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MAN83742R3 04/06

Instruction Manual

HI 83742
COLOR & PHENOLS
ISM
for wine analysis

HANNA instruments®

www.hannainst.com

CE

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 use of the instrument. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

This instrument is in compliance with CE directives.

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CE DECLARATION OF CONFORMITY

Recommendations for Users

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

Operation of these instruments may cause unacceptable interferences to other electronic equipments, this 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 put the instrument in microwave ovens. For yours and the instrument safety do not use or store the instrument in hazardous environments.

HANNA instruments

CE

DECLARATION OF CONFORMITY

We

Hanna Instruments Italia Srl
Viale Delle Industrie, 12/A
35010 Ronchi di Villafranca - PD
ITALY

herewith certify that the Ion Selective Meter:

HI 83742

has been tested and found to be in compliance with EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC according to the following applicable normatives:

EN 61000-6-1: Electromagnetic Compatibility - Generic Immunity Standard
IEC 61000-4-2 Electrostatic Discharge
IEC 61000-4-3 RF Radiated
IEC 61000-4-4 Fast Transient

EN 61000-6-3:Electromagnetic Compatibility - Generic Emission Standard
EN 55022 Radiated, Class B

EN61010-1: Safety requirements for electrical equipment for measurement, control and laboratory us

Date of Issue: 16-06-2005

A. Marsilio - Engineering Manager
On behalf of
Hanna Instruments Italia S.r.l.

WARRANTY

HI 83742 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to the 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 your dealer. 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.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

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

ACCESSORIES

REAGENT SETS

HI 83742-20	Phenols reagent set for wine (20 tests)
HI 83742-25	Color reagent set for wine (20 tests) containing HI 83742-0 Wine Solvent 1
HI 83742-27	Color reagent set for wine (20 tests) containing HI 83742-3 Wine Solvent 3

OTHER ACCESSORIES

DEMI-10	Bottle to prepare 10 liters of demineralized water
HI 740027P	1.5V AA batteries (10 pcs)
HI 731318	Tissue for wiping cuvets (4 pcs)
HI 731321	Glass cuvets (4 pcs)
HI 731325W	Caps for cuvets (4 pcs)
HI 93703-50	Cuvets cleaning solution (230 mL)
HI 740226	5 mL graduated syringe
HI 731340	200 µL automatic pipette
HI 731350	Plastic tips for 200 µL automatic pipette (25 pcs)
HI 731342	2000 µL automatic pipette
HI 731352	Plastic tips for 2000 µL automatic pipette (25 pcs)
HI 740157	Plastic refilling pipette (20 pcs)

BATTERY REPLACEMENT

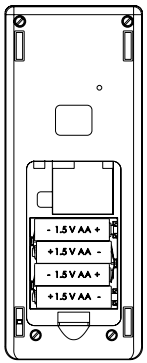
Battery replacement must only take place in a non-hazardous area.

The blinking "🔋" will appear when the batteries power gets low.

When batteries are completely discharged, "0% bAtt" will appear and after two seconds the instrument is switched off.

Remove the battery cover from the bottom of the instrument and change the old batteries with 4 fresh 1.5V batteries, paying attention to the correct polarity.

Replace the cover.

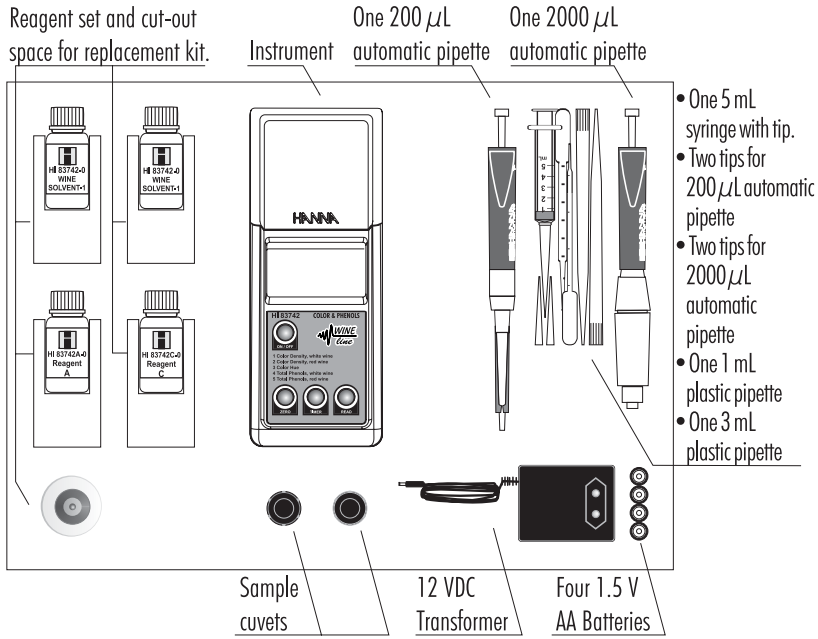


PRELIMINARY EXAMINATION

Please examine this product carefully. Make sure that the instrument is not damaged. If any damage occured during shipment, please notify your Dealer.

Each **HI 83742** Ion Selective Meter is supplied complete with:

- Two sample cuvets and caps
- Reagents for 5 tests (HI 83742-0, HI 83742A-0 HI 83742B-0, HI 83742C-0)
- One 200 µL automatic pipette with two tips and Instruction Sheet
- One 2000 µL automatic pipette with two tips
- One 5 mL syringe with tip
- One 1 mL plastic pipette
- One 3 mL plastic pipette
- 12 VDC transformer (**HI 710005** or **HI 710006**)
- Four 1,5V AA batteries
- Tissue for wiping cuvets
- Instruction manual
- Instrument Quality Certificate
- Rigid carrying case



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 **HI 83742** is an auto-diagnostic portable microprocessor meter that benefits from Hanna's years of experience as a manufacturer of analytical instruments. It has an advanced optical system based on a special tungsten lamp and a narrow band interference filter that allows most accurate and repeatable readings. All instruments are factory calibrated.

The auto-diagnostic feature of this meter ensures always optimal measurement conditions to ensure most precise readings. The light level is automatically adjusted each time a zero-measurement is made, and the temperature of the lamp is controlled to avoid overheating.

SIGNIFICANCE OF USE

Color determination of wine

Analytical techniques have become a valuable tool of modern wine makers. Especially the definition and the processing techniques to obtain the desired wine color are of key importance. The right decisions taken during maturation of the grapes, processing, aging and blending, all strongly influence the final result of wine color.

The color of wine is always read after removal of suspended matter. There are manly two color components present, yellow and red but also a blue or green hue may appear. The color hue is the ratio between the yellow color concentrations over the red one, and is an indication about the degree of evolution.

The yellow color in wine comes from the present of tannins (polymers of flavonoid -procyanidins type, and non-flavonoid phenols) and can be read without dilution. The increase of the yellow-brown color in older wines is due to aging or oxidation.

The red colors of wines are caused by free anthocyanins, copigments of anthocyanins, and polymerized phenolic compounds. The color of these pigments is pH dependent and can be intense dark. It is therefore necessary to dilute the wine sample taking care not to change the original wine pH. Hanna recommends using the special wine solvent to minimize possible errors due to dilution.

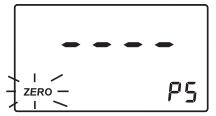
Phenol determination of wine

Phenolic compounds are important for several reasons since they (i) affect the color of the wine, (ii) have an astringent taste, (iii) may case pungent odder, (iv) are a source of oxygen reduction, and (v) are sources of browning substances.

Wine can contain a large variety of phenolic compounds and with traditional analytical techniques it is difficult to distinguish between total phenols and specific phenols. Although some progress has been made with HPLC, the most common analyses for total phenols remain the reaction of phenolic substances with the Folin-Ciocalteu reagent. Other methods like the direct spectrophotometric determinations are less accurate, because of difference in specific molar absorptivity, and color present of non phenolic substances.

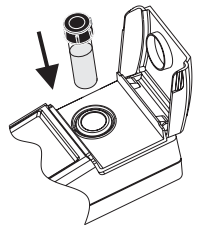
MEASUREMENT

- Press "RANGE" to select the parameter code "P5" for total phenols, red wine (see page 13).



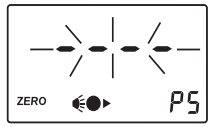
- Fill an empty cuvet with deionized water to the 10 mL mark and replace the cap. This is the **zero.**

#1
(Zero)

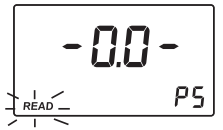


- Insert the zero cuvet into the holder and close the lid.

- Press ZERO and "----" will blink on the display.



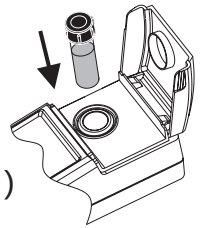
- After a few seconds the display will show "-0.0-". The meter is now zeroed and ready for measurement.



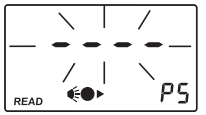
- Remove the cuvet from the instrument.

- Insert the sample (cuvet #2) into the holder and close the lid.

#2
(Sample)



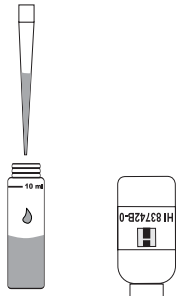
- Press READ/TIMER and "----" will blink during measurement.



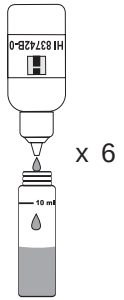
- The instrument directly displays concentration in g/L of GAE (gallic acid equivalent) on the Liquid Crystal Display.

Note: If the phenol concentration is higher than 5 g/L, then pre-dilute the wine sample in the following way: use the automatic pipette to add 2 mL of deionized water and 2 mL of wine sample. Then follow the normal sample preparation procedure, using this pre-diluted sample as red wine sample. In this case the final value must be multiplied by 2.

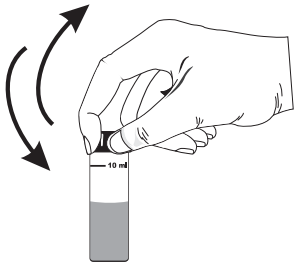
- Use the 200 µL automatic pipette with a clean pipette tip to add exactly 0,2 mL of **diluted red wine sample**.



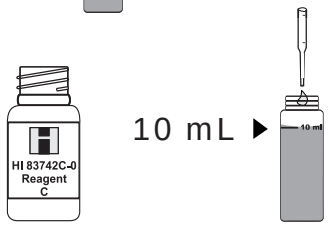
- Add 6 drops of HI 83742B-0 Folin & Ciocalteu's Reagent to the cuvet.



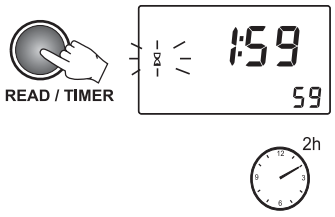
- Replace the cap and shake gently to mix.



- Wait for 1 minute and then use the 3 mL pipette to add HI 83742C-0 Reagent C Carbonate Buffer, to bring the volume up to the 10 mL mark.



- Turn the meter ON and press RANGE to select the parameter code "P5" for total phenols, red wine (see page 13). Then hold down READ/TIMER for several seconds. The instrument will show the countdown. Alternatively, wait for 2 hours.
  The instrument gives an acoustic signal to alert the user that the countdown is finished.



- This is the reacted sample.

The reaction between phenols and the Folin-Ciocalteu reagent involves oxidation of the phenolic groups (R-OH) with a mixture of phosphotungstenic acid ($H_3PW_{12}O_{40}$) and phosphomolybdenic acid ($H_3PMo_{12}O_{40}$) to the quinoid form (R=O). The concomitant reduction of the Folin-Ciocalteu reagent causes a blue color in the sample that is proportional to the total phenolic content that, in turn, is expressed as g/L of Gallic Acid Equivalents (GAE).
Another common method to express the phenol content is to report the Folin Index (FI) or Total Phenol Index. Simply multiply the read value in g/L of GAE times 25, to find the Folin Index value.

SPECIFICATIONS

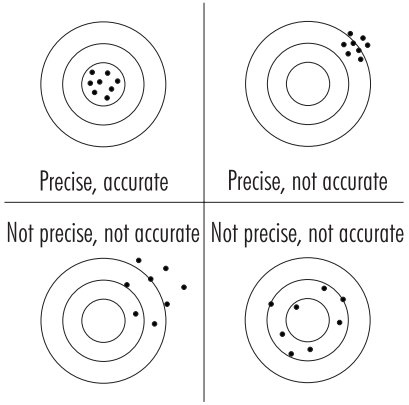
Light Detector	Silicon Photocell
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Battery Type	4 x 1,5 volt AA batteries / 12 to 20 VDC through voltage adapter
Auto-Shut off	After 15' of non-use.
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")
Weight	500 g (17,6 oz.).

PRECISION AND ACCURACY

Precision is how closely repeated measurements agree with each other. Precision is usually expressed as standard deviation (SD). Accuracy is defined as the nearness of a test result to the true value.

Although good precision suggests good accuracy, precise results can be inaccurate. The figure explains these definitions.

For example for phenols: in a laboratory using a standard solution of 0.350 g/L gallic acid and a representative lot of reagent, an operator obtained with a single instrument a standard deviation of 0.015 g/L.



PRINCIPLE OF OPERATION

Absorption of Light is a typical phenomenon of interaction between electromagnetic radiation and matter. When a light beam crosses a substance, some of the radiation may be absorbed by atoms, molecules or crystal lattices.

If pure absorption occurs, the fraction of light absorbed depends both on the optical path length through the matter and on the physical-chemical characteristics of the substance according to the Lambert-Beer Law:

$$-\log I/I_{\circ} = \varepsilon_{\lambda} \, c \, d$$

or

$$A = \varepsilon_{\lambda} \, c \, d$$

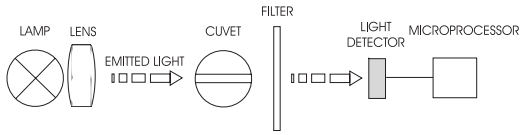
Where:

$-\log I/I_{\circ}$	=	Absorbance (A)
$I_{\circ}$	=	intensity of incident light beam
I	=	intensity of light beam after absorption
ε_{λ}	=	molar extinction coefficient at wavelength λ
c	=	molar concentration of the substance
d	=	optical path through the substance

Therefore, the concentration "c" can be calculated from the absorbance of the substance as the other factors are known.

Photometric chemical analysis is based on the possibility to develop an absorbing compound from a specific chemical reaction between sample and reagents. Given that the absorption of a compound strictly depends on the wavelength of the incident light beam, a narrow spectral bandwidth should be selected as well as a proper central wavelength to optimize measurements.

The optical system of Hanna's **HI 83000** series colorimeters is based on special subminiature tungsten lamps and narrow-band interference filters to guarantee both high performance and reliable results.



Block diagram (optical layout)

TOTAL PHENOLS, RED WINE

SPECIFICATIONS

Range	0.00 to 5.00 g/L
Resolution	0.01
Precision	±0.10 @ 2.00 g/L
Light Source	Tungsten lamp with narrow band interference filter @ 610 nm
Method	The reaction between Phenols and the reagents causes a blue tint in the sample.

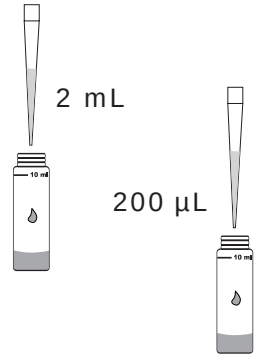
REQUIRED REAGENTS

Code	Description	Quantity/test
HI 83742A-0	Acid Reagent	5 mL
HI 83742B-0	Folin & Ciocalteu's Reagent	6 drops
HI 83742C-0	Carbonate Buffer	4.5 mL

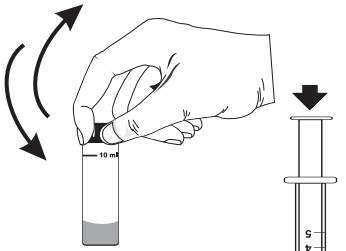
For reagent set and other accessories see page 26.

SAMPLE PREPARATION

- Use the 2000 µL automatic pipette to add exactly 2 mL of deionized water to an empty cuvet.
  For a correct use of the automatic pipette please follow the related Instruction Sheet.

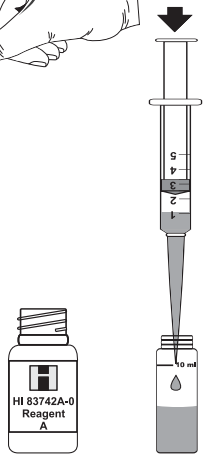


- Then use the 200 µL automatic pipette to add exactly 0,2 mL of red wine.



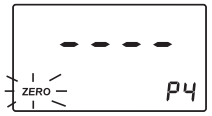
- Replace the cap and shake gently to mix. This is the **diluted red wine sample**.

- Take another empty cuvet and use the 5 mL syringe to add exactly 5 mL of HI 83742A-0 reagent to an empty cuvet.
  Note: in order to measure exactly 5 mL of reagent with the syringe, follow the instructions on page 11.



MEASUREMENT

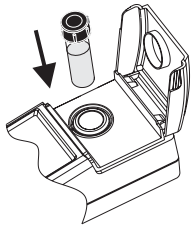
- Press "RANGE" to select the parameter code "P4" for total phenols, white wine (see page 13).



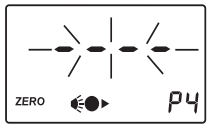
- Fill an empty cuvet with deionized water and replace the cap. This is the **zero**.

#1
(Zero)

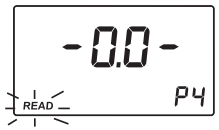
- Insert the zero cuvet into the holder and close the lid.



- Press ZERO and "----" will blink on the display.



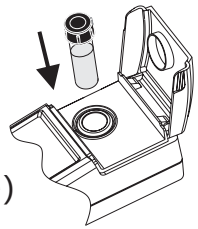
- After a few seconds the display will show "-0.0-". The meter is now zeroed and ready for measurement.



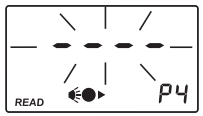
- Remove the cuvet from the instrument.

- Insert the sample (cuvet #2) into the holder and close the lid.

#2
(Sample)



- Press READ/TIMER and "----" will blink during measurement.



- The instrument directly displays concentration in g/L of GAE (gallic acid equivalent) on the Liquid Crystal Display.

  Note: If the phenols concentration is 0,750 g/L or higher, please repeat the test following the instruction for red wine (page 23).

A microprocessor controlled special tungsten lamp emits radiation which is first optically conditioned and beamed to the sample contained in the cuvet. The optical path is fixed by the diameter of the cuvet. Then the light is spectrally filtered to a narrow spectral bandwidth, to obtain a light beam of intensity I_0 or I.

The photoelectric cell collects the radiation I that is not absorbed by the sample and converts it into an electric current, producing a potential in the mV range.

The microprocessor uses this potential to convert the incoming value into the desired measuring unit and to display it on the LCD.

The measurement process is carried out in two phases: first the meter is zeroed and then the actual measurement is performed.

The cuvet has a very important role because it is an optical element and thus requires particular attention. It is important that both the measurement and the calibration (zeroing) cuvets are optically identical to provide the same measurement conditions. Whenever possible use the same cuvet for both. It is necessary that the surface of the cuvet is clean and not scratched. This to avoid measurement interference due to unwanted reflection and absorption of light. It is recommended not to touch the cuvet walls with hands.

Furthermore, in order to maintain the same conditions during the zeroing and the measuring phases, it is necessary to close the cuvet to prevent any contamination.

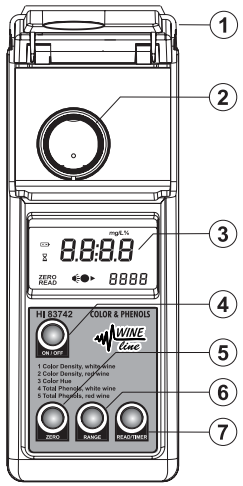
ABBREVIATIONS

- **°C**: degree Celsius
- **°F**: degree Fahrenheit
- **g/L**: grams per liter. g/L is equivalent to ppt (part per thousand)
- **mL**: milliliter
- **LCD**: Liquid Crystal Display

FUNCTIONAL DESCRIPTION

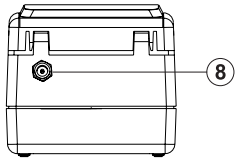
INSTRUMENT DESCRIPTION

FRONT

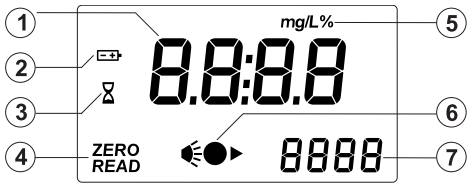


1) Lid
2) Cuvet Holder
3) Liquid Crystal Display (LCD)
4) ON/OFF key, to turn the meter on and off
5) ZERO key, to zero the meter
6) RANGE key, to select parameter
7) READ/TIMER key, to perform measurement
8) Power Socket 12V to 20V DC 2.5 Watt

REAR

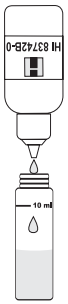


DISPLAY ELEMENTS DESCRIPTION

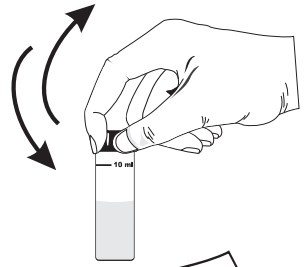


1) Four digit main display.
2) Battery icon: appears when the battery voltage is getting low.
3) The hourglass icon: appears during the countdown.
4) Status information.
5) Measurement unit.
6) Lamp status indicator.
7) Four digit secondary display.

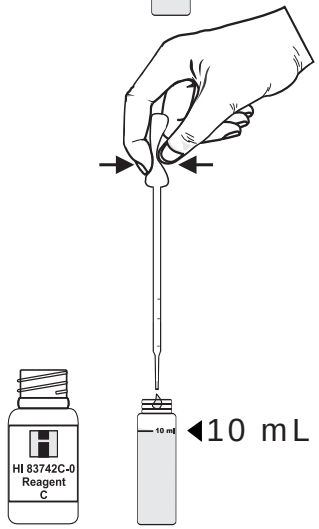
- Add 6 drops of HI 83742B-0 Folin & Ciocalteu's Reagent to the cuvet.



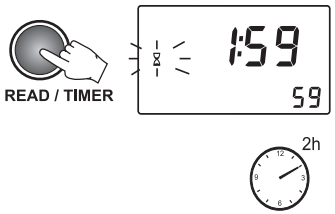
- Replace the cap and shake gently to mix.



- Wait for 1 minute and then use the 3 mL pipette to add HI 83742C-0 Reagent C Carbonate Buffer, to bring the volume up to the 10 mL mark.



- Turn the meter ON and press RANGE to select the parameter code "P4" for total phenols, white wine (see page 13). Then hold down READ/TIMER for several seconds. The instrument will show the countdown. Alternatively, wait for 2 hours.
  The instrument gives an acoustic signal to alert the user that the countdown is finished.



- This is the reacted sample.

#2
(Sample)

TOTAL PHENOLS, WHITE WINE

SPECIFICATIONS

Range	0.000 to 0.750 g/L
Resolution	0.001
Precision	±0.015 @ 0.350 g/L
Light Source	Tungsten lamp with narrow band interference filter @ 610 nm
Method	The reaction between Phenols and the reagents causes a blue tint in the sample.

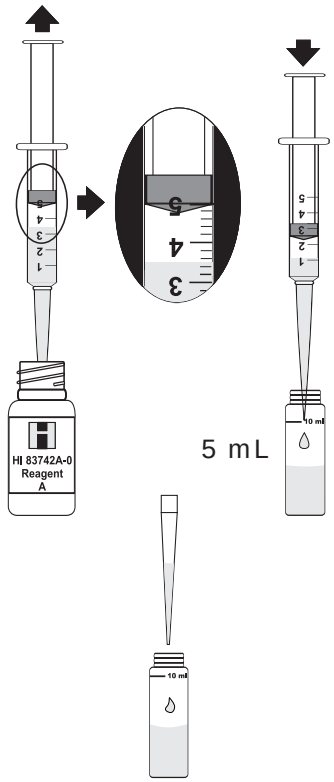
REQUIRED REAGENTS

Code	Description	Quantity/test
HI 83742A-0	Acid Reagent	5 mL
HI 83742B-0	Folin & Ciocalteu's Reagent	6 drops
HI 83742C-0	Carbonate Buffer	4.5 mL

For reagent set and other accessories see page 26.

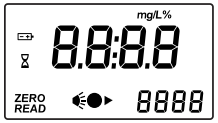
SAMPLE PREPARATION

- Use the 5 mL syringe to add exactly 5 mL of HI 83742A-0 reagent to an empty cuvet.
  Note: in order to measure exactly 5 mL of reagent with the syringe, follow the instructions on page 11.

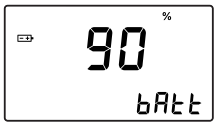


- Use the 200 µL automatic pipette to add exactly 0,2 mL of white wine sample to an empty cuvet.
  For a correct use of the automatic pipette please follow the related Instruction Sheet.

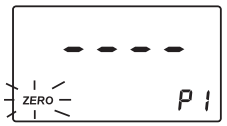
GUIDE TO DISPLAY CODES



This prompt appears for a few seconds each time the instrument is turned ON.

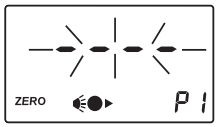


These prompts indicate the type of power supply: "Line" (if the external power supply is used) or the battery level.

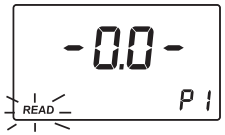


Indicates that the instrument is in a ready state and waiting for the next command (Timer or Zero).

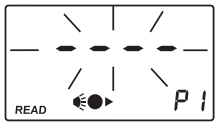
After Timer is pressed, a blinking hourglass icon appears and the display shows a 2 hours coundown. Also the Zero tag might blink if no zero measurement has been made before. At the end of the countdown an acoustic signal alerts the user that the timer is finished.



Indicates that the meter is performing a zero measurement. The light intensity is automatically re-adjusted (auto-calibration features) if necessary.

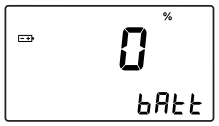


The instrument is zeroed and a measurement can be made.



Indicates that the meter is making a measurement.

Batteries voltage is getting low and the batteries need to be replaced.

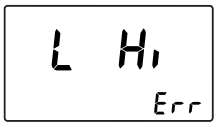


Indicates that the batteries are dead and must be replaced. After this message appears, the instrument is switched off. Change the batteries and restart the meter.

ERROR MESSAGES

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

a) on zero reading:



"Light high": there is too much light to perform a measurement. Please check the preparation of the zero cuvet.

"Light low": there is not enough light to perform a measurement. Contact your dealer or the nearest Hanna Customer Service Center.

"No Light": the instrument cannot adjust the light level. Contact your dealer or the nearest Hanna Customer Service Center.

b) on sample reading:

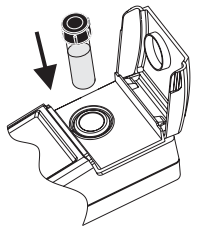
"Inverted": the sample and the zero cuvet are inverted.

The sample absorbs less light than the zero reference. Check the procedure and make sure you use the same cuvet for reference (zero) and measurement.

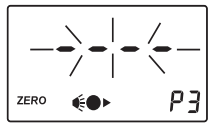
A flashing value of the maximum concentration indicates an over range condition. The concentration of the sample is beyond the programmed range: dilute the sample and measure again.

- Fill an empty cuvet with deionized water and replace the cap. This is the **zero**.

#1
(Zero)



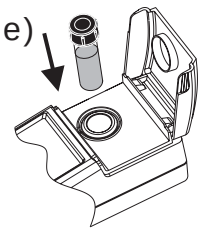
- Insert the zero cuvet into the holder and close the lid.
- Press ZERO and "----" will blink on the display.



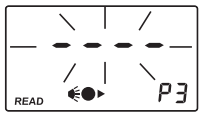
- After a few seconds the display will show "-0.0-". The meter is now zeroed and ready for measurement.

- Remove the cuvet from the instrument.

#2
(Sample)



- Insert the sample (cuvet #2) into the holder and close the lid.
- Press READ/TIMER and "----" will blink during measurement.



- The instrument directly displays the color hue on the Liquid Crystal Display.

INTERFERENCES

Suspended matter should be removed by centrifugation or prior filtration. Use an adequate filter material that does not absorb color.

COLOR HUE

SPECIFICATIONS

Range	0.00 to 9.99
Resolution	0.01
Precision	±0.03 @ 0.75
Light Source	Tungsten lamp with narrow band interference filters @ 420 and 520 nm
Method	Direct reading.

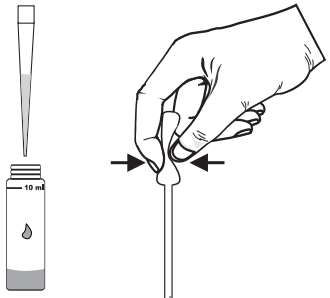
REQUIRED REAGENTS

Code	Description	Quantity/test
HI 83742-0	Wine Solvent-1	8 mL

For reagent set and other accessories see page 26.

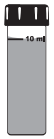
SAMPLE PREPARATION

- Use the 2000 µL automatic pipette to add exactly 2 mL of wine sample to an empty cuvet. For a correct use of the automatic pipette please follow the related Instruction Sheet.



- Then use the 1 mL plastic pipette to fill the cuvet with HI 83742-0 Wine Solvent-1 up to the 10 mL mark.

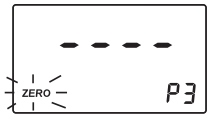
- Replace the cap. This is the sample.



#2
(Sample)

MEASUREMENT

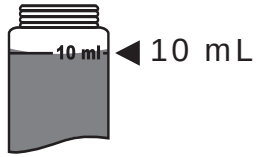
- Press "RANGE" to select the parameter code "P3" for color hue (see page 13).



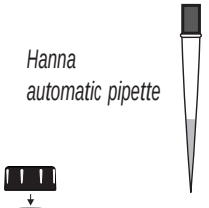
GENERAL TIPS FOR AN ACCURATE MEASUREMENT

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

- For a correct filling of the cuvet: the liquid in the cuvet forms a convexity on the top; the bottom of this convexity must be at the same level of the 10 mL mark.

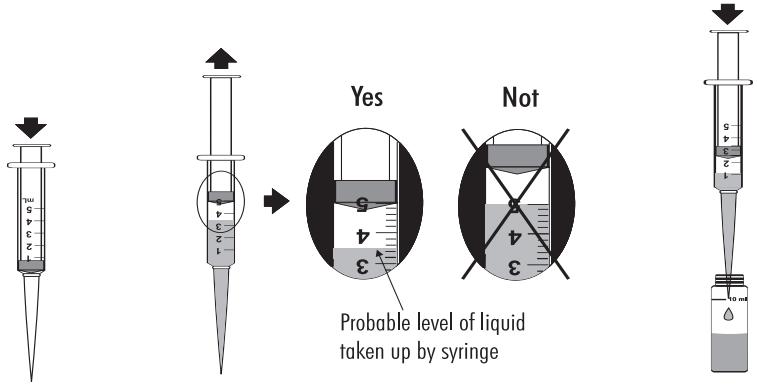


- For dosing the wine sample, we recommend to use the supplied Hanna automatic pipettes (HI 731340 - 200 µL, HI 731342 - 2000 µL). For a correct use of the Hanna automatic pipette, please follow the related Instruction Sheet.

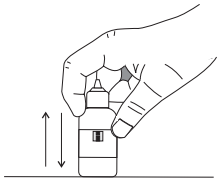


- In order to avoid reagent leaking and to obtain more accurate measurements, it is recommended to close the cuvet first with the supplied HDPE plastic stopper and then with the black cap.

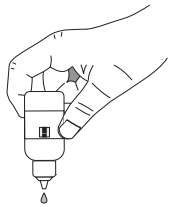
- In order to measure exactly 5 mL of reagent with the 5 mL syringe:
  (a) push the plunger completely into the syringe and insert the tip into the reagent bottle.
  (b) pull the plunger up until the lower edge of the seal is exactly on the 5 mL mark.
  (c) take out the syringe and clean the outside of the syringe tip. Be sure that no drops are hanging on the tip of the syringe, if so eliminate them. Then, keeping the syringe in vertical position above the cuvet, push the plunger completely down into the syringe. Now the exact amount of 5 mL has been added to the cuvet.



- Proper use of the dropper:
  (a) to get good reproducible results, tap the dropper on the table for several times and wipe the outside of the dropper tip with a cloth.
  (b) always keep the dropper bottle in a vertical position while dosing the reagent.

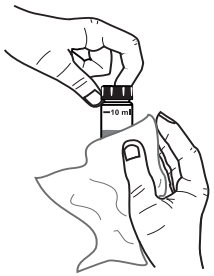


(a)



(b)

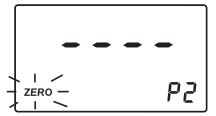
- Whenever the cuvet is placed into the measurement cell, it must be dry outside, and completely free of fingerprints, oil or dirt. Wipe it thoroughly with **HI 731318** (tissue for wiping cuvets, see chapter ACCESSORIES) or a lint-free cloth prior to insertion.



- Do not let the reacted sample stand too long after reaction, or accuracy will be lost.
- After the reading it is important to discard immediately the sample, otherwise the glass might become permanently stained.
- All the reaction times reported in this manual are referred to 20°C (68°F). As a general rule of thumb, they should be doubled at 10°C (50°F) and halved at 30°C (86°F).

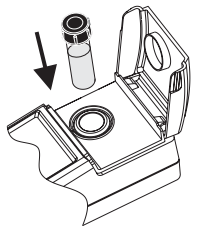
MEASUREMENT

- Press "RANGE" to select the parameter code "P2" for color density - red wine (see page 13).

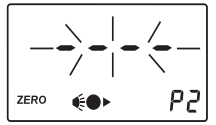


- Fill an empty cuvet with deionized water and replace the cap. This is the **zero**.

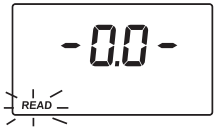
#1
(Zero)



- Insert the zero cuvet into the holder and close the lid.
- Press ZERO and "----" will blink on the display.

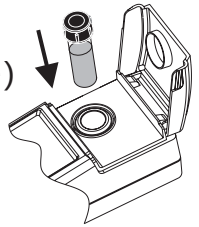


- After a few seconds the display will show "-0.0-". The meter is now zeroed and ready for measurement.

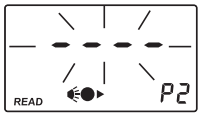


- Remove the cuvet from the instrument.

#2
(Sample)



- Insert the sample (cuvet #2) into the holder and close the lid.
- Press READ/TIMER and "----" will blink during measurement.



- The instrument directly displays the color density on the Liquid Crystal Display.

INTERFERENCES

Suspended matter should be removed by centrifugation or prior filtration. Use an adequate filter material that does not absorb color.

COLOR DENSITY, RED WINE

SPECIFICATIONS

Range	0.00 to 15.00
Resolution	0.01
Precision	±0.20 @ 5.00
Light Source	Tungsten lamp with narrow band interference filters @ 420 and 520 nm
Method	Direct reading.

REQUIRED REAGENTS

Code	Description	Quantity/test
HI 83742-0	Wine Solvent-1	8 mL
HI 83742-3	Wine Solvent-3	8 mL [optional reagent]

For reagent set and other accessories see page 26.

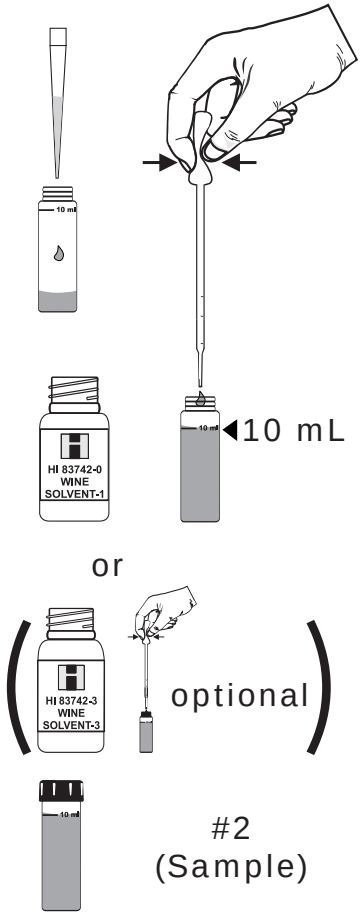
SAMPLE PREPARATION

- Use the 2000 µL automatic pipette to add exactly 2 mL of red wine sample to an empty cuvet. For a correct use of the automatic pipette please follow the related Instruction Sheet.
- Then use the 1 mL plastic pipette to fill the cuvet with HI 83742-0 Wine Solvent-1 (or with HI 83742-3 Wine Solvent-3 - optional reagent) up to the 10 mL mark.

  Note: HI 83742-0 Wine Solvent 1 is used to measure the true color of red wines and the results obtained are conform to EC Directive 2676/90. The corresponding replacement kit is HI 83742-25 (see page 26).

  Note: HI 83742-3 Wine Solvent 3 is a stabilized and ready-to-use solution at a fixed pH value (=3.2) to compare different types of dark colored wine samples often used for blending. The corresponding replacement kit is HI 83742-27 (see page 26).

- Replace the cap. This is the sample.

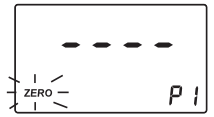


OPERATIONAL GUIDE

MEASUREMENT PROCEDURE

- Turn the instrument on by pressing ON/OFF.

- The meter will first perform an LCD self diagnostic test by displaying a full set of figures.
- When the LCD displays "----", it is ready. On the secondary LCD a code indicates which parameter is selected ("P1" or "P2" or... "P5"). The display code that appears is the one of the last selected parameter.



- Press the RANGE key to select the desired parameter.
- After the desired parameter code appears on the display, perform a measurement procedure following the instructions reported in the related chapter.

PARAMETER REFERENCE TABLE

HI 83742 - COLOR & PHENOLS

Code	Parameter	Page
1	Color Density, white wine	14
2	Color Density, red wine	16
3	Color Hue	18
4	Total Phenols, white wine	20
5	Total Phenols, red wine	23

COLOR DENSITY, WHITE WINE

SPECIFICATIONS

Range	0.000 to 1.000
Resolution	0.001
Precision	±0.010 @ 0.200
Light Source	Tungsten lamp with narrow band interference filter @ 420 nm
Method	Direct reading.

REQUIRED REAGENTS

No reagents required. For other accessories see page 26.

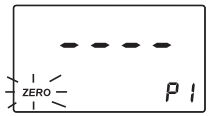
SAMPLE PREPARATION

- Use the plastic pipette to fill a cuvet with white wine. and replace the cap. This is the sample.

#2
(Sample)

MEASUREMENT

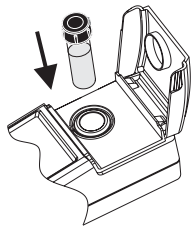
- Press "RANGE" to select the parameter code "P1" for color density - white wine (see page 13).



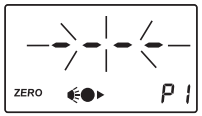
- Fill an empty cuvet with deionized water and replace the cap. This is the **zero**.

#1
(Zero)

- Insert the zero cuvet into the holder and close the lid.



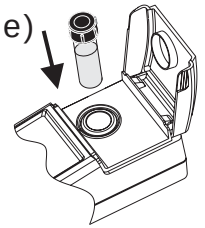
- Press ZERO and "----" will blink on the display.



- After a few seconds the display will show "-0.0-". The meter is now zeroed and ready for measurement.

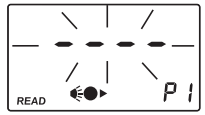
- Remove the cuvet from the instrument.

#2
(Sample)



- Insert the sample (cuvet #2) into the holder and close the lid.

- Press READ/TIMER and "----" will blink during measurement.



- The instrument directly displays the color density on the Liquid Crystal Display.

INTERFERENCES

Suspended matter should be removed by centrifugation or prior filtration. Use an adeguate filter material that does not adsorb color.