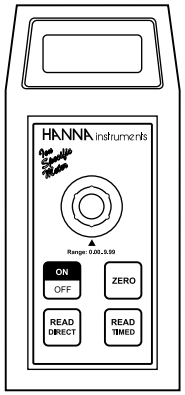
Instruction Manual

HI 93719
Magnesium Hardness
ISM



HANNA instruments
http://www.hannainst.com

CE
This Instrument is in Compliance with the CE Directives

WARRANTY

HI 93719 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions.

This warranty is limited to repair or replacement free of charge.

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

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.

Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct operation of the meter. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

This instrument is in compliance with CE directives EN 50081-1 and EN 50082-1.

PRELIMINARY EXAMINATION

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

Each Ion Specific Meter is supplied complete with

- 9V Battery
- Two Sample Cuvets and Caps
- One Transport Cap

Note: Conserve all packing material until the instrument has been observed to function correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

The HI 93719 meter measures the magnesium hardness content, as $CaCO_3$, in water and wastewater in the 0.00 to 2.00 mg/L (ppm) range.

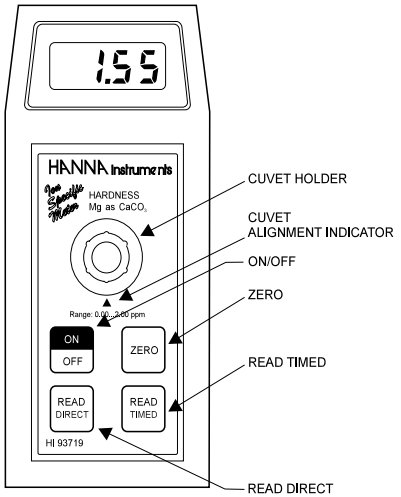
The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same place every time it is placed into the measurement cell.

The reagents are in liquid form and are supplied in bottles. The amount of reagent is precisely dosed to ensure maximum repeatability.

Display codes aid the user in routine operations.

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

SPECIFICATIONS



SPECIFICATIONS

Range	0.00 to 2.00 mg/L
Resolution	0.01 mg/L
Accuracy	±0.11 mg/L ±5% of reading
Typical EMC Deviation	±0.02 mg/L
Light Source	Light Emitting Diode @ 555 nm
Method	Adaptation of the *Standard Methods for the Examination of Water and Wastewater, 18th edition,* EDTA colorimetric method. The reaction between Mg and reagents causes a violet tint in the sample
Light Detector	Silicon Photocell
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Battery Type/Life	1 x 9 volt/40 hours
Auto-Shut off	After 10' of non-use
Dimensions	180 x 83 x 46 mm (7.1 x 3.3 x 1.8")
Weight	290 g (10 oz.).

REQUIRED REAGENTS

Code	Description	Quantity
HI 93719A-0	Mg indicator	0.5 mL
HI 93719B-0	Alkali solution	0.5 mL
HI 93719C-0	EDTA solution	1 drop
HI 93719D-0	EGTA solution	1 drop

REAGENT SETS

HI 93719-01 Reagents for 100 tests

HI 93719-03 Reagents for 300 tests

DISPLAY CODE GUIDE

`---`	This indicates that the meter is in a ready state and zeroing can be performed.
`SIP`	Sampling in Progress. This prompt appears each time the meter is performing a measurement.
`-0.0-`	This indicates that the meter is in a zeroed state and measurement can be performed.
`ZERO`	A zero reading was not taken. Insert a sample before adding reagent and press ZERO.
`-0.00`	Under range. A blinking "0.00" indicates that 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.
`3.30`	Over range. A flashing value higher than the maximum concentration readable (see specifications) indicates that the sample absorbs too much light, meaning that the concentration is too high. Dilute the sample.
`CAP`	Light over range. The cuvet is not inserted correctly and an excess ambient light is reaching the detector. If the cover is properly installed, then contact your dealer or the nearest Hanna Customer Service Center.
`LO`	Light under range. The zero sample is too dark for proper zeroing. If this is not the case, contact your dealer or the nearest Hanna Customer Service Center.
`V 2.50`	The "V" indicates that the battery voltage is getting low and the battery needs to be replaced.
`-BA-`	This indicates that the battery is dead and must be replaced. Note: once this indication is displayed, the meter will lockup. Change the battery to restart.

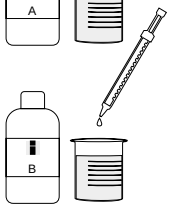
OPERATIONAL GUIDE

MEASUREMENT PROCEDURE

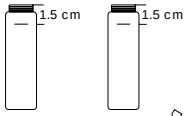
- Turn the meter on by pressing ON/OFF.
- When the LCD displays "- - -", it is ready.

- Fill a graduated beaker to the 50 mL mark with the sample.

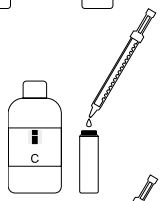
- Add 0.5 mL of HI 93719A Magnesium indicator solution, then swirl to mix.



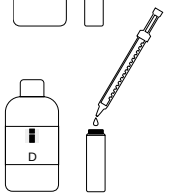
- Add 0.5 mL of HI 93719B Alkali solution for Magnesium, then swirl to mix.



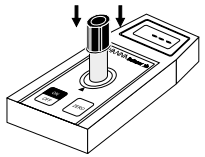
- Fill two cuvets up to 1.5 cm (¾") below the rim with 10 mL of sample each.



- Add 1 drop of HI 93719C EDTA solution to one cuvet, replace the cap and swirl the solution. This is the blank.

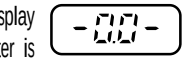


- Add 1 drop of HI 93719D EGTA solution to the second cuvet, replace the cap and swirl the solution. This is the sample.

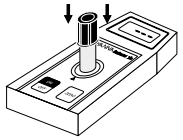


- Place the blank into the holder and ensure that the notch on the cap is positioned securely into the groove.
- Press ZERO and "SIP" will appear on the display.

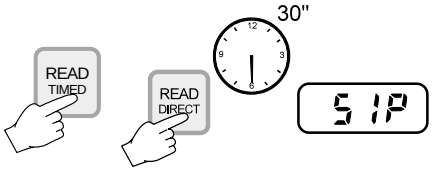
- Wait for a few seconds and the display will show "-0.0-". Now the meter is zeroed and ready for measurement.



- Remove the blank and insert the sample into the instrument, making sure that the notch on the cap is positioned securely into the groove.



- Press READ TIMED and the display will show the countdown prior to the measurement. Alternatively wait for exactly 30 seconds and press READ DIRECT. In both cases "SIP" will appear during measurement.



- The instrument directly displays concentration in mg/L (ppm) of magnesium hardness, as $CaCO_3$, on the Liquid Crystal Display. To convert the result to mg/L Mg, multiply the reading by 0.243.

Note: the test will detect any calcium or magnesium contamination in the mixing cylinders, measuring droppers or sample cells. To test cleanliness, repeat the test multiple times until you obtain consistent results.

SAMPLE DILUTION

This meter is designed to determine low levels of hardness, typically found in water purification systems.

When testing some other sources of water, it is not uncommon to come across levels of hardness that are greater than the range of this meter.

This problem can be overcome through dilution. Dilutions must be performed with hardness-free water or the readings will be erroneous.

A dilution to reduce the level of hardness by a factor of one hundred is performed as follows:

- Fill a 1 mL syringe with the sample.
- Place the syringe in a 50 mL beaker, making sure that the beaker is clean and empty, and inject 0.5 mL into the beaker.
- Fill the beaker up to the 50 mL mark with hardness-free water.

Now, follow normal measurement procedure. The true value of the sample is the reading obtained multiplied by a factor of one hundred (the dilution factor).

For your reference, factors to convert readings in mg/L to French degrees (FD), German degrees (DD) and English degrees (ED) of hardness are as follows:

1 mg/L = 0.1 FD = 0.056 DD = 0.07 ED.

INTERFERENCES

Interference may be caused by excessive amounts of heavy metals.

TIPS FOR AN ACCURATE MEASUREMENT

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

- Do not touch the cuvet walls with hands.
- 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.
- Do not let the test sample stand too long after reagent is added or accuracy will be lost.
- Whenever the cuvet is placed into the measurement cell, it must be completely free of fingerprints, oil or dirt. Wipe it thoroughly with HI 731318 or a lint-free cloth prior to insertion.
- It is important that the sample does not contain any debris. This would corrupt the readings.
- It is possible to take multiple readings in a row, but it is recommended that a zero reading be taken for each sample and that the same cuvet is used for zeroing and measurement.
- It is important to discard the sample immediately after the reading is taken because the glass might become permanently stained.
- Shaking the cuvet can generate bubbles in the sample, causing higher readings. To obtain accurate measurements, remove such bubbles by swirling or by gently tapping the vial.
- 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).

ACCESSORIES

REAGENT SETS

HI 93719-01 Reagents for 100 tests
HI 93719-03 Reagents for 300 tests

OTHER ACCESSORIES

HI 710009	Blue rubber boot
HI 710010	Orange rubber boot
HI 721310	9V battery (10 pcs)
HI 731318	Tissue for wiping cuvets (4 pcs)
HI 731321	Glass cuvets (4 pcs)
HI 731325	Caps for cuvets (4 pcs)
HI 93703-50	Cuvets cleaning solution (230 mL).

CE DECLARATION OF CONFORMITY

HANNA instruments

CE

DECLARATION OF CONFORMITY

We

Hanna Instruments Srl
V.le delle industrie 12
35010 Ronchi di Villafranca (PD)
ITALY

herewith certify that the colorimeters

HI93700 HI93701 HI93702 HI93704 HI93705 HI93706 HI93707
HI93708 HI93709 HI93710 HI93711 HI93712 HI93713 HI93714
HI93715 HI93716 HI93717 HI93718 HI93719 HI93720 HI93721
HI93722 HI93723 HI93724 HI93725 HI93726 HI93727 HI93728
HI93729 HI93730 HI93731 HI93732 HI93737 HI93738 HI93742
HI93746 HI93747 HI93748 HI93749 C101 C104

have been tested and found to be in compliance with the following regulations:

IEC 801-2	Electrostatic Discharge
IEC 801-3	RF Radiated
EN 55022	Radiated, Class B
EN 61010-1	User Safety Requirement

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D.Volpato - Engineering Manager
On behalf of
Hanna Instruments S.r.l.

Recommendations for Users

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

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

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

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

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