

POCKET TURBIDIMETER™

Analysis System

CERTIFICATION

Hach Company certifies this instrument was tested thoroughly, inspected and found to meet its published specifications when it was shipped from the factory. The **Pocket Turbidimeter Instrument** has been tested and is certified as indicated to the following instrumentation standards:

Immunity:

EN 50082-1:1997 (Generic Immunity Standard) **per 89/336/EEC**

EMC: Supporting test records by Hach Company, certified compliance by Hach Company.

Required Standard/s include:

EN 61000-4-2 (IEC 1000-4-2) Electro-Static Discharge

EN 61000-4-3 (IEC 1000-4-2) Radiated RF Electro-Magnetic Fields

ENV 50204 Radiated Electro-Magnetic Field from Digital Telephones

Additional Standard/s include:

ENV 50204 “1995” Radiated Electro-Magnetic Field from Digital Telephones

Emissions:

EN 50081-1 (Generic Emission Standard) **per 89/336/EEC EMC:**
Supporting test records by Intellistor O.A.T.S., certified compliance by Hach Company.

Required European Standard/s include:

EN 55011 (CISPR 11) Emissions, Class B Limits

Additional Emissions Standard/s include:

**CANADIAN INTERFERENCE-CAUSING EQUIPMENT
REGULATION, IECS-003, Class A:** Supporting test records by
Intellistor O.A.T.S., certified compliance by Hach Company.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

FCC PART 15, Class “A” Limits: Supporting test records by Intellistor O.A.T.S., certified compliance by Hach Company.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. The following techniques of reducing the interference problems are applied easily.

1. Remove power from the Pocket Turbidimeter Instrument by removing one of its batteries to verify that it is or is not the source of the interference.
2. Move the Pocket Turbidimeter Instrument away from the device receiving the interference.
3. Reposition the receiving antenna for the device receiving the interference.
4. Try combinations of the above.

TABLE OF CONTENTS

CERTIFICATION	iii
SAFETY PRECAUTIONS	ix
SPECIFICATIONS	xi
OPERATION	1
General Description	3
Principle of Operation.....	5
Battery Installation.....	6
Preparing the Pocket Turbidimeter Sample Cell	9
Oiling the Pocket Turbidimeter Sample Cell.....	11
Indexing the Sample Cell.....	12
Using StablCal® Stabilized Standards.....	13
Instructions for Preparing StablCal Stabilized Formazin Standards	13
Precautions for Use of Standards.....	15
Controlling Ambient Light	16

TABLE OF CONTENTS, continued

CALIBRATION	17
Calibration Helpful Hints.....	17
CALIBRATION PROCEDURE	19
MEASURING TURBIDITY PROCEDURE	25
MAINTENANCE	29
Helpful Hints.....	29
Cleaning the Sample Cells and Caps	31
GENERAL INFORMATION	37
PARTS AND ACCESSORIES	39
WARRANTY	41
REPAIR SERVICE	43

SAFETY PRECAUTIONS

As part of good laboratory practice, please become familiar with the reagents used in these procedures. Read all product labels and the MSDS (Material Safety Data Sheets) before using any chemicals. Please contact Hach with questions about reagents or procedures.

Use of Hazard Information

If multiple hazards exist, the signal word corresponding to the greatest hazard shall be used.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury

CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury

NOTE

Information that requires special emphasis.

Precautionary Labels

Please pay particular attention to labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed.

⚠ This symbol, if noted on the instrument, references the Instruction Manual for operational and/or safety information.

⚠ *Battery Installation* on page 6.

The Pocket Turbidimeter Instrument is a Class 1 LED product. A Class 1 LED product has insufficient energy to be considered an eye hazard.

SPECIFICATIONS

Range: 0.1 - 400 NTU

Accuracy: $\leq 5\%$ of reading from 0-400 NTU or ± 0.1 NTU (whichever is greater) when calibrated using StablCal[®] Standards. Accuracy tested at 20-25 °C; accuracy may vary when the instrument is operated at environmental extremes.

Resolution: 0.1 NTU below 100 NTU; 1 NTU from 100 to 400 NTU

Repeatability: $\pm 5\%$ of reading

Light Source: Infrared LED (Light Emitting Diode), 880 nm

Operating Temperature Range: 0 to 50 °C (instrument only)

Storage Temperature Range: -40 to 60 °C (instrument only)

Storage Temperature Range: (StablCal Stabilized formazin only)

Short Term: -40 to 40 °C

Long Term: 5 to 20 °C

Operating Humidity Range RH Non-condensing: 0 to 90% at 30 °C;
0 to 80% at 40 °C; 0 to 70% at 50 °C

This is a Class 1 LED product.

OPERATION

WARNING

Handling chemical samples, standards, and reagents can be dangerous. Review the necessary Material Safety Data Sheets and become familiar with all safety procedures before handling any chemicals.

ADVERTÊNCIA

A manipulação de amostras, padrões e reagentes químicos pode ser perigosa. Reveja as necessárias Fichas Técnicas de Segurança do Material e familiarize-se com os procedimentos de segurança antes de manipular quaisquer substâncias químicas.

ADVERTENCIA

La manipulación de muestras químicas, patrones y reactivos puede ser peligrosa. Antes de manipular cualquier producto químico, conviene leer las Fichas Técnicas de Seguridad y familiarizarse con los procedimientos de seguridad.

ATTENTION

La manipulation des échantillons chimiques, étalons et réactifs peut être dangereuse. Lire les fiches de données de sécurité des produits nécessaires et se familiariser avec toutes les procédures de sécurité avant de manipuler tout produit chimique.

WARNUNG

Da das Arbeiten mit chemikalischen Proben, Standards, Reagenzien und Abfällen mit Gefahren verbunden ist, empfiehlt die Hach Company dem Benutzer dieser Produkte dringend, sich vor der Arbeit mit sicheren Verfahrensweisen und dem richtigen Gebrauch der Chemikalien oder Biogefahrgut vertraut zu machen und alle entsprechenden Material Sicherheitsdatenblätter aufmerksam zu lesen.

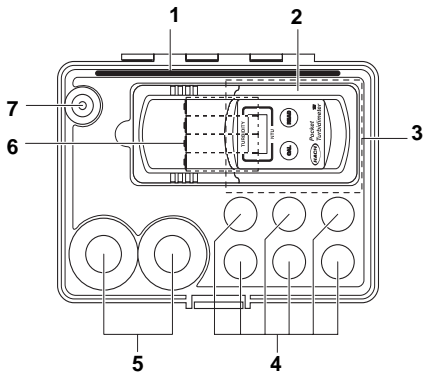
General Description

The Pocket Turbidimeter Instrument* measures turbidity and provides a direct readout on the liquid crystal display from 0.0 to 400 NTU. Designed primarily for field use, the Pocket Turbidimeter Instrument is convenient, reliable, and easy to use and calibrate. The instrument operates on four AAA batteries (battery-saving features are incorporated into the software).

The instrument cap is used as a light shield during calibration and measurement and provides a dust-free environment for the optics and sample compartment when not in use.

The instrument is supplied with StablCal® Stabilized Formazin Standards (1.0 NTU and 20 NTU), silicone oil, an oiling cloth, four AAA alkaline batteries, six sample cells with caps, and this instruction manual all contained in a 30 x 18 x 14 centimeter (12 x 7.5 x 5.5 inch) polypropylene case. See *Figure 1* on the next page.

* Patent Pending



1. Oiling Cloth	26873-00
2. Pocket Turbidimeter Instrument	52600-60
3. Instruction Manual	52600-18
4. Sample Cells with press on caps, 6/pkg	52631-00
5. StablCal	
1.0 NTU, 100 mL	26598-42
20 NTU, 100 mL	26601-42
6. Batteries, AAA Alkaline, 4/pkg	46743-00
7. Silicone Oil, 15 mL	1269-36

Figure 1

Packaging Guide

Principle of Operation

The Pocket Turbidimeter Instrument operates on the nephelometric principle of turbidity measurement. The optical system includes an infrared LED and detector to monitor scattered light. Variation in the LED is automatically compensated, reducing calibration drift.

Calibration with StablCal® Stabilized Formazin Standards provides the capability for direct readout in FNU or NTU*. The instrument design is based on criteria specified in the ISO 7027 Turbidimeter Measurement Standards.

Note: *This product contains a Class 1 LED device which produces light at 880 ± 20 nm. A Class 1 LED represents no threat of injury to users of the product.*

The optical system is comprised of an 880 ± 20 nm light emitting diode (LED) assembly, a 90° detector to monitor scattered light, and an LED monitoring detector. The instrument measures turbidity up to 400 units in FNU/NTU measurement mode using the single 90° detector.

* $1 \text{ FNU} = 1 \text{ NTU}$ when the instrument is calibrated with formazin or stabilized formazin.

⚠ Battery Installation

Caution: This product is designed to use only alkaline batteries. Use of other types of batteries may result in damage to the instrument and injury to the user.

Prudence: Cet appareil est conçu pour utiliser seulement des piles alcalines. L'utilisation d'autres types de piles peut endommager l'appareil et blesser l'opérateur.

Atenção: Só devem ser utilizadas neste produto pilhas alcalinas. A utilização de outros tipos de pilhas pode ocasionar danos ao instrumento e ferimentos ao utilizador.

Atencion: Este producto ha sido diseñado para ser utilizado únicamente con baterías alcalinas. El uso de otro tipo de baterías puede provocar daños en el aparato y lesiones al usuario.

Vorsicht: Dieses Produkt darf nur mit Alkalibatterien betrieben werden. Der Gebrauch anderer Batterien kann das Gerät beschädigen und zu Verletzungen des Benutzers führen.

Figure 2 provides an exploded view of the battery installation. Loosen the captive screw to remove the battery compartment cover. Place the four batteries provided with the instrument in the holder as indicated (the proper polarities are shown on the battery holder). Replace the battery compartment cover and tighten the captive screw.

When power is applied, the display will momentarily show **88.8**, then the software version. If 88.8 does not appear momentarily on the display, remove and reinsert one of the batteries. When replacing discharged batteries, always replace the complete set of four. Rechargeable batteries are not recommended and cannot be recharged in the instrument.

When the batteries are removed for replacement, all calibration information is lost. Recalibration is required each time the batteries are replaced. See *CALIBRATION* on page 17.

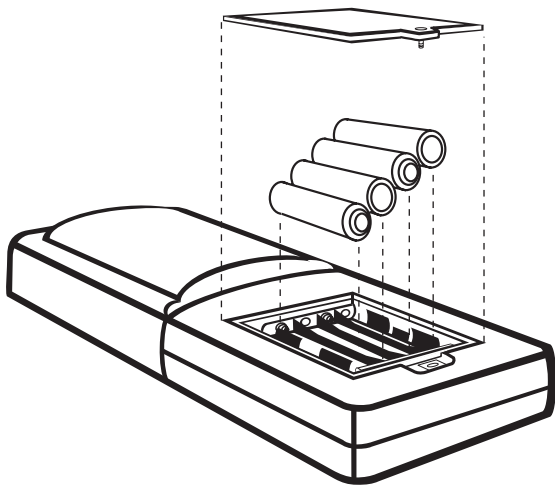


Figure 2

Battery Installation

Preparing the Pocket Turbidimeter Sample Cell

The Pocket Turbidimeter sample cell, supplied with a press-on cap, holds 5 mL of sample or standard (see *Figure 2*). The optical surfaces are the vertical sides of the lower, rectangular portion of the cell.

Take care to ensure that all the optical surfaces are free of dust, debris, fingerprints, and scratches. See *Cleaning the Sample Cells and Caps* on page 31. Polish the outside optical surfaces of the sample cell with silicone oil and the oiling cloth provided immediately before use. Doing so will mask minor imperfections and scratches and remove any dust on the optical surfaces which could cause inaccurate results. See page 11 for instructions.

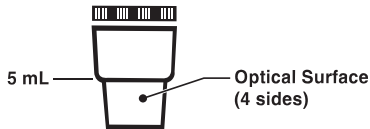
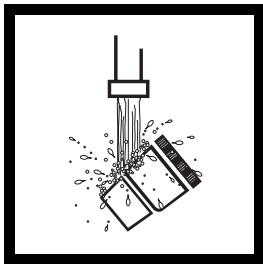


Figure 3

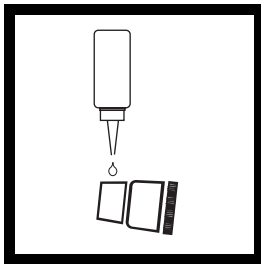
Pocket Turbidimeter Sample Cell

Note: Do not store formazin or StablCal Stabilized Formazin in the sample cells. Immediately after use, wash the interior surfaces of the sample cells with a cotton swab dipped in detergent (Liqui-nox[®] or equivalent) and water. Rinse with turbidity-free water. Cap the cells immediately after cleaning to prevent contamination.

Oiling the Pocket Turbidimeter Sample Cell

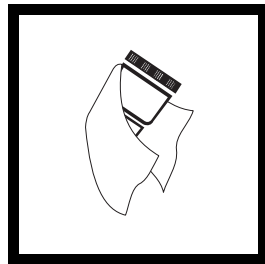


1. Thoroughly clean and rinse the Pocket Turbidimeter sample cell, following the instructions on page 31.



2. Apply a small drop of silicone oil to each of the outside four vertical rectangular sides of the cell.

Note: Store the oiling cloth in a sealed plastic storage bag to prevent contamination.



3. Spread the oil uniformly on the optical surfaces of the cell using the oiling cloth provided. Wipe off excess oil with the oiling cloth. The cell should appear nearly dry with little or no visible oil and no dust particles.

Sample Cell Information

Perform the calibration procedure on page *17* using one sample cell for both standards or using two sample cells, one for each NTU value.

If two sample cells are used in the calibration and the sample turbidity is expected to be between 0 and 20 NTU, measure the sample turbidity in the sample cell which contained the low calibration (1.0 NTU) standard.

If two sample cells are used in the calibration and the sample turbidity is expected to be between 20 and 400 NTU, measure the sample turbidity in the sample cell which contained the high calibration (20.0 NTU) standard.

Indexing the Sample Cell

The first time a sample cell is used, make a mark on the upper round portion of the cell to specify the cell orientation in the sample cell compartment. Each time the cell is used, insert it in this orientation.

Using StablCal® Stabilized Standards

Most consistent results will be achieved with the use of StablCal Stabilized Formazin Standards. The *Instructions for Preparing StablCal Stabilized Formazin Standards* below, provide information on how to accurately prepare StablCal Standards for use.

Instructions for Preparing StablCal Stabilized Formazin Standards

When using bulk standards that have been sitting undisturbed for longer than a month, start at Step 1. If the standards are used on at least a weekly interval, start at Step 3.

1. Shake the standard vigorously for 2-3 minutes to resuspend any particles.
2. Allow the standard to stand undisturbed for 5 minutes.
3. Gently invert the bottle of StablCal 5 to 7 times.

-
4. Prepare the sample cell for measurement using traditional preparation techniques (oiling the sample cell and marking the cell to maintain the same orientation in the sample cell compartment) to eliminate any optical variations in the sample cell.
 5. Rinse the sample cell at least one time with the standard and discard the rinse.
 6. Immediately fill the bottom optical portion of the sample cell (approximately 5 mL) with the standard. Cap the sample cell and let it stand for one minute. The standard is now ready for use in the calibration procedure.

Precautions for Use of Standards

- **Do not store standards in sample cells!**
- Do not transfer the StablCal standard to another container for storage.
- Store between 5 and 20 °C. Avoid prolonged exposure to temperatures exceeding 25 °C.
- Do not return used standard back into its original container.
- For long term storage, refrigeration at 5 °C is recommended.
- Always allow the standard to come to ambient instrument conditions before use (not to exceed 25 °C).

Controlling Ambient Light

The instrument cap also serves as a light shield when taking readings. In strong ambient light (direct sunlight) the instrument cap may not provide sufficient protection and slightly higher NTU values may be seen.

If possible, do not take turbidity readings in bright sunlight. If you must take readings in bright sunlight, take the following measures to minimize the effects of the light:

1. Block the direct path of the sunlight with an object so the instrument is in shadow.
2. Block light reflected from below the instrument by cradling the instrument in your hand while taking a reading. Make sure the instrument light shield is properly installed and your fingers seal the edges of the light shield.

–or–

Place the instrument on a dark, non-reflective surface.

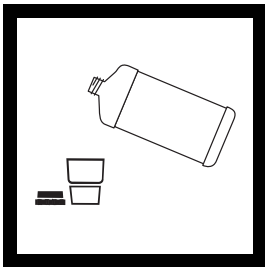
CALIBRATION

Calibration Helpful Hints

- Complete the entire calibration procedure within four (4) minutes. If any calibration point is changed and the calibration is not completed within the allotted time, an instrument “time out” will occur and all calibration information will be lost.
- Individual calibration points may not be updated, a complete calibration (dark value, 1.0 NTU, and 20 NTU data points) must be performed.
- Best calibration of the instrument will result by calibrating in the same environment as that in which the testing will be performed.
- For best measurement results, hold or place the instrument in a horizontal to 45° of horizontal position. **Do not** hold the instrument perpendicular (90°) during measurement or calibration.
- Do not calibrate with standards other than those specified in this manual.

-
- Have both standards prepared (including mixing the bulk standards and transferring them to the sample cells) prior to beginning the calibration.
 - Use freshly mixed StablCal Standards as directed in *Using StablCal® Stabilized Standards* on page 13.
 - Wash the inside and outside of sample cells before and after use. Refer to *Cleaning the Sample Cells and Caps* on page 31.
 - Mark the cell orientation to ensure it is inserted into the sample cell compartment with the same orientation each time it is used. See *Indexing the Sample Cell* on page 12.
 - Wipe the sample cell with the oiling cloth immediately before use to eliminate dust particles on the cell.
 - See *Troubleshooting and Error Codes* on page 32 for information regarding error messages which may occur during calibration.

CALIBRATION PROCEDURE



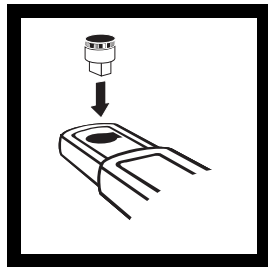
1. Pour 5-mL of properly mixed 1.0 NTU StablCal® Standard into the clean, indexed and oiled Pocket Turbidimeter sample cell.

Note: The volume contained within the flat-sided portion of the turbidimeter sample cell equals approximately 5 mL.



2. Cap the cell, then remove dust particles by wiping the cell with the oiling cloth immediately before inserting it into the sample cell compartment.

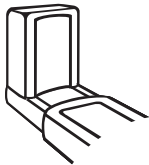
Note: If the cell sits for more than 10 minutes before use, invert once or twice to ensure the StablCal is properly mixed.



3. Place the sample cell containing the 1.0 NTU standard into the instrument sample cell compartment.

CALIBRATION PROCEDURE, continued

Wait 30 seconds.



4. Cover the sample cell with the light shield and wait 30 seconds for the standard to stabilize.



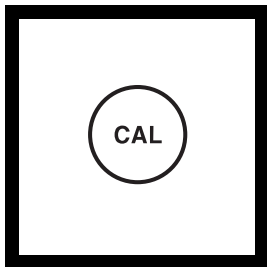
5. Press and hold the **CAL** key then press the **READ** key. Release both keys. After a short delay, **dA** will flash alternating with the dark value (based on the last calibration or the instrument default if no previous calibration exists).



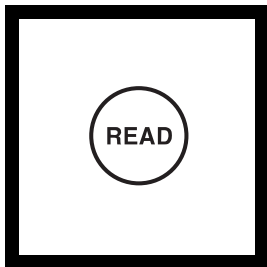
6. *If only reviewing the calibration point, do not press **READ**; skip to Step 7.*

To continue calibration, press and hold the **READ** key until the reading is stable. Release the **READ** key to accept the new dark value.

CALIBRATION PROCEDURE, continued

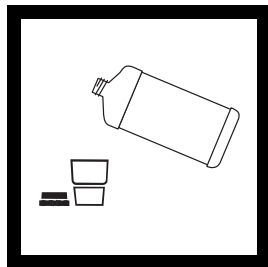


7. Press the **CAL** key. After a short delay, the display shows **C1.0** alternating with the 1.0 NTU value using the last calibration (or the instrument default value if no previous calibration exists).



8. *If the 1 NTU value is only to be reviewed and not changed, do not press **READ**; skip to Step 9.*

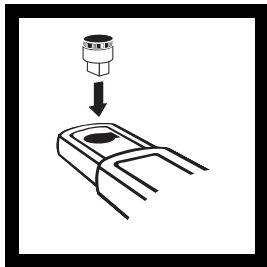
To continue calibration, press and hold the **READ** key. When the reading is stable, release the **READ** key to save the new 1.0 NTU value.



9. Pour 5-mL of properly mixed 20 NTU StablCal[®] Standard into the clean, indexed and oiled Pocket Turbidimeter sample cell. Cap the cell.

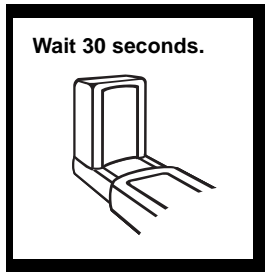
Note: The volume contained within the flat-sided portion of the turbidimeter sample cell equals approximately 5 mL.

CALIBRATION PROCEDURE, continued

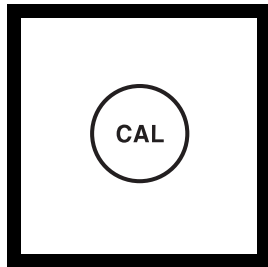


10. To remove all dust, wipe the sample cell exterior with the oiling cloth then insert it into the sample cell compartment.

***Note:** If the cell is allowed to sit for more than 10 minutes after being filled, invert once or twice to ensure the StabCal is properly mixed.*

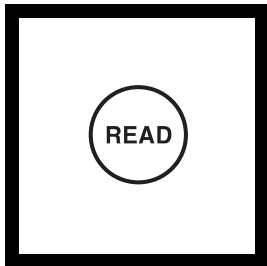


11. Cover the sample cell with the light shield and wait 30 seconds for the standard to stabilize.



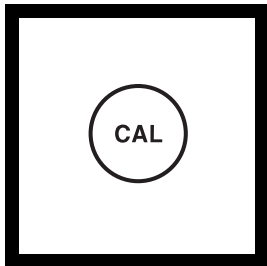
12. Press the **CAL** key. After a short delay, the display shows **C20** alternating with the 20 NTU value using the last calibration (or the instrument default value if no previous calibration exists).

CALIBRATION PROCEDURE, continued



13. If the 20 NTU value is only to be reviewed and not changed, do not press **READ**; skip to Step 14.

To continue calibration, press and hold the **READ** key until the reading is stable. Release the **READ** key to save the new 20 NTU value.



14. Press the **CAL** key to end the calibration. The instrument displays **CLd** to indicate a new calibration has been entered. If no data points were changed, the instrument displays **OLd** to show the previous calibration has been retained.

***Note:** When the calibration is complete, clean all sample cells and caps using a cotton swab, detergent (Liqui-nox[®] or equivalent), and water. Rinse with deionized water and dry and cap the cells for storage.*

MEASURING TURBIDITY PROCEDURE

CAUTION

The Pocket Turbidimeter is not intended for use with flammable samples or those containing hydrocarbons or concentrated acids that might attack the components. Conduct compatibility tests prior to analysis if the sample to be monitored is in question.

ATENÇÃO

O Pocket Turbidimeter não se destina a ser utilizado com amostras inflamáveis, ou com as que contêm hidrocarbonetos ou ácidos concentrados que possam atacar os componentes do. Efectue testes de compatibilidade antes da análise, se houver dúvidas sobre a amostra a ser monitorizada.

PRECAUCIÓN

El Pocket Turbidimeter no se debe utilizar con muestras inflamables o con aquellas que contengan hidrocarburos o ácidos concentrados que puedan atacar los componentes del . Se aconseja realizar pruebas de compatibilidad antes de efectuar el análisis si se desconoce si la muestra que se desea controlar los contiene.

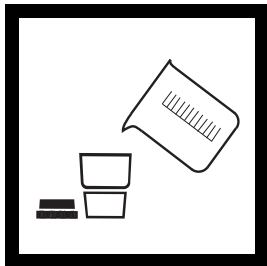
PRUDENCE

Le Pocket Turbidimeter n'est pas prévu pour utilisation avec des échantillons inflammables ou ceux contenant des hydrocarbures ou des acides concentrés qui pourraient attaquer les composants. Effectuer des tests de compatibilité avant l'analyse s'il existe un doute sur l'échantillon à analyser.

VORSICHT

Das Pocket Turbidimeter darf nicht für Tests mit brennbaren Proben oder Proben, die Kohlenwasserstoffe oder konzentrierte Säuren enthalten, benutzt werden. Diese Inhaltsstoffe können die Bauteile des Gerätes angreifen. Vor der Analyse fraglicher Proben sind Kompatibilitätstests durchzuführen.

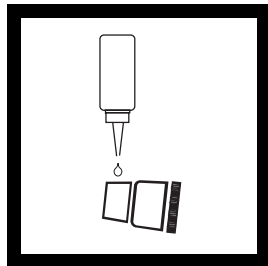
MEASURING TURBIDITY, continued



1. Pour 5 mL of sample into the Pocket Turbidimeter sample cell. Cap the cell.
(See *Sample Cell Information* on page 12.)

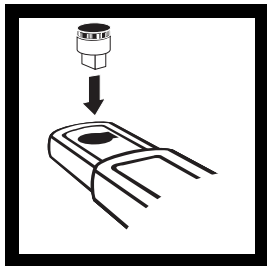


2. Wipe the outside surfaces of the cell with the oiling cloth to remove any liquid. Take care not to scratch the cell.



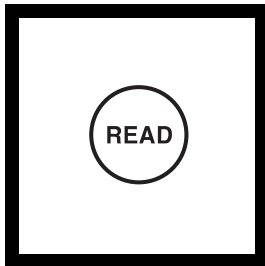
3. Apply silicone oil to the sample cell using the procedure presented on page 11. Wipe the cell again with the oiling cloth immediately before inserting it into the sample cell holder to remove all dust.

MEASURING TURBIDITY, continued



4. Insert the sample cell into the instrument sample compartment and cover the cell with the instrument cap.

Note: For best results, use the same sample cell and cell orientation as that used in the calibration of the instrument.



5. Press and hold the **READ** key until the reading stabilizes (approximately 5 seconds). Release the **READ** key and record the displayed reading.

Note: The value will remain on the display for approximately one minute, then the display will go blank.

Note: If **FFF** is displayed, the turbidity is either >440 NTU or the ambient light is extremely high. Refer to the section concerning Error code FFF in Table 1 on page 35 for additional information.

MAINTENANCE

Helpful Hints

- Do not allow liquids to enter any part of the Pocket Turbidimeter. Instrument damage will result.
- Store the Pocket Turbidimeter Instrument in a clean, dry environment. If necessary, use a damp, soft cloth to clean the exterior of the instrument.
- Do not immerse the instrument.
- If sampling by dipping the sample cell into the sample, first remove the cell from the instrument. Dry the outside of the cell before reinserting it into the instrument.
- Wipe the outside of the sample cell with the oiling cloth to remove liquid or dust before inserting it into the instrument.

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- Clean the sample compartment and the sample cell windows with a cotton swab dampened with isopropyl alcohol or detergent and turbidity-free water. Rinse with turbidity-free water. Do not use acetone or other organic solvents to clean the sample cells; damage to the cells will result.
 - Empty the sample cells before storing them in the carrying case.
 - Keep cleaned sample cells capped to prevent contamination.
 - If the foam insert inside the carrying case lid becomes wet, allow it to dry before storing the instrument in the closed carrying case.
 - If liquids enter the instrument, thoroughly clean and dry before storing the instrument in a closed carrying case.
 - Do not store samples or standards in the plastic sample cells.

Cleaning the Sample Cells and Caps

Rinse with 1:1 HCl followed by multiple rinses with particle-free water.

or

Soak in warm water to which a mild detergent (Liqui-nox[®] or equivalent) has been added; use a cotton swab to scrub the cells if necessary. Rinse several times with turbidity-free water.

Cap the cleaned cells to prevent contamination.

Avoid excessive scrubbing of the cells, scratches will result.

Do not use strong organic solvents; they will etch the sample cells.

Table 1 Troubleshooting and Error Codes

Error Code	Cause	Possible Solution
E01	Invalid interrupt	Call Hach Service.
E03	Low battery	Replace all four batteries and recalibrate the instrument.
E04	Light leak during dark point calibration	Ensure the light shield (instrument cap) is properly in-stalled. Read and follow the instructions in <i>Controlling Ambient Light</i> on page 16. Redo the entire calibration.* Call Hach Service.

Table 1 Troubleshooting and Error Codes (continued)

Error Code	Cause	Possible Solution
E05	First calibration point (1.0 NTU) too low	During a calibration: Verify the proper standard is being used and reread the standard. Continue with the calibration. Outside of calibration mode: Verify standards, then redo the entire calibration.* Call Hach Service.
E06	First calibration point (1.0 NTU) too high	During a calibration: Verify the proper standard is being used and reread the standard. Continue with the calibration. Outside of calibration mode: Verify standards, then redo the entire calibration.* Call Hach Service.

Table 1 Troubleshooting and Error Codes (continued)

Error Code	Cause	Possible Solution
E07	Second calibration point (20 NTU) too low	During a calibration: Verify the proper standard is being used and reread the standard. Continue with the calibration. Outside of calibration mode: Verify standards, then redo the entire calibration.* Call Hach Service.
E08	Second calibration point (20 NTU) too high	During a calibration: Verify the proper standard is being used and reread the standard. Continue with the calibration. Outside of calibration mode: Verify standards, then re-do the entire calibration.* Call Hach Service.

Table 1 Troubleshooting and Error Codes (continued)

Error Code	Cause	Possible Solution
E09	Calibration error or instrument is not calibrated.	Redo the calibration.* Call Hach Service.
FFF	Turbidity is >440 NTU Extremely high ambient light	Dilute the sample with turbidity-free water to within the range of the instrument and reread the sample. Make sure the instrument cap is properly installed as a light shield. Read and follow the instructions in <i>Controlling Ambient Light</i> on page 16.

* If a *valid* previous calibration exists, that calibration may be recalled to replace a new calibration which is incorrect. If **E04** through **E09** is flashing on the display when the calibration routine is complete, press the **READ** key within approximately one minute. **OLd** will appear on the display to denote retention of the previous calibration. If **OLd** does not appear and the error code recurs, the previous calibration is invalid or does not exist. Recalibrate the instrument.



GENERAL INFORMATION

At Hach Company, customer service is an important part of every product we make.

With that in mind, we have compiled the following information for your convenience.

PARTS AND ACCESSORIES

Replacement Parts

Description	Cat No.
Batteries, AAA alkaline, pkg/4	46743-00
Instrument Cap/Light Shield, each	52632-00
Instrument manual, each.....	52600-18
Oiling Cloth for sample cell preparation	26873-00
Sample Cell with press-on cap, 5-mL, 6/pkg	52631-00
Silicone Oil, 15 mL	1269-36
Swabs, cotton, presterilized, 100/pkg.....	25543-00

Replacement Reagents

StablCal [®] Standard, 1.0 NTU, 100 mL	26598-42
StablCal [®] Standard, 20 NTU, 100 mL	26601-42

Optional Reagents

Liqui-nox Laboratory Detergent, 1 qt. (1.946 L)	20881-53
HCl, 1:1, 500 mL.....	884-49
Deionized water, 500 mL	272-49

WARRANTY

Hach warrants the Pocket Turbidimeter Instrument against defective materials or workmanship for two years from the date of shipment.

HACH WARRANTS TO THE ORIGINAL BUYER THAT HACH PRODUCTS WILL CONFORM TO ANY EXPRESS WRITTEN WARRANTY GIVEN BY HACH TO THE BUYER. EXCEPT AS EXPRESSLY SET FORTH IN THE PRECEDING SENTENCE, HACH MAKES NO WARRANTY OF ANY KIND WHATSOEVER WITH RESPECT TO ANY PRODUCTS. HACH EXPRESSLY DISCLAIMS ANY WARRANTIES IMPLIED BY LAW, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

WARRANTY, continued

LIMITATION OF REMEDIES: Hach shall, at its option, replace or repair nonconforming products or refund all amounts paid by the buyer. **THIS IS THE EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.**

LIMITATION OF DAMAGES: IN NO EVENT SHALL HACH BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND FOR BREACH OF ANY WARRANTY, NEGLIGENCE, ON THE BASIS OF STRICT LIABILITY, OR OTHERWISE.

Catalog descriptions, pictures and specifications, although accurate to the best of our knowledge, are not a guarantee or warranty.

For a complete description of Hach Company's warranty policy, request a copy of our Terms and Conditions of Sale for U.S. Sales from our Customer Service Department.

REPAIR SERVICE

Authorization must be obtained from Hach Company before sending any item for repair. Please contact the Hach Factory Service Center serving your location.

<p>In the United States: Hach Company 100 Dayton Ave. P.O. Box 907 Ames, Iowa 50010 Toll-free: 800-227-4224 (U.S.A. only) FAX: (515) 232-1276</p>	<p>In Canada: Hach Sales & Service Canada, Ltd. 1313 Border Street, Unit 34 Winnipeg, Manitoba R3H 0X4 Toll-free: 800-665-7635 (Canada only) Telephone: (204) 632-5598 FAX: (204) 694-5134</p>
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Outside the U.S.A. - **Contact the HACH office or distributor serving you.**

On the Worldwide Web - **www.hach.com**; E-mail - **techhelp@hach.com**
