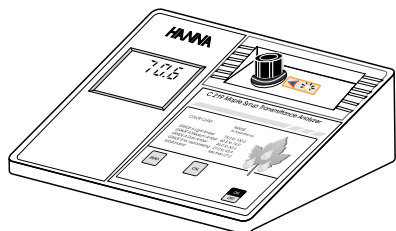


Instruction Manual

C 219 Maple Syrup Transmittance Analyzer



HANNA
instruments

www.hannacan.com



This Instrument is in Compliance
with the CE Directives

Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct operation of the meter. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at techserv@hannacan.com or call 1-800-842-6629. This instrument is in compliance with CE directives EN 50081-1 & EN 50082-1.

WARRANTY

C 219 is warranted for 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. Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. 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, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

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

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If there is any damage, notify your Dealer.

- Each C 219 instrument is supplied complete with
- Two 9V Batteries
 - One Light Shield Cap
 - One Transport Cap
 - 12 VDC Transformer (HI 710005 or HI 710006)

Note: save all packing material until you are sure that the instrument works correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

The C 219 instrument measures the percent light transmittance of maple syrup as compared to analytical reagent glycerol. The transmittance value allows identification of syrup quality class. Measurements are done by using matched square optical cuvetts having a 10 mm light path.

Display codes aid the user in routine operations.

The meters have an auto-shut off feature that will turn the instrument off after 10 minutes of non-use.

SPECIFICATIONS

Range	0.0 to 100.0 % Transmittance
Resolution	0.1 in % Transmittance
Accuracy	±1% of reading @ % Transmittance=75.0
Typical EMC Deviation	±0.1 in % Transmittance
Light Source	Tungsten lamp with narrow band interference filter @ 560 nm
Method	Direct Measurement
Light Detector	Silicon Photocell
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Battery Type	2 x 9 volt
Auto-Shut off	After 10' of non-use
Dimensions	230 x 165 x 70 mm (9.0 x 6.5 x 2.8")
Weight	640 g (22.6 oz.)

REQUIRED STANDARD

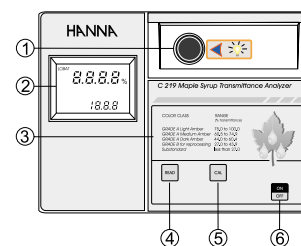
4 mL Glycerol (see accessories)

SIGNIFICANCE AND USE

The primary characteristic for classifying maple syrup is color. When syrup is very light in color, as matching the minimum light transmittance standards, the grade assigned to syrup is high. When syrup color is dark, the grade is low. Color classes are expressed in percent of light transmission as compared to an analytical glycerol standard fixed at one hundred percent transmittance. All syrup is considered to be at minimum density, 66.0 degrees Brix at 68 degrees F (20°C), and to have no flavors nor other characteristics extraneous to pure maple syrup.

COLOR CLASS	RANGE (% Transmittance)
Extra light	75.0 to 100.0
Light	60.5 to 74.9
Medium	44.0 to 60.4
Amber	27.0 to 43.9
Dark	less than 27.0

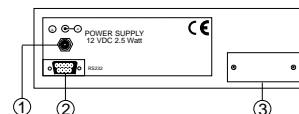
FUNCTIONAL DESCRIPTION



FRONT PANEL

- 1) Cuvet Holder
- 2) Liquid Crystal Display
- 3) Color Class/% Transmittance Table
- 4) READ, to perform measurement
- 5) CAL, to calibrate the meter prior to measurement
- 6) ON/OFF, to turn the meter on and off

REAR PANEL



- 1) Power Supply 12 VDC 2.5 Watt
- 2) RS 232 Socket
- 3) Batteries Compartment

GUIDE TO DISPLAY CODES

	This indicates that the meter is in a ready state and calibration can be performed.
	Sampling in Progress. This flashing prompt appears each time the meter is performing a measurement.
	The microprocessor is adjusting the light level, indicated by a scrolling "SIP".
	This indicates that the meter has been calibrated and measurement can be performed.
	This indicates that the calibration procedure failed due to a low signal-to-noise ratio. In this case press CAL again. Or, it may indicate over range: a flashing 100.0% value as result of a reading indicates that the sample absorbs less light than the glycerol standard.
	Calibration was not performed. Follow the instructions described in the measurement procedures for calibrating the meter.
	The instrument is performing an internal check-up.
	Light over range. The cuvet is not inserted correctly and an excess ambient light is reaching the detector. If the cap is properly installed, contact your dealer or the nearest Hanna Customer Service Center.
	The instrument cannot adjust the light level. Please check that the sample does not contain any debris.
	There is not enough light to perform a measurement. Please check the preparation of the Glycerol cuvet.
	There is too much light to perform a measurement. Please, check the preparation of the Glycerol cuvet.
	There is too much light for the sample measurement. Please check if the right sample cuvet is inserted.
	The sample and Glycerol cuvet are inverted.
	The blinking "LOBAT" indicates that the battery voltage is getting low and the battery needs to be replaced.
	This indicates that the battery is dead and must be replaced.

Light under range. The standard is to dark for proper calibration. If this is not the case, contact your dealer or the nearest Hanna Customer Service Center.

Light over range. The standard is to light for proper calibration. If this is not the case, contact your dealer or the nearest Hanna Customer Service Center.

This indicates that the meter has lost its configuration. Contact your dealer or the nearest Hanna Customer Service Center.

INTERFACE WITH PC

To connect your meter to the PC use the optional HI 920010 cable (available from your Hanna Dealer). Make sure that your meter is switched off and plug the connectors, one into the meter RS 232C socket, the other into the serial port of your PC.

Note: cables other than HI 920010 may use a different configuration, in which case, communication between the meter and the PC may not be possible.

Data transmission from the instrument to the PC is now much easier with HI 92000 Windows[®] compatible application software offered by Hanna Instruments.

HI 92000 allows you to use the powerful capabilities of most spread sheet programs (e.g. Excel[®], Lotus 1-2-3[®]). Simply open your file downloaded by HI 92000 from your spread sheet program and then it is possible to make any elaboration available with your software (e.g. graphics, statistic analysis).

User friendly, HI 92000 offers a variety of features and has an on line help to support you throughout any situation.

To install HI 92000 you need a 3.5" drive and a few minutes to follow the instructions conveniently printed on the disk label.

For acquiring data with PC from the C219 instrument select "Real-Time Logging". Click on "Settings" and then select the communication port (1 to 4) and set the baud rate. The transmission speed (baud rate) of the meter and the external device must be identical. The meter is factory set to 2400.

If you wish to change this value, please contact your nearest Hanna Center.

Data are recorded on PC by pressing "log sample" after measurement has been performed. Follow the on line help for more details.

BATTERY REPLACEMENT

Battery replacement must only take place in a non-hazardous area using two 9V alkaline batteries.

Remove the battery cover on the back of the meter, attach two fresh 9V batteries and replace the cover while paying attention to the correct polarity.

ACCESSORIES

C219/C220 Kit	Kit for maple syrup analysis, including, 82 cuvetts, 30 mL of Glycerol & two 5 mL syringe (80 tests average)
HI 721310	9V battery (10 pcs)
HI 731318	Tissue for wiping cuvetts (4 pcs)
HI 731325	Caps (4 pcs)

OPERATIONAL GUIDE

POWER CONNECTION

Plug the 12VDC adapter (HI 710005 - 110VDC, or HI 710006 - 220VDC) into the DC socket. Plug the adapter into the outlet. Alternatively, remove the battery cover on the back of the meter; attach two fresh 9 V batteries and replace the cover.

Note: insure the main line is surge protected.

Note: always turn the meter off before unplugging it to insure no data is lost.

MEASUREMENT PROCEDURE

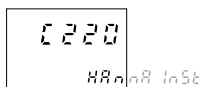
- Turn the meter on by pressing ON/OFF.



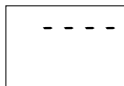
- The meter will first perform an LCD self diagnostic test by displaying a full set of figures.



- Then it will show a scrolling "C219 Hanna Inst" message.



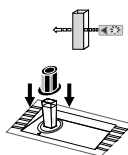
- When the LCD displays "----", the meter is ready.



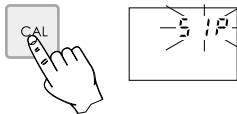
- To perform calibration, use a **first syringe** to fill one cuvet with 4 mL of Glycerol, up to 5 mm (0.2") below the rim.



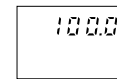
- Place the Glycerol cuvet into the holder paying attention to the direction of the light indicated by the arrow, then put the black cap on.



- Press CAL and "SIP" will appear on the display.



- Wait for a few seconds and the display will show "100.0%". Now the meter is calibrated and ready for measurement.

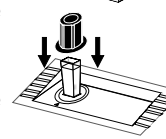


- Remove the Glycerol cuvet.

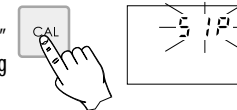
- Add to a second cuvet 4 ml of maple syrup, up to 5 mm (0.2") below the rim, using a **second syringe**. This is the sample.



- Place the sample cuvet into the holder, then put the black cap on.



- Press READ and "SIP" will appear during measurement.



- The instrument directly displays percent of light transmittance as compared to glycerol standard (fixed at one hundred percent).

- Check in the manual or the front panel to which color class the transmittance value corresponds.

INTERFERENCES

Interference may be caused by air bubbles or turbidity in the sample. Scratched or dirty cuvetts will also affect readings. Always check clearness of cuvetts prior to use.

TIPS FOR AN ACCURATE MEASUREMENT

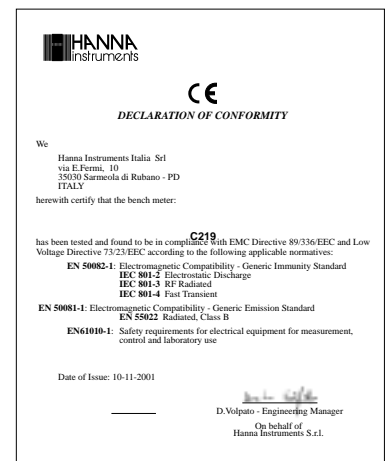
The instruction listed below should be carefully followed during testing to ensure best accuracy.

- Do not touch the cuvet walls with hands.
- Whenever the cuvet is placed into the measurement cell, it must be completely free of fingerprints, oil or dirt. Wipe it thoroughly with HI 731318 or a lint-free cloth prior to insertion.
- It is important that the sample does not contain any debris. This would corrupt the readings.
- Use matched square cuvetts, having 4 clear faces and a 10 mm path length.

- It is recommended to take and analyze samples at room temperature.
- It is recommended to take the sample of maple syrup in the middle of the container.
- Do not use the same cuvet with glycerol for more than 5-10 times to perform calibration and dispose of it after 1 day has passed.
- Never re-use maple syrup sample cuvetts, dispose of them after one use.
- Use 1 syringe for glycerol, and the other one for syrup in order to avoid contamination.
- Samples should be completely free of air bubbles. If bubbles are present, let the samples stand until air bubbles have completely disappeared (not more than 30 minutes, see note below).

NOTE: Maple syrup samples exposed to direct sunlight and/or air will darken over time. This is caused by microorganisms.

CE DECLARATION OF CONFORMITY



Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance.

To avoid damages or burns, do not perform any measurement in microwave ovens.

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