

# Wine Testing Catalog

Introducing  
Hanna's  
Full Line  
of Wine  
Instrumentation



VIEW  
TE

[www.hannainst.com/usa](http://www.hannainst.com/usa)

 **HANNA**<sup>®</sup>  
instruments

With Great Products, Come Great Results™

# HI 901·HI 902 Automatic Titrators



## Designed to Measure:

pH · Free and Total  $\text{SO}_2$  · Reducing Sugars · Total Acidity · Volatile Acidity · General Alcohol · Ammonium · Potassium Fluoride · Nitrogen

## Clip Lock™ Exchangeable Burette System

With Clip-Lock™, it only takes a couple seconds to exchange the reagent burettes to perform a different titration.



## A Complete Analysis

These instruments perform a complete analysis comprising of sample preparation, dispensing of titrant solution, stirring, measuring and waiting times, recognition of the end point and storing the results. All the parameters that a titration requires are grouped into a method.

The titrators are already supplied with a pack of standard methods or you can create your own. Using a floppy disk or connecting the titrator to HI 900 PC application, methods (standard and user) can be upgraded, stored or deleted.

## Ordering information

HI 901-01 Titrator supplied with one burette driver assembly, 25 mL glass burette, stirrer unit, 115 VAC

HI 902-01 Titrator supplied with two burette driver assemblies, 25 mL glass burette, stirrer unit, 115 VAC

## Electrodes, Solutions and Accessories

### ISE Electrodes



<b>HI 4101</b> <b>AMMONIA</b> <b>Gas-Sensing;</b> <b>Combination</b>	<b>HI 4002</b> <b>BROMINE</b> <b>Solid-state;</b> <b>Half-cell</b>	<b>HI 4010</b> <b>FREE</b> <b>FLUORIDE</b> <b>Solid-state;</b> <b>Half-cell</b>	<b>HI 4110</b> <b>FREE</b> <b>FLUORIDE</b> <b>Solid-state;</b> <b>Combination</b>	<b>HI 4014</b> <b>POTASSIUM</b> <b>Polymer</b> <b>Membrane;</b> <b>Half-cell</b>	<b>HI 4114</b> <b>POTASSIUM</b> <b>Polymer</b> <b>Membrane;</b> <b>Combination</b>
Determination of ammonium, ammonia in wine	Determination of free bromide ions in wine	Determination of free fluoride in wine	Determination of free fluoride in wine	Determination of potassium ions in wine	Determination of potassium ions in wine

### Electrodes

<b>HI 1131B</b>	pH Electrode, refillable, glass body, single junction, BNC, 1 m (3.3') cable
<b>HI 1083B</b>	pH electrode, glass body, Ø 3 mm, single junction, BNC and 1 m cable
<b>HI 1048B</b>	pH electrode for wine applications, refillable, with annular Teflon® junction, glass body, PNC connector, 1 m (3.3') cable
<b>FC 200B</b>	pH electrode for dairy products, with non-toxic material body, conic tip, open junction, BNC connector, 1m (3.3') cable
<b>HI 7662-T</b>	Temperature probe

### Solutions

#### Electrode Maintenance

<b>HI 6004</b>	pH 4 millesimal calibration
<b>HI 6007</b>	pH 7 millesimal calibration solution, 500 mL bottle
<b>HI 6010</b>	pH 10 millesimal calibration solution, 500 mL bottle
<b>HI 70300L</b>	Electrode storage solution, 500 mL bottle

#### Accessories

<b>HI 900100</b>	Dosing Pump	<b>HI 900920</b>	Temperature Probe
<b>HI 900105</b>	5 mL Burette	<b>HI 900930</b>	RS232 cable for PC connection
<b>HI 900110</b>	10 mL Burette	<b>HI 900900</b>	Windows® compatible software
<b>HI 900125</b>	25 mL Burette	<b>HI 900270</b>	Aspiration tube
<b>HI 900301</b>	Propeller stirrer with sliding positioning collar	<b>HI 900280</b>	Dosing tube

# HI 222

## Wine pH and Temperature Bench Meter

- Features HANNA's Calibration Check™
- Electrode condition on LCD display
- Computer compatible



### Recognizing dirty pH electrodes

In the process of wine making, most pH measurements are made in the must. A pH electrode gets dirty rapidly when measuring the pH of must because sediments deposit on the pH measuring bulb and on the pH electrode junction. This becomes a big problem during the actual pH measurement, and even after, if the electrode has not been properly cleaned. Simply, a dirty pH electrode can give results that are up to 0.5 pH inaccurate — even after a pH calibration has just been performed.

### Knowing when to clean pH electrodes

Conventional pH meters do not warn the user when the pH electrode is dirty. A common example of this occurs just after calibrating the instrument — the pH electrode is immersed into the pH 7 buffer and the reading is lower than expected (pH 6.8 or 6.9 instead of 7.0). HI 222 uses HANNA's unique technology to detect when the electrode is dirty and gives a warning during calibration.

### Cleaning pH electrodes

It is of the utmost importance to properly clean the pH electrode prior to use. A proper cleaning of the electrode must be done with appropriate cleaning solutions in order to remove all the deposits on the sensitive bulb and junction. HI 70635 (wine deposits removal) and HI 70636 (wine stain removal) are tailored made cleaning solutions that remove all deposits from your pH electrode and will guarantee your measurements are always accurate and your pH electrode will last a long time. HANNA is the only manufacturer to offer tailor made cleaning solutions for winemaking.

### Calibration Check™ Features

- :: **Calibration messages**  
During calibration, the user is warned if one or more parameters are not suitable to perform an accurate calibration.
- :: **Electrode condition on LCD display**  
Determined from the electrode offset and slope.
- :: **Electrode response time on LCD display**  
Determined from electrode performance during calibration.
- :: **Calibration alarm time out**  
Can be programmed from 1 to 7 days or can be disabled.



### Ordering information

HI 222 is supplied complete with HI 1048P CPS™ glass-body combination pH electrode with 1 m cable, HI 7669/2W stainless steel temperature probe, HI 76404 electrode holder, pH 3.00 and pH 7.01 calibration solutions for wine calibration, wine stains and deposits cleaning solutions, storage solution, 12V DC adapter, quick reference card for pH in wine analysis and instruction manual.

## Electrodes, Solutions and Accessories

### Electrodes

<b>HI 1043P</b>	Glass body, double junction, refillable, combination pH electrode
<b>HI 1053P</b>	Glass body, triple ceramic, conic shape, refillable, combination pH electrode
<b>HI 1131P</b>	Glass-body, single junction, refillable, combination pH electrode
<b>HI 1083P</b>	Glass -body, micro, Viscolene, nonrefillable, combination pH electrode
<b>HI 1048P</b>	Glass-body, refillable, pH electrode with open junction
<b>HI 3131P</b>	Glass-body, refillable, combination platinum ORP electrode

### Calibration Solutions

#### pH Calibration Solutions

<b>HI 5003P</b>	pH 3.00 Buffer Solution, (25) 20 mL sachets	<b>HI 7009L</b>	pH 9.18 Buffer Solution, 500 mL
<b>HI 70004P</b>	pH 4.01 Buffer Solution, (25)20 mL sachets	<b>HI 7010L</b>	pH 10.01 Buffer Solution, 500 mL
<b>HI 70007P</b>	pH 7.01 Buffer Solution, (25) 20 mL sachets	<b>HI 7001L</b>	pH 1.68 Buffer Solution in FDA approved bottle, 500 mL
<b>HI 70010P</b>	pH 10.01 Buffer Solution, (25) 20 mL sachets	<b>HI 8004L</b>	pH 4.01 Buffer Solution in FDA approved bottle, 500 mL
<b>HI 7001M</b>	pH 1.68 Buffer Solution, 250 mL	<b>HI 8006L</b>	pH 6.86 Buffer Solution in FDA approved bottle, 500 mL
<b>HI 5003</b>	pH 3.00 Buffer Solution, 500 mL	<b>HI 8007L</b>	pH 7.01 Buffer Solution in FDA approved bottle, 500 mL
<b>HI 7004L</b>	pH 4.01 Buffer Solution, 500 mL	<b>HI 8009L</b>	pH 9.18 Buffer Solution in FDA approved bottle, 500 mL
<b>HI 7006L</b>	pH 6.86 Buffer Solution, 500 mL	<b>HI 8010L</b>	pH 10.01 Buffer Solution in FDA approved bottle, 500 mL
<b>HI 7007L</b>	pH 7.01 Buffer Solution, 500 mL		

### Electrode Maintenance Solutions

#### Storage Solutions

<b>HI 70300L</b>	Storage solution, 500 mL
<b>HI 80300L</b>	Storage solution in FDA approved bottle

#### Cleaning Solutions

<b>HI 70000P</b>	Electrode Rinse Solution, (25) 20 mL sachets	<b>HI 7061L</b>	General Cleaning solution, 500 mL
<b>HI 700635P</b>	Cleaning Solution for wine deposits, (25) 20mL sachets	<b>HI 7073L</b>	Protein Cleaning Solution, 500 mL
<b>HI 700636P</b>	Cleaning Solution for wine stains, (25) 20 mL sachets	<b>HI 7074L</b>	Inorganic Cleaning Solution, 500 mL
<b>HI 70635L</b>	Cleaning Solution for wine deposits, 500 mL	<b>HI 7077L</b>	Oil & Fat Cleaning Solution, 500 mL
<b>HI 70636L</b>	Cleaning Solution for wine stains, 500 mL	<b>HI 8061L</b>	General Cleaning Solution in FDA approved bottle
		<b>HI 8073L</b>	Protein Cleaning Solution in FDA approved bottle
		<b>HI 8077L</b>	Oil and Fat Cleaning Solution in FDA approved bottle

#### Refilling Electrolyte Solutions

<b>HI 7071</b>	3.5M KCl + AgCl Electrolyte, (4 )30 mL, for single junction electrodes
<b>HI 7072</b>	1 M KNO <sub>3</sub> Electrolyte (4) 30 mL
<b>HI 7082</b>	3.5M KCl Electrolyte, (4) 30 mL, for double junction electrodes
<b>HI 8071</b>	3.5M KCl + AgCl Electrolyte in FDA approved bottle, (4) 30 mL, for single junction electrodes
<b>HI 8072</b>	1M KNO <sub>3</sub> Electrolyte in FDA approved bottle, (4) 30 mL
<b>HI 8082</b>	3.5M KCl Electrolyte in FDA approved bottle, (4) 30 mL, for double junction electrodes

### Accessories

<b>HI 92000</b>	Windows® compatible software
<b>HI 920010</b>	9-pin serial cable for PC
<b>HI 710005</b>	Voltage adapter from 115V to 12 VDC (USA plug)
<b>HI 710006</b>	Voltage adapter from 230V to 12 VDC (European plug)
<b>HI 710012</b>	Voltage adapter from 240V to 12 VDC (UK plug)
<b>HI 710013</b>	Voltage adapter from 230V to 12 VDC (South Africa plug)
<b>HI 710014</b>	Voltage adapter from 230V to 12 VDC (Australia plug)
<b>ChecktempC</b>	Pocket-size thermometer (range -50.0 to 120.0°C)

# HI 9026W

## pH and Temperature in Wine

- **Electrode monitoring**
- **7 memorized buffers for calibration**
- **Custom calibration with two custom buffers**
- **Measures in °C or °F**
- **Backlit, dual-level LCD**
- **Supplied ready to use in a hard carrying case**



### Calibration Check™ System



#### Clean Electrode

Each time pH calibration is performed, the meter internally compares the new calibration with the one previously stored. When this comparison indicates a significant difference, the clean message blinks on the LCD to advise the user that the pH electrode may need to be cleaned and another calibration will need to be performed.



#### Expired Calibration

The instrument is provided with a real time clock (RTC) in order to monitor the time elapsed since the last pH calibration. The RTC is reset every time the meter detects a calibration time-out. The CAL tag will start blinking to warn the user that the meter should be calibrated.

### Ordering information

HI 9026W is supplied with HI 1048B CPS™ pH electrode, HI 7662 temperature probe, pH 3 & pH 7 buffer sachets (20 mL ea.), wine stains and deposits cleaning solution sachets (20 mL ea.), 100 mL plastic beaker, batteries, rugged carrying case and instructions.

### Electrodes, Solutions and Accessories

#### Calibration Solutions pH Calibration Solutions

<b>HI 5003</b>	pH 3.00 Buffer Solution @ 25°C, 500 mL (1 pint)
<b>HI 7007L</b>	pH 7.01 Buffer Solution @ 25°C, 500 mL (1 pint)

#### Electrode Maintenance Cleaning and Storage Solutions

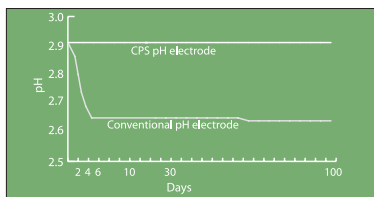
<b>HI 70635L</b>	Cleaning solution for wine deposits, 500 mL
<b>HI 70636L</b>	Cleaning solution for wine stains, 500 mL (1 pint)
<b>HI 7082 3.5M</b>	KCl Electrolyte, (4)30 mL, for double junction electrodes
<b>HI 70300L</b>	Storage Solution, 500 mL

# HI 1048P

## HANNA's CPS™ Electrode for Wine Measurement

CPS™ (Clogging Prevention System) is HANNA's latest innovation in pH electrode technology. Conventional pH electrodes use ceramic junctions that clog quickly when used with wine. When the junction is clogged the electrode does not function. CPS™ technology utilizes the porousness of ground glass coupled with a PTFE sleeve to prevent clogging of the junction. The ground glass allows proper flow of the liquid, while the PTFE sleeve repels dirt. As a result of HANNA's new CPS™ technology, pH electrodes stay fresh for up to 20 times longer than conventional electrodes.

Effects of dirty pH electrode junctions (conventional pH electrode) vs. CPS pH electrode.



After a few days conventional electrodes are already contaminated while the CPS™ pH electrode remains clean for over 100 days.

### Tailor-made Calibration for Wine with pH 3.00 Buffer

HI 222 is the only pH meter in the market today that allows for 2 point pH calibration by using buffers 3 and 7. The ability to calibrate at buffer 3.00 reduces errors due to calibration.

# HI 190 M

## Magnetic Stirrer

Compact magnetic mini-stirrers with electronic controls that allow the user to regulate speed with greater precision.

• With speed safe technology



# HI 84100

## mini Titrator

For the Determination of Sulfur Dioxide For Wine Analysis



- **Titrator, magnetic stirrer, electrode holder & reagent holder in one compact unit**
- **Results in minutes**
- **Simple to operate**



### Significance of Use

An important reason for adding SO<sub>2</sub> is to avoid oxidation. When there is oxygen around, SO<sub>2</sub> itself becomes oxidized before phenol compounds in the wine, and so acts as an oxygen scavenger. Also, SO<sub>2</sub> suppresses the activity of enzymes that cause browning and other problems.

What is really protecting your wine is molecular SO<sub>2</sub>. When you add SO<sub>2</sub>, depending of circumstances, some of it immediately becomes bound. The relationship between the amount of SO<sub>2</sub> and amount of SO<sub>2</sub> remaining free is complex. It is clear, however, that is largely governed by the total SO<sub>2</sub> content of the wine. The rate of binding decreases as the free SO<sub>2</sub> concentration increases. The exact relationship between free and bound (total-free) SO<sub>2</sub> will vary from wine to wine.

Below 30-60 ppm, 33% to 50% of SO<sub>2</sub> addition becomes bounded. What remains is called "free" and it is divided in two parts. The larger, and relatively ineffective free part is "bisulphite" (HSO<sup>-</sup>). The smaller part of the free is the active molecular. The amount of molecular SO<sub>2</sub> in your wine depends both on the level of free SO<sub>2</sub> present as well as pH. For instance, at pH 3.2, the amount of the free SO<sub>2</sub> for 0.8 ppm molecular SO<sub>2</sub> is 22 ppm. At pH 3.5, you will need 43 ppm free - essentially double.

In most situations, 0.8 pp, molecular SO<sub>2</sub> during bulk storage and at bottling will provide you with adequate protection from oxidation and bacterial action. This includes prevention of malolactic bacteria as well.

It is important to remember that the amount of free SO<sub>2</sub> in the wine depends on three things: how much is added, how much was present before the addition and how much of your addition promptly becomes bound.

The level at which molecular SO<sub>2</sub> can be detected by the human senses is about 2.0 ppm. This is also the level which is needed for maximum protection of your wine. This is particularly true in the case of sweet, and most notably, botrytised wines.

The Hanna HI 84100 offers the possibility to test free or total SO<sub>2</sub> in all the wines including the red ones, that are difficult to test with manual methods because the color changes are hardly seen.

### Ordering information

**HI 84100** is supplied with reagent set for 20 titrations, (2) 50 mL beakers, (2) 20 mL beakers, scissors, tube set with cap, ORP electrode, stir bar, power cable, 30 mL bottle of refill solution, 1 mL syringe, (2) wine deposits cleaning solution sachets, (2) wine stain cleaning solution sachets and instruction manual.

### Electrodes, Solutions and Accessories

#### Electrodes

**HI 3148B** ORP probe with shorter cable

#### Reagents

**HI 84100-50** Titrant solution (110 mL)

**HI 84100-51** Alkaline reagent (500 mL)

**HI 84100-52** Acid reagent for total SO<sub>2</sub> determination (500 mL)

**HI 84100-53** Acid reagent for free SO<sub>2</sub> determination (500 mL)

**HI 84100-54** Stabilizer reagent (25 pcs)

**HI 84100-55** Calibration standard (500 mL)

#### Electrode Maintenance Solutions

#### Cleaning and Storage Solutions

**HI 70300L** Storage solution (500 mL)

**HI 7082** Filling solution (4) 30 mL bottles

**HI 70635** Cleaning solution for wine deposits (500 mL)

**HI 70636** Cleaning solution for wine stains (500 mL)

#### Accessories

**HI 70483T** Tube set with cap for titrant bottle and tip

**HI 731316** Stir bar (5)

**HI 740036P** Beaker (10) 50 mL

**HI 740037P** Beaker (10) 20 mL

**HI 740198** Power cable

Free SO<sub>2</sub> concentration (ppm) for 0.8 ppm molecular SO<sub>2</sub> :

pH	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
free SO <sub>2</sub>	14	18	22	28	35	44	55	69	87	109

# HI 84102

## mini Titrator

For the Determination of  
Titratable Total Acidity For  
Wine Analysis



- **Titrator, magnetic stirrer, electrode holder & reagent holder in one compact unit**
- **Results in minutes**
- **Simple to operate**

### Significance of Use

Acids occur naturally during the growing of grapes as part of the fermentation process. Wines show lower levels of acid when there are hot growing seasons or when the grapes come from hotter regions. In the proper proportion, acids are a desirable trait and give the wine character.

The three predominant acids in wine are tartaric, malic, and citric, all of which are intrinsic to the grape. Tartaric acid is the principal acid in grapes and is a component that promotes a crisp flavor and graceful again in wine. A moderate amount of a wine's acid comes from malic acid, which contributes to fruitiness, and a small amount comes from citric acid. Wine also contains trace amounts of other acids. The least desirable acid in wine is acetic acid, which, when present in more than a nominal amount, give wine a sour vinegary aspect.

Total acidity, also called, titratable acidity, is the sum of the fixed and volatile acids. In the United States the total acidity is usually expressed in terms of tartaric acid, even though the other acids are measured.

Total acidity directly effects the color and flavor of wine and, depending on the style of the wine, is sought in a perfect balance with the sweet and bitter sensations of other components. Too much acidity makes wine tart and sharp; too little makes wines flat, flabby and uninteresting. Proper acidity in wine is what makes it refreshing and an ideal accompaniment to food.

The proper acid level of a wine varies, with sweeter wines generally requiring somewhat higher levels to retain the proper balance. For dry table wine the acceptable range is usually 0.60 to 0.75%; for sweet wine it's 0.70 to 0.85%.

### Ordering information

HI 84102 is supplied complete with reagent set for 20 titrations, 2000 µL automatic pipette, (2) plastic tips for 2000 µL automatic pipette, (2) 50 mL beakers, tube set with cap, pH electrode, temperature probe, stir bar, power cable, 30 mL bottle of refill solution, 1 mL syringe, (2) wine deposits cleaning solution sachets, (2) wine stain cleaning solution sachets and instruction manual.

### Electrodes, Solutions and Accessories

#### Electrodes

- HI 1048B pH Electrode
- HI 7662-T Temperature probe

#### Reagents

- HI 84102-50 Titrant solution (110 mL)
- HI 84102-55 Calibration standard (100 mL)
- HI 84102-60 Buffer solution 1, pH 7.00 (500 mL)
- HI 84102-61 Buffer solution 2, pH 8.20 (500 mL)

#### Electrode Maintenance Solutions

#### Cleaning and Storage Solutions

- HI 70635 Cleaning solution for wine deposits (500 mL)
- HI 70636 Cleaning solution for wine stains (500 mL)
- HI 70300L Electrode storage solution (500 mL)
- HI 7082 Electrode filling solution (4)30 mL

#### Accessories

- HI 70483T Tube set ( with cap) for titrant bottle and tip
- HI 731316 Stir bar (5)
- HI 731342 Automatic pipette 2000 µL
- HI 731352 (4) Tips for 2000 µL automatic pipette
- HI 740036P Beaker (10) 50 mL
- HI 740198 Power cable

# HI 84181

## ISE Potassium Meter

- Quick analysis
- Small bench space
- Built-in electrode holder

### Significance of Use

Potassium ion ( $K^+$ ) is absorbed in vine from earth. Unlike other essential nutrients potassium remains in ionic form and passes to the grapes.

Potassium ion is by far the most important ion that can be found in wine with concentrations between 0.7-2 g/L (ppt) and is mostly deriving from grapes.

Potassium ion is greatly influencing the taste of wine, the absence of potassium ion giving a sour taste of wine.

The alcohol content and low temperature make potassium to precipitate as potassium bitartrate. Red wines have an increased content of potassium compared to white wines because the phenols inhibit the precipitation of potassium bitartrate in the red wine.

The HI 84181 ISE Potassium meter measures the potassium content in wine using an ion selective electrode. The used method is double standard addition, a simple and rapid method of analysis, and the result is readily displayed in g/L  $K^+$  (ppt).

Above 2.5 g/L the instrument provides information about the approximate potassium content.



### Ordering information

**HI 84181** is supplied with reagents for 20 tests, HI 61014 Potassium half cell ISE electrode, HI 5315 reference half cell, HI 7665-T temperature probe, 2000  $\mu$ L automatic pipette, filling solution, 2 plastic beakers (50 mL), magnetic stir bar, 1 mL syringe, 1 mL pipette and tip, power cable, and instruction manual.

### Electrodes, Solutions and Accessories

#### Electrodes

**HI 7662T** Temperature probe

**HI 61014** Potassium half cell

**HI 5315** Reference half cell

#### Reagents

**HI 84100-20** Reagent set for 20 tests

**HI 84181-0** ISA solution for potassium analysis in wine, 500 mL

**HI 84181-1** Standard solution No.1 for potassium analysis

**HI 84181-2** Standard solution No.2 for potassium analysis

#### Electrode Maintenance Solutions

#### Cleaning and Storage Solutions

**HI 7093** Electrode filling solution

#### Accessories

**HI 740036P** Beaker 50 mL (10 pcs)

**HI 731316** Stir bar (5)

**HI 731342** Automatic pipette 2000  $\mu$ L

**HI 731352** Tips for 2000  $\mu$ L automatic pipette (25pcs)

**HI 740143** Syringe 1mL (6 pcs)

**HI 740144** Syringe tip (6 pcs)

**HI 741355P** Capillary pipette

# HI 84184

## ISE Fluoride Meter

- Quick analysis
- Small bench space
- Built-in electrode holder

### Significance of Use

Fluoride ion (F<sup>-</sup>) comes from grapes used for wine and its usual concentration value varies between 0.1 and 2 mg/L. Higher levels of Fluoride content in wine can derive from cryolite used by farmers as an insecticide in the vine.

The HI 84184 ISE Fluoride meter measures the Fluoride content in wine using an ion selective electrode. The used method is double standard addition, and the result is readily displayed in F<sup>-</sup> mg/L (ppm).

### Ordering information

**HI 84184** is supplied with reagents for 20 tests, HI 61010 Fluoride ISE half cell electrode, HI 5315 reference half cell, HI 7665-T temperature probe, 1000 µL automatic pipette, 2 plastic beakers (50 mL), 2 plastic beakers (20 mL), electrolyte solution, magnetic stir bar, 1 mL syringe, 1 mL pipette and tip, power cable and instruction manual.



### Electrodes, Solutions and Accessories

#### Electrodes

- HI 7662T** Temperature probe  
**HI 61010** Fluoride half cell  
**HI 5315** Reference half cell

#### Solutions

##### Reagents

- HI 84184-20** Reagent set for 20 tests  
**HI 84184-0** TISAB solution for fluoride analysis in wine, 500 mL  
**HI 84184-1** Standard solution No.1 for fluoride analysis in wine, 500mL  
**HI 84184-2** Standard solution No.2 for fluoride analysis in wine, 500 mL

#### Electrode Maintenance

##### Cleaning and Storage Solutions

- HI 7075** Electrode filling solution
- #### Accessories
- HI 740036P** (10) 50 mL plastic beaker  
**HI 740037P** (10) 20 mL plastic beaker  
**HI 731316** Stir bars (5)  
**HI 731341** Automatic pipette 1000 µL  
**HI 731351** (25) Tips for 1000 µL automatic pipette  
**HI 740143** (6) Syringe 1mL  
**HI 740144** (6) Syringe tip  
**HI 741355P** Capillary pipette

# HI 84185

## ISE Ammonia Nitrogen Meter

- Quick analysis
- Small bench space
- Built-in electrode holder

### Significance of Use

The nitrogenous compounds of must and wine are deriving from grapes and play an important role in fermentation, clarification, and potential microbial instability of wines. They are profoundly modified during the alcoholic fermentation by the physiologic activity of yeast. Thus, yeast assimilates 60-70% of the must nitrogen, ammonium ion completely disappearing during the fermentation and the total nitrogen being slightly reduced.

Ammonia is present in grapes as ammonium in a few milligrams amount and it serves as the primary form of available nitrogen for yeast metabolism. So, the content of ammonium ion can drastically decrease during the alcoholic fermentation, increasing again, especially in red wines, at the end of the malolactic fermentation because the lactic bacteria releases ammonia nitrogen in wine. The amount of ammonium ion in must influences the rapidity of fermentation start and evolution.

The ammonia concentration ranged from 24 to 209 mg/L (ppm) in grapes and from a few mg/L (ppm) to about 50 mg/L (ppm) in wine.

The HI 84185 ISE Ammonia Nitrogen meter measures the ammonia nitrogen ( $N-NH_3$ ) content in wine using an ion selective electrode. The used method is double standard addition, a simple and rapid method of analysis, and the result is readily displayed in ammonia nitrogen ( $N-NH_3$ ) mg/L (ppm).



### Ordering information

**HI 84185** is supplied with reagents for 20 tests, HI 61101 Fluoride combination ISE electrode, membrane, HI 5315 reference half cell, HI 7665-T temperature probe, 1000  $\mu$ L automatic pipette, filling solution, tweezers, 2 plastic beakers (50 mL), magnetic stir bar, 1 mL syringe, power cable and instruction manual.

### Electrodes, Solutions and Accessories

#### Electrodes

- HI 7662T** Temperature probe  
**HI 61101** Ammonia electrode

#### Solutions

##### Reagents

- HI 84185-20** Reagent set for 20 tests  
**HI 84185-0** ISA solution for ammonia analysis in wine  
**HI 84185-1** Standard solution No.1 for ammonia analysis in wine, 500 mL  
**HI 84185-2** Standard solution No. 2 for ammonia analysis in wine, 500 mL

#### Electrode Maintenance

##### Cleaning and Storage Solutions

- HI 4000-47** Buffer replacement kit  
**HI 4000-40** Ammonia filling solution  
**HI 4000-45** Ammonia conditioning and storage solution

#### Accessories

- HI 4001-51** (20) Membrane  
**HI 740036P** (10) 50 mL plastic beakers  
**HI 731316** Stir bar (5)  
**HI 731341** Automatic pipette 1000  $\mu$ L  
**HI 731351** (25) Tips for 1000  $\mu$ L automatic pipette  
**HI 740143** (6) Syringe 1mL  
**HI 740144** (6) Syringe tip  
**HI 741355P** Capillary pipette

## HI 9142W · HI 9143W

# Dissolved Oxygen Meters for Wine

with Spot Check Probe

- Probe fits in bottle necks
- Fast, accurate results
- Waterproof



ideal for Spot Checks



## DO Meters Tailored for Wine

**HI9143W** Dissolved Oxygen meter can measure DO in bottled wine as well as in the storage tanks. This meter has automatic compensation capabilities for effects such as temperature, altitude, humidity and salinity. These conditions can all impact the accuracy of your reading and must be accounted for. This meter also comes with a probe that allows for bottle testing.

◀ **HI9142W** is an easy to use and accurate dissolved oxygen meter. It comes with a specific DO probe that will allow user to conduct measurements inside bottled wine.

## Ordering information

**HI 9143W** is supplied with HI 76408 wine spot check D.O. probe with 1 m (3.3') cable, 2 spare membranes, HI 7041S electrolyte solution (30 mL), batteries, rugged carrying case and instructions.

**HI 9142W** is supplied with HI 76408 wine spot check D.O. probe with 1m (3.3') cable, 2 spare membranes, HI 7041S electrolyte solution (30mL), batteries, calibration screwdriver, rugged carrying case and instructions.

## Electrodes, Solutions and Accessories

### Electrodes

- HI 76407/4** D.O. probe with 4 m (13') cable
- HI 76408** Spot check D.O. probe for wine with 1m (3.3') cable
- HI 76407/20 Solutions** D.O. Probe with 20 m (67") cable

- HI 7040L** Zero Oxygen solution (500 mL)
- HI 7041S** Refilling electrolyte solution (30 mL)

### Accessories

- HI 230 Vac/12** VDC adapter
- HI 76407A/P** (5) Replacement membranes
- HI 721317** Rugged carrying case

# HI 83741

## Photometer for the Determination of Iron in Wine

### Significance of Use

Trace iron concentrations in wine are beneficial for enzyme activity, as a stabilizer, and as a functional component for proteins.

At higher concentrations it alters the redox potential, in favoring oxidation, affecting sensory characteristics and participating in the formation of complexes with tannin and phosphates resulting in instabilities (casse). The most common iron case is "white casse" (iron phosphate), it is initially seen as milky white cloud and later as a precipitate. The "blue casse" (ferric tannate) that occurs less often can be observed in white wines, for example, after tannic acid additions.

Most of the iron present in wine is present in the ferrous Fe(II) state. The ratio of the Fe(II)/Fe(III) depends on the oxidation state of wine. If Fe (III) is formed, it can bind with phosphates that are normally present in wine.

Since iron strongly binds with several organic acids, some wine makers add citric acid to the wine to complex free iron in wine is contact with iron in wine is contact with iron containing alloys during processing. During fermentation a part of the iron is absorbed by yeast and thus removed from the wine during filtration.

Casse formation depends on: iron concentration, pH, ORP, phosphate, content and the type of wine

#### white casse formation

iron concentration > 7 ppm  
high redox potential (Fe<sup>3+</sup> + present)  
ph 2.9-3.6



### Ordering information

**HI 83741** is supplied with reagents for 5 tests, 1000 µl pipette, 1 mL pipette, (2) cuvetts with caps, tissue for wiping cuvetts, scissors, 12 VDC power adapter, (4) 1.5V AA batteries and instruction manual in a hard carrying case.

### Reagents and Accessories

#### Reagents

**HI 83741-20** (20) Iron reagents

#### Accessories

**HI 731318** (4) Cuvet tissues

**HI 731341** 1000 µL pipette

**HI 731351** (25) 1000 µL plastic tips for automatic pipette

**HI 731321** (4) Glass cuvetts

**HI 731325W** (4) Caps for cuvetts

**HI 93703-50** Cuvetts cleaning solution

**HI 710006** 12 VDC power supply

**HI 740027P** (10) 1.5V AA batteries

# HI 83740

## Photometer for the Determination of Copper in Wine



### Significance of Use

Grapes accumulate normally only a small amount of copper by natural translocation from roots. Unless exposed to significant airborne borne pollution or vineyard sprays, increased concentrations in wine result from contamination during post fermentation processing, like contact with non stainless steel equipment and as impurities in fining agents and filter media.

The copper concentration in wine is normally low, less that 0.10 to 0.30mg/L, because excess copper is precipitated during fermentation due to adsorption onto the yeast cells. This adsorption and precipitation can reduce the initial copper concentration with 40 to 89%. At higher concentration copper plays an important role in catalyzing oxidation reactions of wine phenols.

It is important to check the copper content both in must and in wine, because at levels about 9 mg/L copper becomes a metabolic toxin that inhibits or delays alcoholic fermentation, and concentrations exceeding 1mg/L may be sensorial detected and should be avoided.

Other copper related problems can be manifested as formation of white haze (in white wines) and later as a reddish brown amorphous precipitate. This precipitated "casse" develops only under the strongly reducing conditions found in bottles wines. It has been found that this casse is a mixture of copper compounds and proteins.

#### Factors favoring and inhibiting copper case formulation in wine

##### Necessary conditions for copper casse formation

strong reducing conditions  
low iron concentrations  
high protein levels  
light and heat

### Ordering information

**HI 83740** is supplied with reagents for 5 tests, (2) spoons, (2) 1 mL pipettes, (2) 3 mL pipettes, (2) cuvetts with caps, (2) sample preparation vials, tissue for wiping cuvetts, 12 VDC power adapter, (4) 1.5V AA batteries and instructions in a hard carrying case.

### Reagents and Accessories

#### Reagents

**HI 83740-20** (20) Copper reagents

#### Accessories

**HI 740027P** (10) 1.5V AA batteries

**HI 731318** (4) Cuvet tissue

**HI 731321** (4) Glass cuvetts

**HI 731325W** (4) Caps for cuvetts

**HI 93703-50** Cuvetts cleaning solution (230 mL)

**HI 740231** (2) 20 mL glass cylinder with caps

**HI 710006** 12 VDC power supply

##### Preventive Measures

copper levels at less than 0.3 mg/L  
limit SO<sub>2</sub> addition  
cold -stabilize and bentonite fine to reduce proteins in white wine

# HI 83748

## Photometer For the Determination of Tartaric Acid in Wine

### Significance of Use

Tartaric acid and tartrate are playing an important role in the stability of wines. They can be present in wine and juice in various forms, like tartaric acid ( $H_2T$ ), potassium bi-tartrate (KHT) or calcium tartrate (CaT). The ratio of these depends mainly on the pH of the wine. The percent of tartrate present as bitartrate (HT) is maximum at pH 3.7.

The formation of crystalline deposits (tartrate casse) is a phenomenon of wine aging but does not meet customer acceptance. It is therefore important to test for, and to reduce potential of bottle precipitation; for example by adjusting the pH of the wine that significantly influences the potential of casse formation.

Potassium concentrations in wine can range from 600 to 2500 ppm in certain red wines. Although the potassium bi-tartrate is soluble in water, alcohol and low temperatures decrease its solubility. Especially during the alcoholic fermentation potassium bi-tartrate becomes increasingly insoluble resulting in super-saturation and precipitation. The KHT stability can be restored by chilling (with or without seeding). Wines with initial pH values below 3.65 can show a reduction in pH during cold stabilization because of generation of one free proton for each KHT precipitated. The pH may drop as much as 0.2 pH unites. For wines at higher pH than 3.7, the pH shifts to a higher pH.

Calcium concentrations can range from 6 to 165 ppm and may complex with tartrate or oxalate to form crystalline precipitates. Calcium tartrate instabilities occur normally from 4 to 7 months after fermentation and are temperature independent.

Sulphates, proteins, gum and poly-phenols can form stable complexes with tartrate thus inhibiting casse formation. the complexes are mainly between poly-phenols and tartaric acid in red, and proteins in white wine. This explains why, as pigment polymerization occurs, the holding capacity of tartaric acid diminishes, resulting in delayed casse. the sulfate instead does not complex with potassium from 50% in white wines up to 100% in red ones.

Tartaric acid concentrations in wine range normally from 1.5 to 4.0 g/L. This acid concentration may not be confused with total or titratable acidity of wines that are often expressed in tartaric acid content too. Although it is the tartaric acid that is the predominantly present acid (up to 60% of the total acidity), others like malic, citric and several volatile acids do give a significant contribution total acidity.



### Ordering information

**HI 83748** is supplied with reagents for 5 tests, 200  $\mu$ l pipette, 5 mL syringe, (2) cuvetts with caps, tissue for wiping cuvetts, 12 VDC power adapter, (4) 1.5V AA batteries and instruction manual in a hard carrying case.

### Reagents and Accessories

#### Reagents

**HI 83748-20** (20) Tartaric acid reagents

#### Accessories

**HI 731318** (4) Cuvet tissue

**HI 731340** 200  $\mu$ l pipette

**HI 731350** (25) 200  $\mu$ l pipette tips

**HI 731321** (4) Glass cuvetts

**HI 731325W** (4) Caps for cuvetts

**HI 93703-50** Cuvets cleaning solution

**HI 740226** 5 mL graduated syringe

**HI 710006** 12 VDC power supply

**HI 740027P** (10) 1.5V AA batteries

# HI 83742

## Photometer For the Determination of Color and Total Phenols in Wine



### 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 the removal of suspended matter. there are mainly 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 sever reasons since they (i) affect the color of the wine, (ii) have an astringent taste, (iii) may cause pungent odor, (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 in specific molar absorptivity, and color present of non phenolic substances

The reaction between phenols and the Folin-Ciocalteu reagent involves oxidation of the phenolic groups (R-OH) with a mixture of phosphotungstic 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.

### Ordering information

**HI 83742** is supplied with reagents for 5 tests, 2000 µl pipette, 200 µl pipette, 1 mL pipette, 3 mL pipette, 5 mL syringe, (2) cuvetts with caps, tissue for wiping cuvetts, 12 VDC power adapter, (4) 1.5V AA batteries and instruction manual in a hard carrying case.

### Reagents and Accessories

Reagents	
<b>HI 83742-20</b>	(20) Total phenols and color reagents
<b>HI 83742-25</b>	(20) Wine solvent
Accessories	
<b>DEMI-10</b>	Bottle to prepare 10 liters of demineralized water
<b>HI 731318</b>	(4) Cuvet tissues
<b>HI 731342</b>	2000 µl pipette
<b>HI 731352</b>	2000 µl pipette tips
<b>HI 731340</b>	200 µl pipette
<b>HI 731350</b>	200 µl pipette tips
<b>HI 740142P</b>	(10) 5 mL graduated syringe
<b>HI 740144P</b>	(10) 5 mL graduated syringe
<b>HI 731321</b>	(4) Glass cuvetts
<b>HI 710006</b>	12 VDC power supply
<b>HI 740027P</b>	(10) 1.5V AA batteries

# HI 83749

## Photometer for Turbidity and Bentonite Monitoring in Wine

### Significance of Use BENTOCHECK

The prevention of protein haze or deposit in bottled white wines is a universal concern and often a wine needs to be stabilized before bottling. One commonly used stabilization agent is bentonite. Bentonite is a volcanic clay earth type filling agent (like kaolin). It improves the clarity and stability of wine but has also negative aspects because of the volume of lees formed, reduction of tannin and color. Since there are different types and qualities of bentonite with different capacity of protein removal, it is important to make laboratory trails with the same lot and wetting degree of the bentonite as that will be used in the cellar.

Protein stabilization is normally not a problem in bottled red wines because of the relatively high concentration of phenols that binds and precipitates with the instable proteins before bottling. Often bentonite is added to red wines at a level of about 12 g/hL (1lb/1000 gal), reducing colloidal suspended particles thus improving membrane filterability.

Wines with low phenols contents, such as rose, light reds and whites should be checked for protein stability before bottling. Hanna is offering a rapid test to verify the risk of future protein haze formation. If protein instability is detected, a next test can help defining the right amount of bentonite to be added for improving protein stability. It is important not to overdose bentonite, avoiding stripping wine flavor, body, and significant loss of color, especially in young red wines. Moreover, adding only the necessary amount of bentonite to obtain the desired protein stability is also costs saving.



### Ordering information

**HI 83749** is supplied with reagents, 1000 µl pipette with 2 tips, (4) cuvetts, 1 mL graduated syringe, (4) 25 mL graduated cylinders, filter papers, cuvet cleaning cloths, 1 bottle color removal, cal. kit, funnel, 12 VDC power adapter, (4) 1.5V AA batteries and instruction manual in a hard carrying case.

### Solutions and Accessories

#### Solutions

**HI 83749-01** Bentocheck solution, 100 mL

#### Accessories

**HI 93703-58** Silicon oil (dropper) 15 mL

**HI 83749-11** Calibration Turbidity Kit

**HI 731331** (4) Glass Cuvetts

**HI 731318** (4) Cuvet Tissues

**HI 740220** 25 mL graduated syringe with stopper

**HI 731341** 1000 µl pipette

**HI 731351** (25) 1000 µl pipette tips

**HI 740233** (100) Filter papers type 2

**HI 740142P** 1 mL graduated syringe

**HI 740144P** (10) 1 mL graduated syringe tips

**HI 740234** Replacement lamp for turbidity meter

**HI 92000** Windows® compatible software

**HI 920005** i-Button®

**HI 920011** RS232 cable for PC connection

**HI 920005** 5 tag holders with tags

**HI 731331** Large (4) 10 mL cuvet

**HI 740027P** (10) 1.5V AA batteries

**HI 740217** Safety shield

**HI 710005** Voltage adapter from 115V to 12 VDC

# HI 83746

## Photometer for Reducing Sugar Concentration

### Significance of Use

The determination of concentration of reducing sugars (RS) is one of the most important parameters that need to be measured during the wine making process. Following the increase of RS during maturation of grapes can help decide when to start harvest. Having the highest possible sugar content is important because this is the main parameter that defines the commercial value of grapes. During the alcoholic fermentation instead, the decrease of sugars can be followed to decide when fermentation is completed, or allows making corrective actions if the content of RS is too low to obtain the desired alcohol degree or sweetness.

The predominant RS in grape products are glucose and fructose (hexoses). After reaction with excess alkaline cupric tartrate (Fehling reagents), the RS content can be determined colorimetrically. The Fehling method is not an exact determination but an index of the reducing sugar concentration, because the reaction depends upon the amount and kind of RS present. When the reducing sugar content is known at the beginning of fermentation, the potential alcohol degree can be estimated multiplying the sugar concentration (in g/L) by 0.06. Phenols interfere in the Fehling reaction and therefore red wine must be colored prior to analysis. Wine also contains non-fermentable reducing sugars like pentose which will also be analyzed by this method.

#### Typical content of reducing sugars in must and wine

<b>Must</b>	Sweet must	20-25 %	200-250 g/L
	Normal	10-20 %	100-200 g/L
	In fermentation	4-12.5 %	40-125 g/L
<b>Wine</b>	Sweet	2.5-12.5 %	25-125 g/L
	Semi sweet	0.8-2.5 %	8-25 g/L
	Almost dry	0.2-0.8 %	2-8 g/L
	Dry	0-0.2 %	0-2 g/L

# HI 839800-01

## Practical and accurate test tube reactor for Photometers

With the **HI 839800-01**, the user can speed up the analysis process of large quantities of samples without sacrificing accuracy. And accurate temperature control system ensures the digestion develops exactly at 150° C ±2°C as required by the Standard Method. **HANNA's HI 839800-01** test tube reactor accepts up to 25 standard 16 mm diameter cuvetts for each reaction cycle.



### Ordering information

**HI 83746** is supplied with 1000 µl pipette with 2 tips, 200 µl pipette, (2) cuvetts, filter papers, cuvet cleaning cloths, 1 bottle color removal, funnel, 12 VDC power adapter, (4) 1.5V AA batteries and instruction manual in a hard carrying case.

### Reagents and Accessories

#### Reagents

**HI 83746-20** Reagents for reducing sugar analysis

#### Accessories

- HI 731318** (4) Cuvet Tissues
- HI 7311331** Large (4)10 mL cuvetts
- HI 731340** 200 µl pipette
- HI 731350** (25) 200 µl pipette tips
- HI 731341** 1000 µl pipette
- HI 731351** (25)1000 µl pipette tips
- HI 740142P** 1 mL graduated syringe
- HI 740144P** (10) 2 mL graduated syringe tips
- HI 740216** Tube rack for glass vials
- HI 740217** Safety shield
- HI 740232** (100) Filter papers type 1
- HI 839800-02** Thermoreactor
- HI 93703-59** Carbon decoloration for red wine
- HI 740027P** (10) 1.5V AA batteries



## Temperature in Wine Testing

# HI 99551 • HI 99556

## Infrared Thermometers

### Ordering information

HI 99551-01	IR, -14 to 572°F
HI 99556-01	IR + probe, -14 to 572°F

°C Models Available

### Accessories

HI 765PW	Temperature probe for HI 99556
HI 731318	Sensor cleaning tissue (4pcs)
HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 71004	Soft carrying case
HI 721316	Rugged carrying case



## Checktemp®



Professional high accuracy pocket thermometers with exclusive calibration check device.

- Celsius [-50.0 to 150.0°] or Fahrenheit [-58.0 to 302.0°]
- 3000 hours of battery life from one AAA battery
- Stainless Steel Probe

### Ordering information

HI 98501	°C
HI 98502	°F

## HI 151 Pocket Thermometer

with Folding Probe  
±0.3°C Accuracy and Cal-Check®



### Ordering information

HI 151-00 is supplied complete with battery and instructions.  
HI 151-01 is supplied complete with battery and instructions.

## Checktemp - Dip®

- Celsius [-20 to 100°] or Fahrenheit [-4 to 212°]
- 3000 hours of battery life from one AAA battery
- Stainless steel probe

### Ordering information

HI 98509-01	°C w/10 ft. Cable
HI 98510-01	°F w/10 ft. Cable



e-mail:

[wine-brew@hannainst.com](mailto:wine-brew@hannainst.com)

web:

[www.hannainst.com/usa](http://www.hannainst.com/usa)

phone

800.426.6287

ISO 9001:2000  
CERTIFIED

**HANNA®**  
instruments  
With Great Products, Come Great Results™