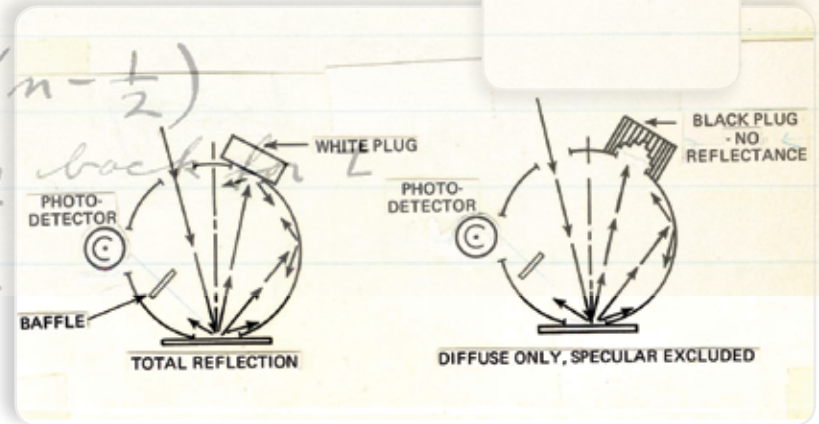
$$n\lambda = 2t + \frac{\lambda}{2}$$

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

substituting back for  $D^2$

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

MM 5076.00



### Measuring Meat Steaks, Fillets, and Patties Using the MiniScan EZ 45/0 LAV

with MiniScan® EZ

The color of meat may change slightly with age, and consumers associate the „correct“ color with freshness and quality. For example, tuna slightly reddens or „blooms“ in storage, but this redness is transient. Consumers accept this natural redness and associate it with good quality tuna. Special treatment of the meat with carbon monoxide mimics this bloom effect, while stabilizing the flesh. Overtreatment, however, causes the redness to persist through the normal stages of decomposition, no longer acting as an indicator of quality and freshness. Measuring the color of the meat during treatment indicates when the process is complete versus overdone.

A HunterLab MiniScan® EZ 45/0 LAV spectrophotometer with the special glass (HunterLab **Part Number A02-1002-129**) or polycarbonate (HunterLab **Part Number B02-1009-550**) covered nose cone installed can be used to measure the color of meat steaks and patties, both natural and breaded, using the method described below.

### THE APPLICATION

Meat portions have several non-uniform characteristics that require compensating preparation and presentation techniques in order to ensure a repeatable sample measurement.

The sample surface is directional and irregular, requiring the averaging of several readings with replacement.

Meat is moist, and care must be taken that moisture does not enter the instrument optics. A glass-covered port eliminates this problem.

Recommended Color Scale

**CIE L\*a\*b\* as a full color descriptor**

Recommended Illuminant/Observer

**D65/10°. C/2° may also be used.**



MiniScan® EZ



## MEASUREMENT METHOD

1. Configure your software or the instrument firmware to read using the desired color scale, illuminant, and observer.
2. Select a meat sample that is at least 25 mm (1 in) thick for steaks, fillets, and patties or 12.5 mm (0.5 inch) thick for breaded products. Cut it as it would be viewed by the customer. If frozen, thaw and store chilled prior to measurement, under conditions similar to those found in retail stores.
3. Standardize the instrument with the glass port in place, first using the black glass to set the bottom of scale. Make sure the black glass is in solid contact with the port.
4. Complete the standardization using the calibrated white standard.
5. Place the MiniScan's nose cone on the sample, ensuring that the sample is in solid contact with the port.
6. Take a single color reading of the meat. Move to another area on the sample and take a second reading. Turn the meat over and take two more readings in different areas on the sample surface. Average the four readings for a single measurement representative of the meat sample.
7. Record the average color values for the sample. For tuna, if the average  $a^* < 16.2$ , then the color is considered acceptable.
8. Wipe the MiniScan's glass cover before making more measurements.



2.



2.



3.



4.



5.

## ABOUT HUNTERLAB

HunterLab, the first name in color measurement, provides ruggedly dependable, consistently accurate, and cost effective color measurement solutions. With over 6 decades of experience in more than 65 countries, HunterLab applies leading edge technology to measure and communicate color simply and effectively. The company offers both diffuse/8° and a complete line of true 45°/0° optical geometry instruments in portable, bench-top and production in-line configurations. HunterLab, the world's true measure of color.

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**More Information about  
Measurement Methods at**

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The world's true measure of color

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