



# HI 84100 mini Titrator

FOR THE DETERMINATION OF FREE AND TOTAL  
SULFUR DIOXIDE FOR WINE ANALYSIS



# Why Sulfur Dioxide is important...

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 thus 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 on circumstances, some of it immediately becomes bound. The relationship between the amount of added SO<sub>2</sub> and the amount of SO<sub>2</sub> remaining free is complex. It is clear however, that it 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<sub>3</sub><sup>-</sup>). The smaller part of the free is the active molecular SO<sub>2</sub>. 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 free SO<sub>2</sub> for 0.8 ppm molecular SO<sub>2</sub> is 22 ppm. At 3.5, you will need 43 ppm free-essentially double.

Free 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

In most situations, 0.8 ppm 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 3 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 human senses is about 2.0 ppm. This also is 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 quickly and accurately test free or total SO<sub>2</sub> in all wines (including red).



- **Stability Indicator**
- **Calibration Messages**
- **Secondary Display**

Pre-programmed  
Free & Total  
Sulfur Dioxide  
analysis method for  
wine samples  
included!



**14.** Acid Reagent

**15.** Standard Solution

**16.** Titrant Solution

**17.** Alkaline Solution

**18.** Large LCD Display

**19.** Titrant Holder

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## Ordering Information

HI 84100 is supplied complete 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.



Specifications	HI 84100 mini Titrator
Range	0 to 400 ppm of SO <sub>2</sub>
Resolution	1 ppm
Accuracy	5% of reading
Method	Ripper titrimetric method
Principle	Equivalence point redox titration
Sample Volume	50 mL
ORP electrode	HI 3148B (included)
Pump Debit	0.5 mL/min
Stirring Speed	1500 rpm
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	220V/50 Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

## Recommended Accessories

HI 70300L	Electrode storage solution (500 mL)	HI 84100-54	Stabilizer reagent (25 pcs.)
HI 70635	Cleaning solution for wine deposits (500 mL)	HI 84100-55	Calibration standard (500 mL)
HI 70636	Cleaning solution for wine stains (500 mL)	HI 3148B	ORP probe with shorter cable
HI 7082	Electrode filling solution (4 x 30 mL)	HI 70483T	Tube set with cap for titrant bottle and tip
HI 84100-50	Titration solution (110 mL)	HI 731316	Stir bar (5 pcs)
HI 84100-51	Alkaline reagent (500 mL)	HI 740036P	Beaker 50 mL (10 pcs.)
HI 84100-52	Acid reagent for total SO <sub>2</sub> determination (500 mL)	HI 740037P	Beaker 20 mL (10 pcs.)
HI 84100-53	Acid reagent for free SO <sub>2</sub> determination (500 mL)	HI 740198	Power cable

Authorized Distributor

2 year  
LIMITED WARRANTY



**HANNA**<sup>®</sup>  
instruments  
With Great Products, Come Great Results™

Also Available from **HANNA**

## TITRATABLE TOTAL ACIDITY mini Titrator

HI 84102 for the Determination of Titratable Total Acidity in Wine

## TARTARIC ACID Photometer

HI 83748 for the Determination of Tartaric Acid in Wine

## TOTAL PHENOLS & COLOR Photometer

HI 83742 for the Determination of Total Phenols & Color in Wine

## COPPER Photometer

HI 83740 for the Determination of Copper in Wine

## IRON Photometer

HI 83741 for the Determination of Iron in Wine

## pH & TEMPERATURE Bench & Portable Meters

HI 222 & HI 9026W pH & Temperature in Wine



Contact your local **HANNA** instruments® distributor for more information.