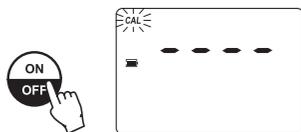
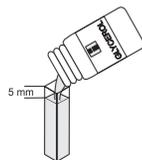


Measurement Procedure

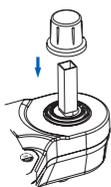
1. Press the **ON/OFF** key to turn the photometer on.
2. When the instrument is ready for measurement "----" are displayed flashing.
If "CAL" is displayed, the instrument requires calibration prior to measurement.



3. Fill one cuvette with 4 mL of Glycerol, up to 5 mm (0.2") below the rim. This is the standard.



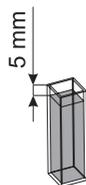
4. Insert the cuvette into the holder paying attention to the direction of the light indicated by the arrow on the instrument. Place the light shield cap on and ensure that the notch on the cap is positioned securely in the groove.



5. Press **CAL**.
The optical and measurement icons are displayed followed by "-0.0-". The instrument is ready for measurement.



6. Remove the cuvette.
7. Add about 4 mL of honey, up to 5 mm (0.2") below the rim, to a second, clean cuvette. This is the sample.

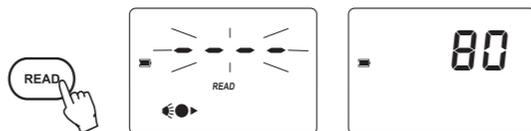


8. Insert the sample into the holder paying attention to the direction of the light indicated by the arrow on the instrument.

Place the light shield cap on and ensure that the notch on the cap is positioned securely in the groove.



9. Press **READ**. The instrument directly displays the honey color intensity value expressed in mm Pfund, as compared to analytical grade Glycerol (fixed at zero mm Pfund).



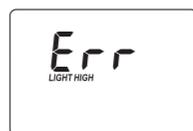
Note: Always use cuvettes in good condition (clean, with no scratches).

Interferences

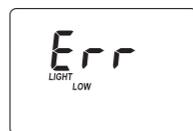
Interference may be caused by air bubbles or turbidity in the sample.

Errors & Warnings

Calibration



Light High: There is an excess amount of ambient light. Measurement can not be taken. Please check preparation of the calibration cuvette.

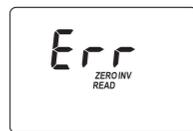


Light Low: There is not enough light to perform a measurement. Please check the preparation of the calibration cuvette.



No Light: The instrument cannot adjust the light level. Please check that the calibration cuvette does not contain any debris.

Sample Reading



Inverted cuvettes: The sample and the calibration cuvettes are inverted. Swap the cuvettes and repeat the measurement.



CAL: Instrument requires calibration.



Under range: A blinking "0" indicates that the sample absorbs less light than the calibration reference. Check the measurement procedure and recalibrate the instrument.



Over range: Maximum concentration value displayed blinking indicates the measured value is outside the range limits (both wavelengths). Dilute the sample and repeat the measurement.

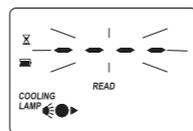


Concentration value (lower than maximum accepted range limits) displayed blinking indicates the measured value is outside the accepted range for one of the wavelengths only. Reading is within accepted range for the other wavelength.

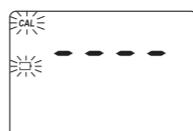
Other



Cap error: Ambient light has reached in the analysis cell. Make sure the light shield cap is correctly positioned.



Cooling lamp: Tungsten lamp needs to cool down.



Battery low: Battery level is too low for the meter to function properly. Replace the battery with new one.



Dead battery: Replace the battery and restart the instrument.

Note: If blinking "ZERO" is displayed, a new zero has to be performed.

Battery Management

A fresh battery lasts for about 750 measurements, depending on light level. To conserve battery, the photometer automatically turns off after 10 minutes of non-use (measurement mode) or 1 hour (calibration mode).

Battery Status

HI96785 displays battery status after each measurement and at power on.

Battery status indicators:

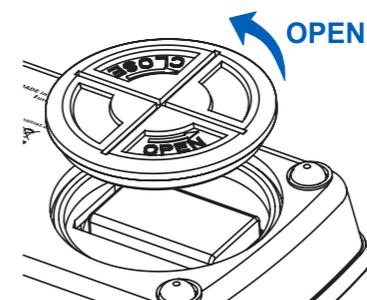
- 3 lines, 100% capacity
- 2 lines, 66% capacity
- 1 line, 33% capacity
- Battery icon blinking, under 10% capacity

To restart the instrument, the battery must be replaced with a fresh one.

Battery Replacement

To replace the instrument's batteries, follow these steps:

1. Turn the instrument off by pressing the **ON/OFF** key.
2. Remove the battery cover by turning it counter-clockwise.
3. Remove the old battery, replace it with one new 9 V battery.
4. Replace the battery cover, turn it clockwise to close.



Accessories

Analysis Kit

HI93703-56 Honey Color Analysis kit contains 100 square cuvettes, 1 x 30 mL glycerol (bottle) and 2 x 5 mL syringe (average of 90 tests)

Other Accessories

HI93703-57 Glycerol, 30 mL (4 pcs.)

HI740226 5 mL graduated syringe

HI740029P 9V battery (10 pcs.)

HI731318 Cloth for wiping cuvettes (4 pcs.)

HI731335 Caps for cuvettes (4 pcs.)

INSTRUCTION MANUAL

HI96785

Honey Color Grade Portable Photometer



Dear Customer,

Thank you for choosing a Hanna Instruments® product. Please read this instruction manual carefully before using this instrument. For more information about Hanna Instruments and our products, visit www.hannainst.com or e-mail us at sales@hannainst.com.

For technical support, contact your local Hanna Instruments office or e-mail us at tech@hannainst.com.

Preliminary Examination

Remove the instrument and accessories from the packaging and examine it carefully. For further assistance, please contact your local Hanna Instruments office or email us at tech@hannainst.com.

Each HI96785 Honey Color Grade portable photometer is supplied with:

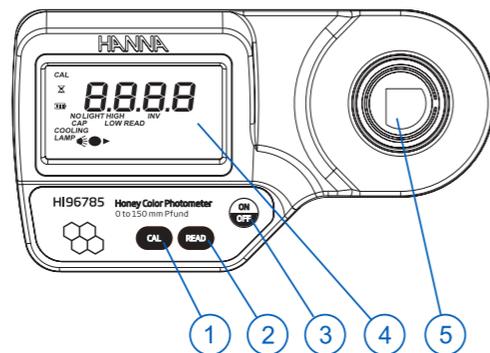
- Sample cuvette (5 pcs.)
- Light shield cap (1 pc.)
- Glycerol, 30 mL bottle
- Cuvette support (1 pc.)
- 9V battery
- Instrument quality certificate
- Instruction manual

Note: Save all packing material until you are sure that the instrument works correctly. Any damaged or defective item must be returned in its original packing material with the supplied accessories.

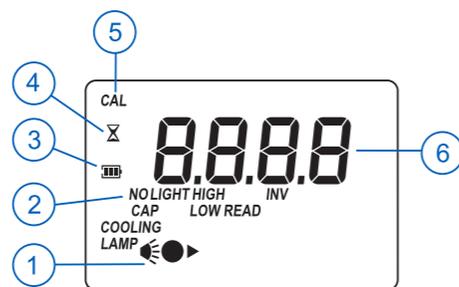
Specifications

Range	0 to 150 mm Pfund
Resolution	1 mm Pfund
Accuracy @25°C (77°F)	±2 mm Pfund @ 80 mm Pfund
Light source	Tungsten lamp
Light detector	Silicon photocell with narrow band interference filter @ 420 nm and 525 nm
Method	Direct measurement
Environment	0 to 50°C (32 to 122°F); max. 95% RH non-condensing
Battery type	9V (1 pc.)
Auto shut-off	After 10 minutes of non-use in measurement mode and after 1 hour of non-use in calibration mode, with last reading reminder
Dimensions	192 x 104 x 69 mm (7.6 x 4.1 x 2.7")
Weight	320 g (11.3 oz.)

Functional Description & LCD Display



1. CAL key, to calibrate the instrument prior to measurement
2. READ key, to take a reading
3. ON/OFF key, to turn the meter on or off
4. Liquid Crystal Display (LCD)
5. Cuvette holder



1. Optical system & measurement icons (lamp, cuvette, detector)
2. Errors & Warnings when measured values outside expected range
3. Battery status indicator
4. Stability indicator
5. Status message
6. Measurement readings

General Description & Intended Use

The HI96785 Honey Colour is a portable photometer used to measure the wavelengths of light passed through the honey in order to determine the colour value, expressed in millimeters.

The photometer has an advanced optical system that uses a Light Emitting Diode (LED) and a narrow band interference filter that allows for accurate and repeatable readings. An exclusive cuvette locking system ensures that the cuvette is inserted into the measurement cell in the same position every time to maintain a consistent 10 mm path length.

All samples are measured in a square, 10 mm light path cuvette and are compared to a glycerol standard. The percent light transmittance readings are directly displayed as mm Pfund.

The primary characteristic for commercial honey classification is colour. Colour classes are expressed in millimeters (mm) Pfund as compared to an analytical grade glycerol standard reference.

The natural colour of untreated honey comes in many tones and it originates from the botanical varieties used by the bees. However, colour tends to darken with age or change according to the method of conservation or production used by beekeepers. These practices can include the use of old beehives, contact with metals, the temperature of conservation, and exposure to light.

Table 1 reports color designations of extracted honey as per U.S. Department of Agriculture.

Table 2 looks at statistical data for different monofloral honey varieties and reports on color designations of extracted honey.

Table 1: The Pfund Honey Colour Grading System

U.S. Department of Agriculture Color Standards Designations	Color Range Pfund Scales (mm)
Water white	8 or less
Extra white	Over 8 to and including 17
White	Over 17 to and including 34
Extra light amber	Over 34 to and including 50
Light amber	Over 50 to and including 85
Amber	Over 85 to and including 114
Dark amber	Over 114

Table 2: Extracted Honey Color Designation

Honey Type		Value (mm Pfund)			
Common name	Latin name	AVERAGE	Standard Deviation (SD)	Min. Value	Max. Value
Acacia tree	Robinia pseudoacacia	15	6	11	27
Chestnut tree	Castanea sativa	92	19	62	119
Citrus spp.	Citrus spp.	14	5	11	35
Dandelion	Taraxacum officinalis	54	11	41	71
Eucalyptus	Eucalyptus spp.	58	11	41	71
Fir honeydew		98	8	83	110
Fir tree honeydew		99	16	83	130
French honeysuckle	Hedysarium coronarium	18	6	11	35
Heather	Erica arborea	96	10	83	119
Lime tree	Tillia spp.	43	17	11	71
Rhododendron	Rhododendron spp.	13	5	11	27
Strawberry tree	Arbutus unedo	70	10	55	83
Sunflower	Heliantus annus	61	6	51	71
Thyme	Thymus spp.	52	16	27	83

Certification

All Hanna Instruments conform to the CE European Directives.



Disposal of Electrical & Electronic Equipment. The product should not be treated as household waste. Instead, hand it over to the appropriate collection point for the recycling of electrical and electronic equipment, which will conserve natural resources.

Disposal of waste batteries. This product contains battery, do not dispose of it with other household waste. Hand it over to the appropriate collection point for recycling. Ensuring proper product and battery disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, or the place of purchase.

Recommendations for Users

Before using this meter, make sure that it is entirely suitable for your specific application and for the environment in which it is used. Any variation introduced by the user to the supplied equipment may degrade the meter's performance. For your and the meter's safety do not use or store the meter in hazardous environments.

Warranty

HI96785 is warranted for a period of two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. This warranty is limited to repair or replacement free of charge. Damage due to accidents, misuse, tampering, or lack of prescribed maintenance is not covered. If service is required, contact your local Hanna Instruments office. If under warranty, report the model number, date of purchase, serial number and the nature of the problem. If the repair is not covered by the warranty, you will be notified of the charges incurred.

If the instrument is to be returned to Hanna Instruments office, first obtain a Returned Goods Authorization (RGA) number from the Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

Hanna Instruments reserves the right to modify the design, construction, or appearance of its products without advance notice.

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