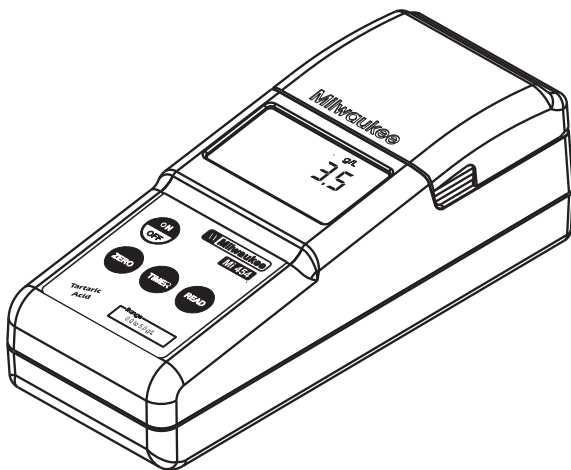


INSTRUCTION MANUAL

Milwaukee Wine Lab Photometer



■ Mi454 Tartaric Acid



www.milwaukeeesters.com

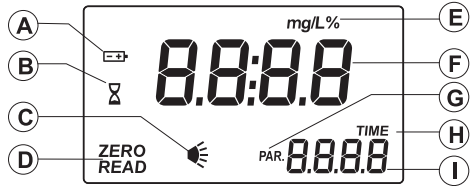
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FUNCTIONAL DESCRIPTION

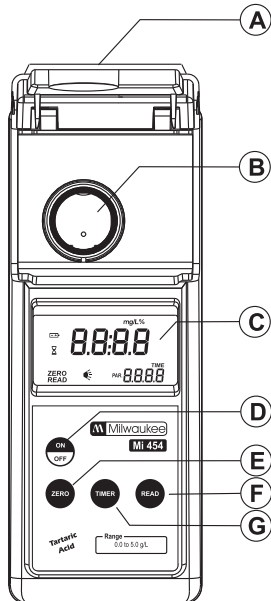
DISPLAY

- A. BATTERY STATUS ICON
- B. HOURGLASS ICON
- C. LAMP STATUS INDICATOR
- D. MEASURE STATUS
- E. MEASUREMENT UNIT
- F. MAIN DISPLAY
- G. PARAMETER NUMBER INDICATOR
- H. TIMER MODE INDICATOR
- I. SECONDARY DISPLAY



FRONT PANEL

- A. LID
- B. CUVET HOLDER
- C. LIQUID CRYSTAL DISPLAY (LCD)
- D. ON/OFF KEY, TO TURN THE METER ON AND OFF
- E. ZERO KEY, TO START THE ZERO MEASUREMENT
- F. READ KEY, TO START THE SAMPLE MEASUREMENT
- G. TIMER KEY, TO ACTIVATE THE COUNTDOWN MODE TIMER



GENERAL DESCRIPTION

Thank you for choosing Milwaukee. This instruction manual will provide you the necessary information for correct use of the meter.

Mi454 is an auto-diagnostic portable microprocessor meter. 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 perform 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

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 units. 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 case 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 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 to total acidity.

This meter is supplied with:

- Two sample cuvetts and caps
- Reagents for 5 tests (Mi554A-0, Mi554B-0)
- One 200 μ L automatic pipette with Instruction Sheet
- Two plastic tips for 200 μ L automatic pipette
- Four 1.5V AA batteries
- Tissue for wiping cuvetts
- Instruction Manual
- Instrument Quality Certificate

SPECIFICATIONS

Range	0.0 to 5.0 g/L
Resolution	0.1 g/L
Precision	SD±0.1 g/L @ 2.0 g/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 525 nm
Method	The reaction between Tartaric Acid and the reagents causes a yellow/orange red tint in the sample.
Environment	0 to 50 °C (32 to 122 °F) ; max 95% RH non-condensing
Battery Type	4 x 1,5 volt AA batteries
Auto-Shut off	After 15' of non-use in <i>measurement mode</i> .
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")
Weight	500 g (17,6 oz.).

Required Reagents

<u>Code</u>	<u>Description</u>	<u>Quantity/test</u>
Mi554A-0	Tartaric Acid Reagent A	5 mL
Mi554B-0	Tartaric Acid Reagent B	6 drops

This instrument is in compliance with CE Directives.

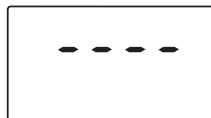
GUIDE TO DISPLAY CODES



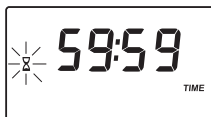
This prompt appears for a few seconds each time the instrument is turned ON.



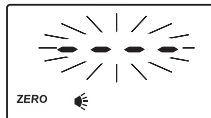
This prompt indicates the battery capacity value.



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



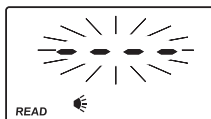
After Timer is pressed, a blinking hourglass icon appears and the display shows a 60 minutes countdown. At the end of the countdown an acoustic signal alerts the user that the timer is finished.



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



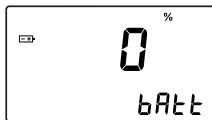
The instrument is zeroed and a measurement can be made.



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.

GENERAL TIPS FOR AN ACCURATE MEASUREMENT

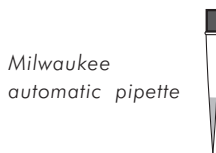
The instructions listed below should be carefully followed during testing to ensure best accuracy.

- For dosing the wine sample and the reagent, we recommend to use the supplied Milwaukee automatic pipette **Mi0026** (200 μ L).

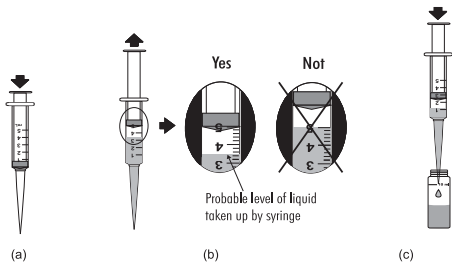
For a correct use of the Milwaukee automatic pipette, please follow the related Instruction Sheet.

- 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).
- 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.

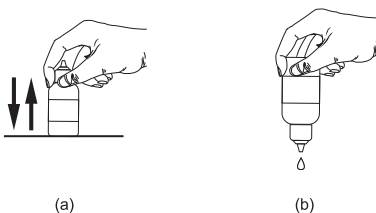
- Whenever the cuvet is placed into the measurement cell, it must be dry outside, and completely free of fingerprints, oil or dirt. Wipe it thoroughly with **Mi0004** (tissue for wiping cuvet, see chapter ACCESSORIES) or a lint-free cloth prior to insertion.



- In order to measure exactly 5 mL of reagent with the 5 mL syringe:
 - push the plunger completely into the syringe and insert the tip into the reagent bottle.
 - pull the plunger up until the lower edge of the seal is exactly on the 5 mL mark.
 - 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.



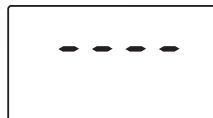
- Proper use of the dropper:
 - to get good reproducible results, tap the dropper on the table for several times and wipe the outside of the dropper tip with a cloth.
 - always keep the dropper bottle in a vertical position while dosing the reagent.



- 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.

MEASUREMENT PROCEDURE

- Turn the instrument on by pressing **ON/OFF**.
- When the LCD displays “---”, it is ready.

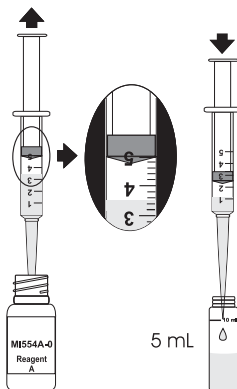


- Use the 200 μ L automatic pipette to add exactly 0,2 mL of wine sample to an empty cuvet.

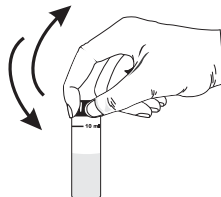


- Use the 5 mL syringe to add exactly 5 mL of **Mi554A-0** reagent.

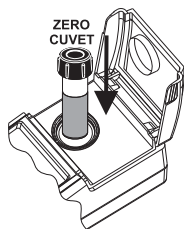
Note: in order to measure exactly 5 mL of reagent with the syringe, follow the instructions on page 9.



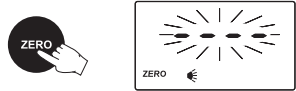
- Close the cuvet and shake gently for some seconds.



- Place the cuvet into the holder and close the lid.



- Press **ZERO** and “----” will blink on the display.

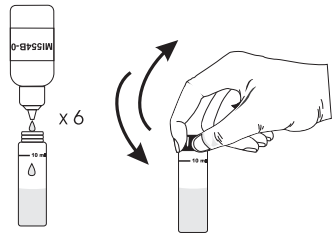


- After a few seconds the display will show “-0.0-”. The meter is now zeroed and ready for measurement



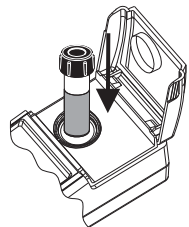
- Remove the cuvet from the instrument and open the cap.

- Add 6 drops of **Mi554B-0** reagent to the cuvet.

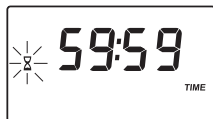


- Replace the cap and shake gently to mix.

- Reinsert the cuvet into the instrument and close the lid.



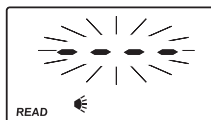
- Press **TIMER** and the instrument will show the countdown or, alternatively, wait for 60 minutes. The instrument gives an acoustic signal to alert the user that the countdown is finished.



or



- Press **READ** and the display will show "----" during measurement.



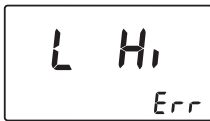
- The instrument directly displays concentration in g/L (ppt) of tartaric acid on the Liquid Crystal Display.

ERROR MESSAGES

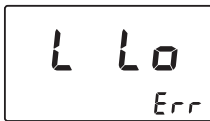


The meter has lost its configuration. Contact your dealer or the nearest Milwaukee Instruments Customer Service Center.

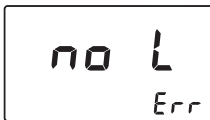
on zero reading:



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

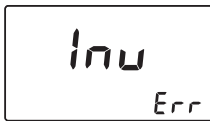


"Light low": there is not enough light to perform a measurement. Please dilute the sample five times (see "General tips for an accurate measurement", page 8).



"No Light": the instrument cannot adjust the light level. Please check that the sample does not contain any debris.

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.

BATTERY REPLACEMENT

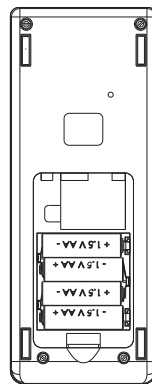
Battery replacement must only take place in a non-hazardous area.

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.



ACCESSORIES

Reagent sets

Mi454KIT Tartaric Acid reagents set for wine (20 tests)

OTHER ACCESSORIES

- Mi0006 1.5V AA batteries (4 pcs)
- Mi0004 Tissue for wiping cuvetts (4 pcs)
- Mi0011 10 mL glass cuvetts (2 pcs)
- Mi0014 Caps for cuvetts (2 pcs)
- Mi0026 200 μ L automatic pipette
- Mi0027 Plastic tips for 200 μ L automatic pipette (25 pcs)

For your Safety don't use or store the instrument in hazardous environments. To avoid damages or burns, do not perform any measurement in microwave ovens.

WARRANTY

This instrument is warranted against defects in materials and manufacturing for a period of 2 years from the date of purchase. Electrodes are warranted for 6 months.

If during this period the repair or replacement of parts is required, where the damage is not due to negligence or erroneous operation by the user, please return the instrument, electrode and probe to either distributor or our office and the repair will be effected free of charge.

Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered by the warranty.

Milwaukee/Martini instruments reserves the right to make improvements in design, construction and appearance of its products without advance notice.

THANK YOU FOR CHOOSING



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