

Errors & Warnings

The checker shows clear warning messages when erroneous conditions appear and when measured values are outside the expected range. The information below provides an explanation of the errors and warnings, and the recommended action to be taken.

Light High: There is an excess amount of ambient light reaching the detector. Please check the preparation of the zero cuvette.



Light Low: There is not enough light to perform a measurement. Please check the preparation of the zero cuvette.



Inverted Cuvettes: The sample and the zero cuvettes are inverted. Swap the cuvettes and repeat the measurement.



Under Range: A blinking "0.00" indicates that the sample absorbs less light than the zero reference. Check the measurement procedure and make sure to use the same cuvette for reference (zero) and measurement.



Over Range: Maximum concentration value displayed blinking indicates the measured value is outside the limits of the method. Verify that the sample does not contain any debris. Dilute the sample and repeat the measurement.



Battery Low: Battery level is too low for the checker to function properly. Replace the battery with a new one.



Drained Battery: The battery is drained and must be replaced. Replace the battery with a new one and restart the checker.

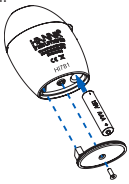


Battery Replacement

To save the battery, the checker shuts down after 10 minutes of non-use. A fresh battery lasts for a minimum of 5000 measurements. When the battery is drained, the instrument displays "bAd" then "bAt", and turns off.

To replace the battery, follow the next steps:

1. Press and hold the ON/OFF button to turn the checker off.
2. Turn the instrument upside down and use a screwdriver to unfasten the screw and remove the battery cover.
3. Remove the old battery, replace it with a new 1.5V AAA battery, inserting the negative end first.
4. Replace the battery cover, fasten and tighten the screw.



Accessories

Reagent Sets

HI781-25 Reagents for 25 Marine Nitrate Low Range tests

Other Accessories

HI781-11	Marine Nitrate Low Range certified standard kit
HI731225	Cuvette black cap for Checker [®] HC colorimeters (4 pcs.)
HI731318	Cloth for wiping cuvettes (4 pcs.)
HI731321	Glass cuvette and seal cap for Checker [®] HC colorimeters (4 pcs.)
HI740028P	1.5V AAA battery set (12 pcs.)
HI740226	5 mL graduated syringe (1 pc.)
HI740228	Filter disc (25 pcs.)
HI740270	10 mL syringe with Luer Lock (1 pc.)
HI740271	Filter holder with Luer Lock (1 pc.)
HI740272	16 gauge blunt needle (6 pcs.)
HI740143	1 mL graduated syringe (6 pcs.)
HI740144P	Plastic tip for 5 mL syringe (10 pcs.)
HI740157P	Plastic refilling pipette (20 pcs.)
HI93703-50	Cuvette cleaning solution, 230 mL

Certification

All Hanna Instruments conform to the CE European Directives.

Disposal of Electrical & Electronic Equipment. The product should not be treated as household waste. Instead hand it over to the appropriate collection point for the recycling of electrical and electronic equipment which will conserve natural resources.

Disposal of waste batteries. This product contains batteries, do not dispose of them with other household waste. Hand them over to the appropriate collection point for recycling.

Ensuring proper product and battery disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, the place of purchase or go to www.hannainst.com.



RoHS
compliant



Recommendations for Users

Before using this product, make sure it is entirely suitable for your specific application and for the environment in which it is used. Please note that this test is not recommended for freshwater applications. Any variation introduced by the user to the supplied equipment may degrade the checker's performance. For your and the checker's safety do not use or store it in hazardous environments.

Warranty

HI781 Checker[®] HC is warranted for a period of one year 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. Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered. If service is required, contact your local Hanna Instruments Office. If under warranty, report the model number, date of purchase, serial number and the nature of the problem. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the checker is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization (RGA) number from the Technical Service department and then send it with shipping costs prepaid. When shipping any product, make sure it is properly packaged for complete protection.

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

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INSTRUCTION MANUAL

HI781 Marine Nitrate Low Range



Dear Customer,

Thank you for choosing a Hanna Instruments product. Please read this instruction manual carefully before using the Checker[®]HC handheld colorimeter. For more information about Hanna Instruments and our products, visit www.hannainst.com or e-mail us at sales@hannainst.com. For technical support, contact your local Hanna Instruments Office or e-mail us at tech@hannainst.com.

Preliminary Examination

Remove the Checker[®]HC handheld colorimeter and accessories from the packing material and examine it carefully. If you require any further information, please contact Hanna Instruments technical support team.

Each HI781 is delivered in a case with custom insert and is supplied with:

- Marine Nitrate Low Range reagent starter kit (reagents for 25 tests)
- Sample cuvette and cap (2 pcs.)
- Filter paper (25 pcs.)
- Filter holder (1 pc.)
- Mixing vial and cap (1 pc.)
- 5 mL syringe with tip (1 pc.)
- 10 mL syringe (1 pc.)
- 1 mL graduated syringe (1 pc.)
- Plastic refilling pipette (1 pc.)
- 16 gauge blunt needle (1 pc.)
- 1.5V AAA Alkaline battery (1 pc.)
- Instruction manual

Note: Save all packing material until you are sure that the Checker[®]HC handheld colorimeter works correctly. Any damaged or defective item must be returned in its original packing material with the supplied accessories.

General Description & Intended Use

HI781 Marine Nitrate Low Range handheld checker is designed to accurately determine nitrate levels in aquariums and marine biology applications.

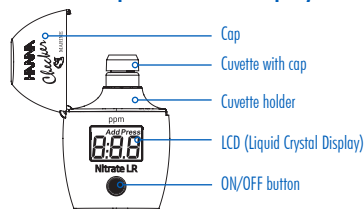
HI781 features a single-button operation system and is easy to use.

The large LCD is easy to read and the auto shut-off feature assures the battery will not be drained.

Specifications

Range	0.00 to 5.00 ppm (as NO_3^-) 0.0 to 50.0 ppm (calculated) using dilution
Resolution	0.01 ppm
Accuracy	$\pm 0.25 \text{ ppm} \pm 2\%$ of reading @ 25 °C (77 °F) $\pm 2.5 \text{ ppm} \pm 5\%$ of calculated reading using dilution
Light source	Light Emitting Diode @ 525 nm
Light detector	Silicon photocell
Method	Colorimetric method. The reaction between nitrate and the reagent causes a pink/violet tint in the sample. This checker has been developed to work with seawater samples.
Interferences	Nitrite, copper
Environment	0 to 50 °C (32 to 122 °F); max. 95% RH non-condensing
Battery type	1.5V AAA Alkaline
Auto shut-off	After 10 minutes of non-use
Dimensions	86.0 x 61.0 x 37.5 mm (3.4 x 2.4 x 1.5")
Weight	64 g (2.3 oz)

Functional Description & LCD Display



Prepare the Filter Holder Assembly

Unscrew the two halves of the reusable filter holder and carefully place one paper filter on the lower piece. The upper piece is marked "TOP"; the lower piece has no marking. Ensure the filter paper is on top of the clear colorless gasket in the filter holder. Thread the upper piece over the lower piece and tighten securely. Ensure that the paper filter is not overlapping the threads. The filter holder assembly is now ready for use.

CLEANING: To clean zinc powder residue from the filter holder assembly, unscrew the filter holder and gently pop the small ridged disk out of the upper half. If necessary, use a small bristle brush and detergent. Rinse thoroughly with Reverse Osmosis Deionized water (RODI) or tap water and dry before use.

Filtration & Dilution

FILTERING: To prevent the filter from tearing, ensure that the filter and filter holder are dry before use. During filtering, keep a constant light pressure on the syringe plunger; it should take about 30 seconds for full filtration. Do not use excessive force.

DILUTION: (1) measure 1 mL of sample using HI740143 1 mL graduated syringe, (2) dispense into mixing vial, (3) add nitrate/nitrite-free artificial seawater up to the 10 mL mark using HI740157P droppers, (4) cap the vial and mix, (5) attach the blunt needle to the 10 mL syringe. To attach, screw the covered blunt needle and remove the cap to expose opening, (6) draw 7 mL of diluted sample into syringe and discard remaining 3 mL of sample from the mixing vial, (7) dispense 7 mL of diluted sample back into the empty mixing vial. Continue with the normal procedure by adding HI781A-0. Multiply results by 10.

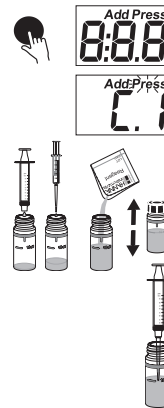
Note: Measurement accuracy will be affected by dilution. Measure dilution volumes carefully!

Measurement Procedure

- Press the ON/OFF button to turn the checker on. All segments will be displayed for a few seconds, followed by "Add", "C.1" with "Press" blinking.

Note: For samples containing 5-50 ppm nitrate, follow the dilution procedure above.

- Using the 10 mL syringe, measure exactly 7 mL of sample into the large mixing vial.
- Using the 5 mL syringe, add exactly 4 mL of HI781A-0 reagent into the large mixing vial.
- Add the content of one packet of HI781B-0 reagent into the large mixing vial. Replace the cap and shake vigorously for 1 minute.
- Remove the cap of the mixing vial. Thread the covered needle onto the 10 mL syringe, remove the plastic cover and draw up the contents of the mixing vial into the syringe.



- Cover the needle with plastic cover and twist to remove. Add the filter to filter holder assembly and attach to the 10 mL syringe using the threaded connection. Hold the syringe and filter holder assembly over a cuvette.
- Very slowly push the plunger into the 10 mL syringe until the 10 mL cuvette has been filled up to the 10 mL mark and replace the cap. Insert the cuvette into the checker and close the cap.
- Press the ON/OFF button. When the display shows "Add", "C.2" with "Press" blinking, the checker is zeroed.
- Remove the cuvette, unscrew the cap and add the content of one packet of HI781C-0 reagent. Replace the cap and shake vigorously for 2 minutes.
- Insert the cuvette into the checker and close the cap.
- Press and hold the ON/OFF button. The display will show the countdown prior to the measurement. Alternatively, wait 8 minutes and press the button.
- When the timer ends the checker will perform the reading. The instrument displays the concentration of nitrate in ppm of NO_3^- . The checker turns off 10 minutes after reading.

Tips for an Accurate Measurement

- Ensure the sample does not contain any debris.
- Whenever the cuvette is placed into the checker, it must be dry outside and free of fingerprints, oil and dirt.
- Wipe the cuvette thoroughly with HI731318 microfiber cleaning cloth or a lint-free cloth prior to insertion.
- Shaking the cuvette can generate bubbles, causing higher readings. To obtain accurate measurements, remove such bubbles by swirling or by gently tapping the cuvette.
- Do not let the reacted sample stand too long after reagent has been added, as accuracy will be affected.
- Discard the sample immediately after the reading has been taken or the glass might become permanently stained.

