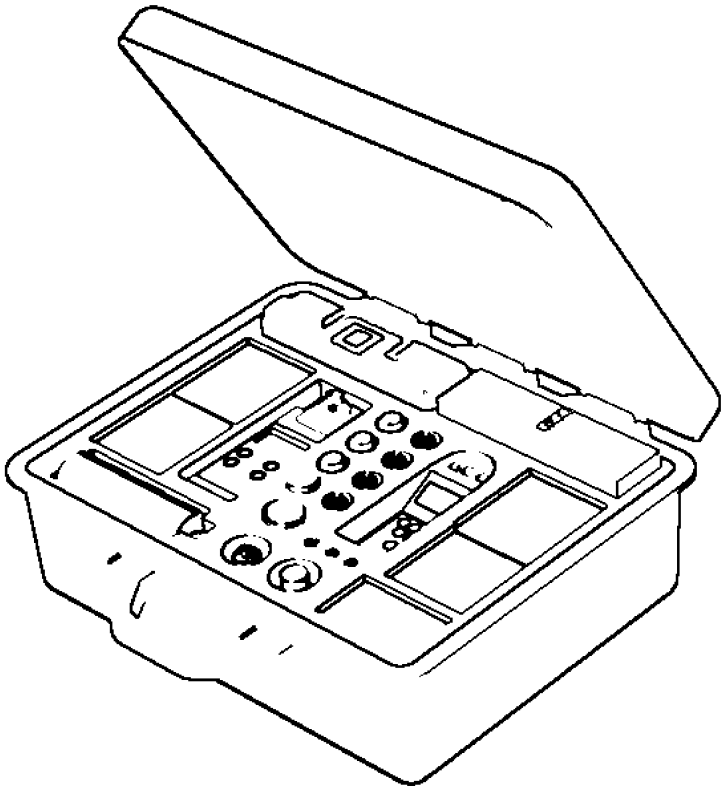
TM 10-6630-222-12&P

TECHNICAL MANUAL

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)

Part Number: IITC-WQAS/P-00001
NSN: 6630-01-477-2395



HEADQUARTERS, DEPARTMENT OF THE ARMY

JUNE 2001

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 7 March 2002

Operator and Unit
Maintenance Manual
(Including Repair Parts and Special Tools List)

FOR

WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)

Part Number: IITC-WQAS/P-00001
NSN: 6630-01-477-2395

DISTRIBUTION STATEMENT A: Approved for public release: distribution is unlimited.

TM 10-6630-222-12&P, 30 June 2001, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove Pages	Insert Pages
A/B blank	A/B blank
0023 00-1 through 0027 00-2	0023 00-1 through 0027 00-2

2. Retain this sheet in the front of manual for reference purposes

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0200801

DISTRIBUTION: To be distributed in accordance with the initial distribution number (IDN) 256672, requirements for TM 10-6630-222-12&P.

WARNING SUMMARY

Do not use decontamination spray on personnel. It could cause personal injury.

CHEMICAL

Do not take any of the chemicals in this kit internally. Personal injury can result.

Avoid direct contact with all chemicals in this kit, some cause skin and eye irritation. Wear protective clothing and eye or face protection as needed. DPD chlorine test power is irritating to eyes, respiratory tract, and may cause allergic skin reaction. Provide ventilation when handling and wear safety glasses and gloves.

POISON

Avoid all bodily contact with kit chemicals: some can be VERY HARMFUL to your health. Kit tests should be done only by personnel who are properly trained and wearing chemical protective rubber gloves with inserts and industrial goggles or protective mask. If exposed, follow FIRST AID INFORMATION inside kit lid or manual.

VAPOR

Alkaline chemical used in the mustard test is extremely hazardous. One drop of this liquid accidentally splashed into the eye can cause permanent vision loss even if immediate first aid is applied. Immediately flush the eye with large amounts of water for 20 to 30 minutes, if possible, with another person's help.

Seek immediate medical treatment. If alkaline solution is swallowed, DO NOT induce vomiting. Dilute alkali by giving water to drink, and seek medical treatment. During a CW alert or CW agent work, wear MOPP level 4 protective equipment. Do not use this kit if you cannot see colors correctly. Do not use an outdated kit for testing because it will give unreliable test results. Read nerve agent test results carefully. In this test, NO COLOR CHANGE means agent is present. In preparing simulated test water, DO NOT USE canteens, canteen cups, or other containers intended for potable water. For first aid, refer to FM 21-11.

INSERT LATEST CHANGE PAGES, DESTROY SUPERCEDED DATA

LIST OF EFFECTIVE PAGES/WORK PACKAGES

NOTE: The portion of text affected by the update is indicated by a vertical line in the outer margins of the page. Updates to illustrations are indicated by miniature pointing hands. Updates to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

original	30 June 2001
Change 1	7 March 2002

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 30 AND THE TOTAL NUMBER OF WORK PACKAGES IS 027, CONSISTING OF TEE FOLLOWING:

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Waminga-b	0		
A	1		
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iiblank	0		
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WP 0001 - 0023 001/2 blank	0		
WP 0023 00-3 - 0025	1		
WP 0026 - 0027	0		
Glossary- 1 - 2	0		

*Zero in this column indicates an original page or work package

TM 10-6630-222-12&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., 30 June 2001

TECHNICAL MANUAL

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)

Part Number: IITC-WQAS/P-00001
NSN: 6630-01-477-2395

CURRENT AS OF 31 MAY 2001

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or email your letter, DA Form 2028, or DA Form 2028-2 direct to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. The email address is amsta-ac-nml@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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GLOSSARY

HOW TO USE THIS MANUAL

CONTENT

This manual is provided for your use in operating and maintaining the Water Quality Analysis Set: Purification . You must familiarize yourself with the entire maintenance procedures before beginning the maintenance task. Maintaining the Water Quality Analysis Set: Purification includes preventive maintenance checks and services.

MANUAL OVERVIEW

To help you become familiar with this new kind of manual as quickly as possible, spend some time looking through the pages. The manual has a new look that is different from the look of the manuals you've been using. You'll find that it's a lot easier to use and you'll be able to find what you're looking for faster. The following is a list and description of each chapter and appendix.

a. Chapter 1 DESCRIPTION AND THEORY OF OPERATION.

Contains general information, purpose of equipment, equipment description, and technical principles of operation regarding the complete Water Quality Analysis Set: Purification.

b. Chapter 2 OPERATOR INSTRUCTIONS.

Contains operating instructions, both under usual and unusual conditions, operation of auxiliary equipment, and preventive maintenance checks and services (PMCS).

c. Chapter 3 OPERATOR TROUBLESHOOTING PROCEDURES.

Contains operator troubleshooting procedures.

d. Chapter 4 UNIT TROUBLESHOOTING PROCEDURES.

Contains unit troubleshooting procedures.

e. Chapter 5 OPERATOR MAINTENANCE INSTRUCTIONS.

Contains operator instructions and maintenance procedures.

f. Chapter 6 UNIT MAINTENANCE INSTRUCTIONS.

Contains unit instructions and maintenance procedures.

g. Chapter 7 SUPPORTING INFORMATION.

1. *References*

Contains a listing of all forms and technical manuals referred to in this manual.

2. *Maintenance Allocation Chart (MAC).*

Contains a listing of all maintenance significant items and their applicable maintenance functions assigned to each maintenance category.

3. *Repair Parts and Special Tools List.*
4. *Components of End Item and Basic Issue Items List.*

Contains listings for components of the end item, and basic issue items.

5. *Expendable/Durable Supplies and Materials List.*

Contains an alphabetized tabular listing of all consumable items used in the maintenance or repair of the Water Quality Analysis Set: Purification.

h. Rear Matter

1. *GLOSSARY*

Contains an alphabetical list of terms, acronyms and abbreviations used in this manual.

2. *INDEX.*

Contains an alphabetical index by subject matter contained in this manual.

3. *DA Form 2028*

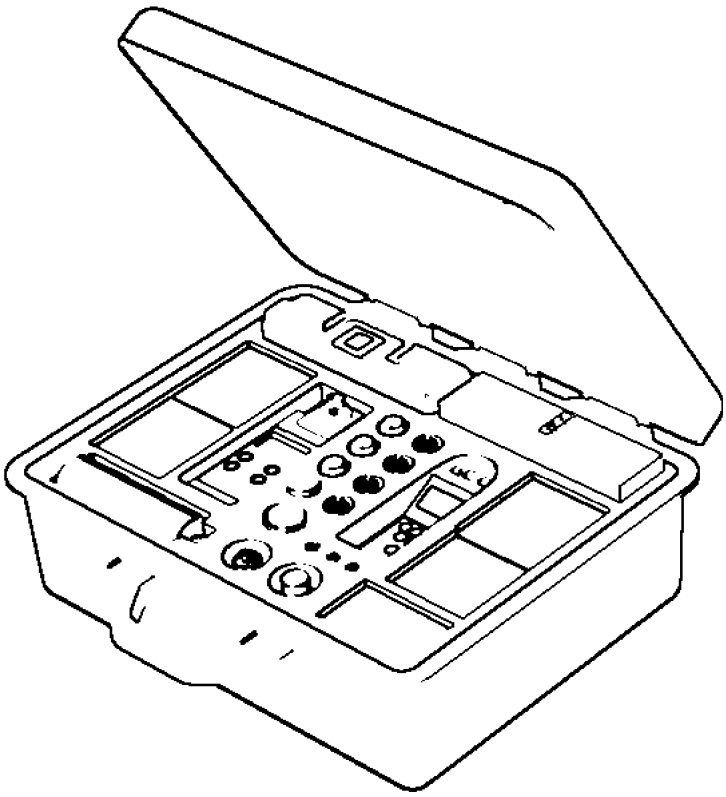
DA Form 2028, with instructions for submittal and sample for usage.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)

GENERAL INFORMATION

SCOPE.

This manual covers the use and maintenance of the Water Quality Analysis Set: Purification (WQAS-P) see figure below, in testing water for contamination and quality. This manual provides descriptions of the various meters and accessory equipment, and supplies operation and maintenance instructions. Also included are instructions for preparing the unit for storage and shipment.



WQAS-P

MAINTENANCE FORMS AND PROCEDURES.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management System, or AR 700-138, Army Logistics Readiness and Sustainability.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATION (EIR).

If your Water Quality Analysis Set: Purification needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army TACOM, ATTN: AMSTA-LC-CJA, Warren, MI 48397-5000. We will send you a reply.

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
GENERAL INFORMATION

CORROSION PREVENTION AND CONTROL (CPC).

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of keywords such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to: Commander, U.S. Army TACOM, ATTN: AMSTA-TR-D/210, Warren, MI 48397-5000; DODAC: W56HZV

OZONE DEPLETING SUBSTANCES.

This set does not contain Ozone depleting substances. (ODS)

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Methods and/or procedures for the destruction of Army materiel to prevent enemy use are covered in TM 750-244-3, "Procedures for Destruction of Equipment to Prevent Enemy Use".

PREPARATION FOR STORAGE AND SHIPMENT.

Refer to Work Package 0018 for specific instructions.

WARRANTY INFORMATION.

Myron L. Ultrameters, including the pH/ORP sensor, have a limited one year warranty. The warranty starts on the date found in block 23 of DA Form 2408-9, Equipment Control Record.
If an instrument fails to operate properly, see Troubleshooting Chapter. The battery and pH/ORP sensor are user-replaceable. For other service, return the instrument prepaid to the Myron L. Company.

MYRON L. COMPANY
6115 Corte Del Cedro
Carlsbad, CA 92009
USA
760-438-2021

If, in the opinion of the factory, failure was due to materials or workmanship, repair or replacement will be made without charge. A reasonable service charge will be made for diagnosis or repairs due to normal wear, abuse or tampering. This warranty is limited to the repair or replacement of the Ultrameter only. The Myron L. Company assumes no other responsibility or liability.

The Turbidity Meter is warranted for a period of two (2) years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. This warranty is limited to repair or replacement free of charge. Damages due to accidents, 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. First obtain a Returned Goods Authorization number from the Customer Service department, then return the instrument with the Authorization # included along with shipment costs prepaid. If the repair is not covered by the warranty, you will be notified of the charges. When shipping any instrument, make sure it is properly packaged for complete protection. The warranty starts on the date found in block 23 of DA Form 2408-9, Equipment Control Record.

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
GENERAL INFORMATION

The Photometer is warranted for a period of one year to be free of defects in material and workmanship, in normal use and service. The obligation under this warranty is limited to factory replacing the instrument or any part thereof. Parts which by their nature are normally required to be replaced periodically, consistent with normal maintenance, specifically lamps including fluorescent blacklight, reagent, desiccant, sensors, electrodes and fuses are excluded.. The warranty starts on the date found in block 23 of DA Form 2408-9, Equipment Control Record.

Report all defects to your supervisor, who will take appropriate action.

END OF WORK PACKAGE

CHAPTER 1

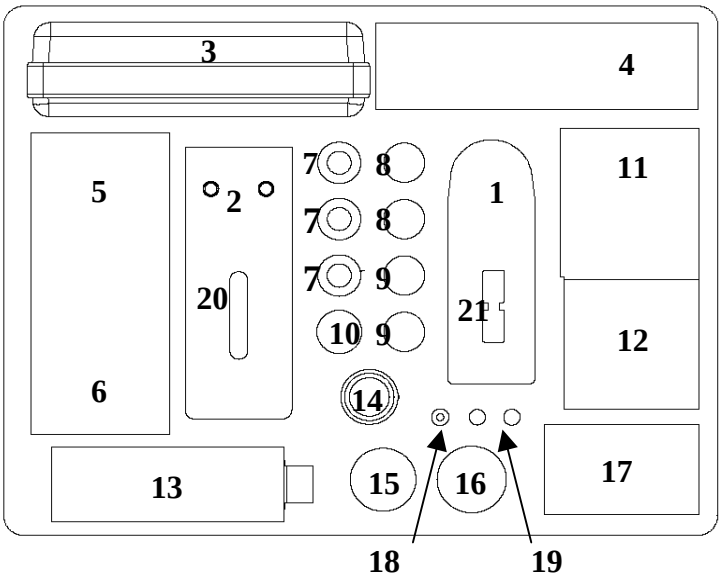
DESCRIPTION AND THEORY OF OPERATION

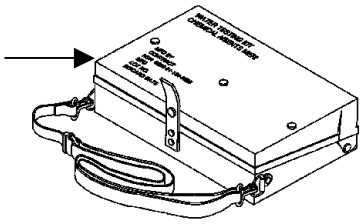
OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

The WQAS:P is a one-person portable suitcase kit containing equipment for testing water quality. The kit is self-contained in a gasketed waterproof case. Foam inserts secure equipment in the case and protect sensitive instruments.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.





Major Components

1. pH/TDS Meter, referred to from here forward as Ultrameter 6P(Digital Conductivity/TDS/Resistivity/pH/ORP/Temperature).
2. Turbidity Meter. Used to determine the turbidity of water and waste water.
3. Photometer, Chlorine. Used to determine free chlorine content.
4. M272 Chemical Agents Water Testing Kit. Visual tests using color comparison to determine hazardous levels of Lewisite, Nerve, Cyanide, and Mustard agents. (See TM 3-6665-319-10.)
5. 1413 uS Conductivity Standard pouches. Used as a reference for the Ultrameter
6. 447 uS Conductivity Standard pouches. Used as a reference for the Ultrameter.
7. Turbidity Measurement Cuvettes. Used to collect samples and conduct test.
8. Turbidity Standard (0 FTU). Used to calibrate the turbidity meter.
9. Turbidity Standard (10 FTU). Used to calibrate the turbidity meter.
10. Chlorine Test Strips. Used for checking chlorine level.
11. 15,000 uS Conductivity Standard Pouches. Used to calibrate the Ultrameter.
12. pH Standard Buffer Pack (7.00 pH). Used to calibrate the turbidity meter.
13. Electrode Storage Solution. Used to store the pH sensor.
14. Container, Beaker. Used to collect samples and conduct tests.
15. Cleaning Solution. Used to clean cuvettes.
16. Demineralizer Bottle. Used to produce demineralized water for water blanks. Used best water quality available.
17. Kimwipes Tissues.
18. Two sided Screwdriver. Used to remove screws, and change batteries.
19. Ballpoint Pens. Used to record information and data as needed.
20. Battery 1.5V AA. Used in the Turbidity Meter.
21. Battery 9V. Used in the Ultrameter and Chlorine Photometer.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT DATA.

WEIGHT AND DIMENSIONS

Weight 28 pounds	Length 24.25 inches	Width 19.50 inches	Height 8.75 inches

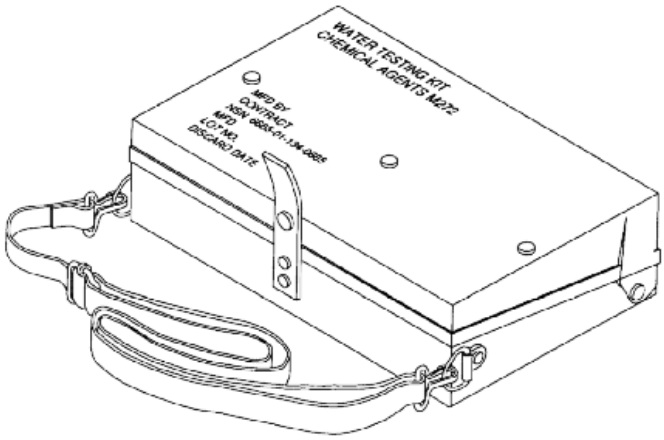
END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) THEORY OF OPERATION

NOTE:
See specific Work Package for detailed information.

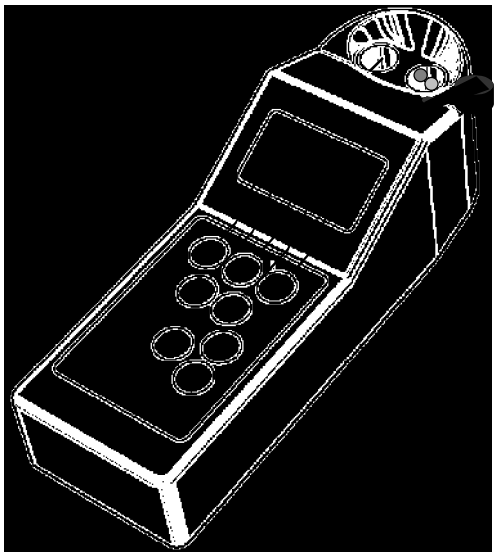
CHEMICAL AGENTS: M272 WATER TESTING KIT.

Water samples are taken and test chemicals added to cause a change in color within test tubes and or a chemical coated ticket. The color change is compared to a reference standard to determine hazardous levels of Lewisite, Nerve, Cyanide, and Mustard agents. (See TM 3-6665-319-10) , Operator's Manual for Water Testing Kit, Chemical Agents: M272 (NSN 6665-01-134-0885).



Chemical Agents: M272 Water Testing Kit

ULTRAMETER 6P (Digital Conductivity/TDS/Resistivity/pH/ORP/Temperature)
The ULTRAMETER is an instrument utilizing advanced microprocessor-based circuitry. Individual or multiple parameter readings may be obtained by filling individual sensors or entire cell cup area.

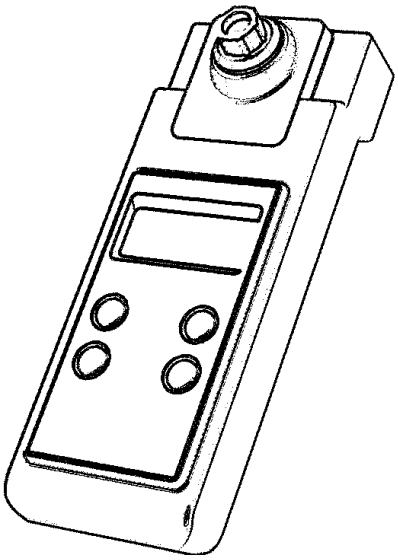


Ultrameter

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) THEORY OF OPERATION

TURBIDITY METER.

Turbidity is a measurement of undissolved solids suspended in a liquid. With the Turbidity meter, measurements can be performed with high precision in the field as well as in the laboratory. The meter is a hand-held, microprocessor-based, battery operated instrument used to determine the turbidity of water and waste-water. The meter covers a 0-1000 FTU range in two scales: 0.00 to 50.00 FTU and 50 to 1000 FTU. The auto-ranging feature of the instrument sets the appropriate range for the measurement.



Turbidity Meter

PHOTOMETER

Water samples are taken, test chemicals are added and readings are taken in milligrams per liter.

Photometer

END OF WORK PACKAGE

CHAPTER 2

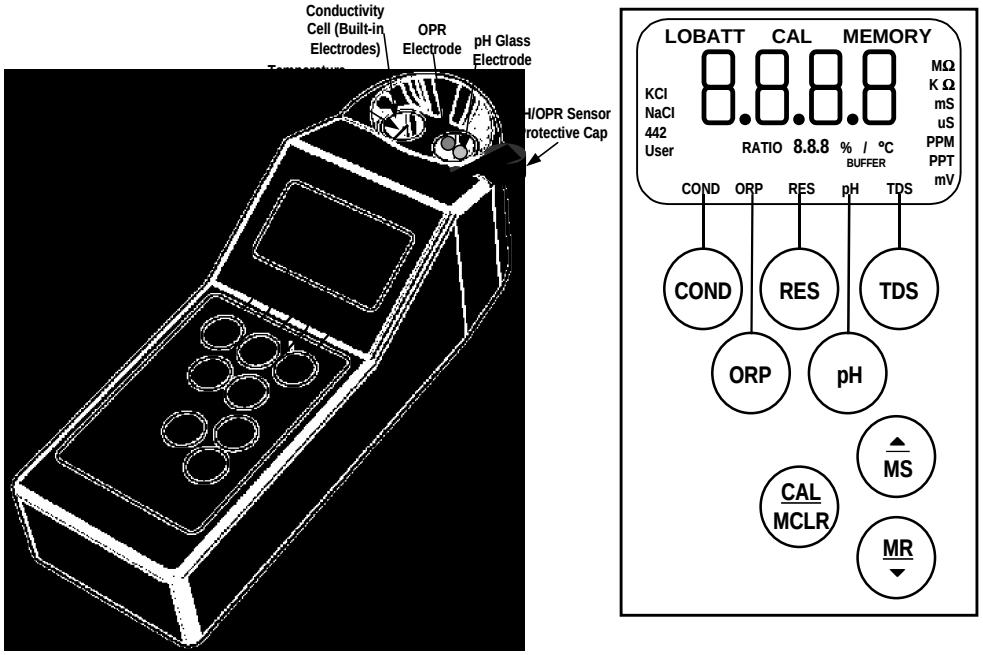
OPERATOR INSTRUCTIONS

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) DESCRIPTION AND USE OF CONTROLS AND INDICATORS FOR ULTRAMETER 6P

INTRODUCTION

The Ultrameter ™ Model 6P is a new line of instruments utilizing advanced microprocessor-based circuitry. This circuitry makes it extremely accurate and very easy to use. For your convenience, your Ultrameter has a brief set of instructions on the back of the instrument.

Special note.....Conductivity, Resistivity, and TDS require mathematical correction to 25ºC values> (ref. Temperature Compensation). On the left of the Ultrameter's liquid crystal display is shown an indicator of the salt solution characteristic used to model temperature compensation of conductivity and its TDS conversion. The indicator can be KCl, NaCl, 442 or USER. Selection affects the temperature correction of conductivity, and the calculation of TDS from compensated conductivity. (ref. Conductivity Conversion to Total Dissolved Solids (TDS)). The selection can affect the reported conductivity of hot or cold solutions, and will change the reported TDS of a solution. Generally, using KCl for conductivity, NaCl for resistivity, and 442™ (Natural Water characteristic) for TDS will reflect present industry practice for standardization. This is how your instrument, as shipped from the factory, is set to operate.



Ultrameter ™ Model 6P

A. FEATURES AND SPECIFICATIONS

- Superior resolution 4 digit LCD displays full 9999 µS/ppm.
- Accuracy of ± 1% of reading (not merely full scale).
- All electrodes are internal for maximum protection.
- Latest 4 electrode cell technology.
- Waterproof to 3 feet/1 meter.
- Auto-ranging conductivity/TDS/resistivity.
- Prompts for easy pH calibration.
- Memory saves 20 readings.
- Factory calibrations stored in microprocessor.
- 3 conductivity/TDS solution conversions preprogrammed into microprocessor.
- USER feature allows:
  - Programming your own COND/TDS conversion factor.
  - Programming your own temperature compensation factor.
  - Disabling temperature compensation.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) DESCRIPTION AND USE OF CONTROLS AND INDICATORS FOR ULTRAMETER 6P

B. GENERAL SPECIFICATIONS:

Display	4 Digit LCD
Dimensions (LxWxH)	7.7x2.7x2.5 in. (196x68x64 mm)
Weight	13.5 oz./383g
Case Material	VALOX*
Cond/Res/TDS Cell Material	VALOX*
Cond/Res/TDS Cell Capacity	0.2 oz./5 ml
PH/ORP Sensor Well Capacity	0.04 oz./1.2ml
Power	9V Alkaline Battery
Battery Life	> 100 Hours/5000 Readings
Operating/Storage Temperature	14-132°F/-10-55°C
Protection Ratings	IP67/NEMA 6 (waterproof to 3 feet/1meter)

*™ GE Corp.

RULES OF OPERATION

A. Operation. Using the instrument is simple:

1. Individual or multiple parameter readings may be obtained by filling individual sensors or entire cell cup area.
2. Rinse the conductivity cell or pH/ORP sensor well with test solution 3 times and refill.
3. Press the desired measurement key to start measurement. Pressing the key again does no harm and restarts the 15 second "off" timer.
4. Note the value displayed or press the MS key to store.

B. Characteristics of the Keys

Though your Ultrameter has a variety of sophisticated options, it is designed to provide quick, easy, accurate measurements by simply pressing one key. All functions are performed one key at a time.
There is no "off" key. After 15 seconds of inactivity the instrument turns itself off (60 seconds in CAL mode).
Rarely will a key be required to be held down. (Procedure to Select a Solution or Cond. Or TDS Calibration).

C. Operation of the Keys (See figure . Each key is referenced by key name inside of "<**…**>")

1. Measurement Keys in General

Any of the 5 measurement keys in the upper part of the keypad turns on the instrument in the mode selected. The mode is shown at the bottom of the display, and the measurement units appear at the right. Pressing a measurement key does this even if you are in a calibration sequence and also serves to abandon a change. (ref. Leaving Calibration).

2. COND. RES and TDS keys

These 3 keys are used with solution in the Conductivity Cell.
Precautions:

- While filling cell cup, insure no air bubbles cling on the cell wall.
- If the proper solution is not selected (KCL, NaCl, 442, or USER), refer to Why Solution Selection is Available, and Procedure to Select a Solution.

a. COND key

Solution to be tested is introduced into the conductivity cell and a press of <**COND**> displays conductivity with units on the right. On the left is shown the solution type selected for conductivity. An over-range condition will show only [----]. (ref. Solution Selection)

b. RES Key

A press of <**RES**> displays resistivity with units on the right. On the left is shown solution type selected for resistivity. (ref. Solution Selection). The range of display of Resistivity is limited to between 10 kilohms (KΩ) and 30 megohms (MΩ). A solution outside that range will only show [----] in the display.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) DESCRIPTION AND USE OF CONTROLS AND INDICATORS FOR ULTRAMETER 6P

c. TDS Key

A press of<**TDS**> displays Total Dissolved Solids with units on the right. This is a display of the concentration of material calculated from compensated conductivity using the characteristics of a known material. On the left is shown solution type selected for TDS. (ref. Solution Selection).

3. pH and ORP Keys

Measurements are made on solution held in the pH/ORP sensor well. (ref. PH and ORP Measuring). The protective cap is removed and the sensor well is filled and rinsed with sample enough times to completely replace the storage solution. After use, the pH/ORP sensor well must be refilled with storage solution, and the protective cap reinstalled securely. (ref. Maintenance of the pH/ORP Sensor and Cleaning Sensors)

a. pH Key

A press of <**pH**> displays pH readings. No units are displayed.

b. ORP Key

A press of <**ORP**> displays Oxidation-Reduction Potential/REDOX reading in milli-volts.

4. CAL/MCLR Key

A press of <**CAL/MCLR**> allows you to enter the calibration mode while measuring conductivity, TDS or pH. Once in CAL mode, a press of this key accepts the new value. If no more calibration options follow, the instrument returns to measuring. (ref. Leaving Calibration). If <**CAL/MCLR**> is held down for about 3 seconds, CAL mode is not entered, but "SEL" appears, to allow solution selection with the Up or Down keys. As when in calibration, the CAL key is now an "accept" key. While reviewing stored records, the MCLR side of the key is active, to allow clearing records.

5. UP or DOWN Keys

While measuring in any parameter, the <▲**/MS**> or <▼**/MR**> keys activate the Memory Store and Memory Recall functions. While in CAL mode, they step or scroll the displayed value up or down. A single press steps the display and holding either key scrolls the value rapidly. While in Memory Recall, they move the display up and down the stack of records.

AFTER USING THE ULTRAMETER

A. Maintenance of the Conductivity Cell

Rinse the cell out with clean water from the demineralizer bottle*. Do not scrub the cell. For oily films, squirt in a foaming non-abrasive cleaner and rinse. Even if a very active chemical discolors the electrodes, this does not affect the accuracy; leave it alone. (ref. Cleaning Sensors).

NOTE

Shelf-life of demineralizer depends on when bottle is opened/used and expiration is determined by color of beads

B. Maintenance of the pH/ORP Sensor

The sensor well must be kept wet with a solution. Before replacing the rubber cap, rinse and fill the sensor well with (in order of preference): storage solution, an almost saturated KCL solution, pH 4 buffer or at least a strong table salt solution. Not distilled water. (ref. pH and ORP Practices).

SPECIFIC RECOMMENDED MEASURING PROCEDURES

If the proper solution is not selected (KCL, NaCl, 442 or USER) see Solution Selection.
NOTE: After sampling high concentration solutions or temperature extremes, more rinsing may be required. When sampling low conductivity solutions, be sure the pH cap is well seated so no solution washes into the conductivity cell from around the pH cap.

A. Measuring Conductivity/Total Dissolved Solids (TDS)

1. Rinse cell cup 3 times with sample to be measured. (This conditions the temperature compensation network and prepares the cell).

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2. Refill cell cup with sample.

3. Press **<COND>** or **<TDS>**.

4. Take reading. A display of [----] indicates an over-range condition from meter setting.

B. Measuring Resistivity

Resistivity is for low conductivity solutions. In a cell cup the value may drift from trace contaminants or absorption from atmospheric gasses, so measuring a flowing sample is recommended.

1. Make sure pH protective cap is secure to avoid contamination.

2. Hold instrument at 30° angle (cup sloping downward).

3. Let sample flow continuously into conductivity cell with no aeration.

4. Press **<RES>** key, use best reading from sample.

NOTE: If reading is lower than 10 kilo-ohms display will be dashes: [----]. Use Conductivity

C. Measuring pH

1. Remove protective cap by squeezing its sides and pulling up.

2. Rinse sensor well 3 times with sample to be measured. Shake out each sample to remove any residual liquid.

3. Refill sensor well with sample.

4. Press **<pH>**.

5. Take reading.

NOTE

After use, fill pH/ORP sensor well with storage solution and replace protective cap. Do not allow pH/ORP sensor to dry out. If of the above are available use salty tap water. (ref. Cleaning pH/ORP Sensors)

SOLUTION SELECTION

A. Why Solution Selection is Available

Conductivity, Resistivity, and TDS require temperature correction to 25°C (XII). Selection determines the temperature correction of conductivity and calculation of TDS from compensated conductivity. (ref. Cond. Conversion to TDS).

B. The 4 Solution Types

On the left side of the display is the salt solution characteristic used to model temperature compensation of conductivity and its TDS conversion. Generally, using KCL for conductivity, NaCl for resistivity and 442 (Natural water characteristic) for TDS will reflect present industry practice for standardization. This is the setup as shipped form the factory. (ref. Solution Characteristics)

The USER selection allows a custom value to be entered for the temperature compensation of conductivity and also the conversion ratio if measuring TDS.

C. Calibration of Each Solution Type

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There is a separate calibration for each of the 4 solution types. Note that calibration of a 442 solution does not effect the calibration of a NaCl solution. For example: Calibration (ref. Conductivity or TDS Calibration) is performed separately for each type of solution one wishes to measure.

D. Procedure to Select a Solution

NOTE: Check display to see if solution displayed (KCL, NaCl, 442 or USER) is already the type desired. If not:

1. Press <**COND**>, <**RES**>, or <**TDS**> which determines which parameter is having its solution type changed.

2. Press and hold <**CAL/MCLR**> key about 3 seconds to make "SEL" appear (see figure to the right). For demonstration purposes, all 4 solution types are shown simultaneously.

3. Use <▲ **/MS**> or <▼ **/MR**> key to obtain type of solution desired. (ref. Solution Characteristics). The selected solution type will be displayed: KCL, NaCl, 442 or User.

4. Press <**CAL/MCLR**> to accept new solution type.

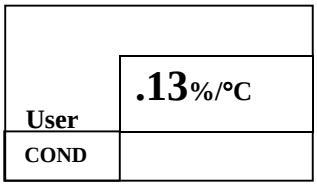
E. Application of USER Solution Type

1. User Programmable Tempco

This feature allows you to change your Ultrameter's temperature compensating factor to another factor between 0-9.99%/°C (ref. Temperature Compensation). This feature does not apply to pH or ORP.

a. As in Procedure to Select a Solution, select "USER" mode.

b. With "USER" mode now selected, press <**CAL/MCLR**>. You may now adjust a temperature compensation from 00%/°C to 9.99%/°C, by pressing <▲ **/MS**> or <▼ **/MR**>. See example in figure to the right.

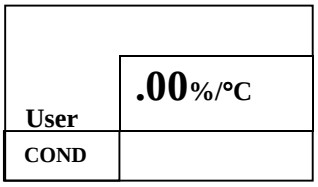


c. Press <**CAL/MCLR**> twice to skip calibration adjustment and accept the new tempco (3 times if in TDS mode). You are now ready to measure samples with your new temperature compensation factor.

2. Disabling Temperature Compensation

a. As in Procedure to Select a Solution, select "USER" mode.

b. With "USER" selected, press <**CAL/MCLR**>. If the display does not show 0.00%/°C, hold <▼ **/MR**> down long enough to bring the tempco to 0.00%/°C (See figure to the right.)



c. Press <**CAL/MCLR**> twice (3 times if in TDS mode). Temperature compensation is now disabled (=0) for measurements in USER mode.

3. User Programmable Conductivity to TDS Ratio

This feature allows you to select a custom conductivity to TDS conversion ratio for USER mode requirements. For example: The conversion ratio range is 0.20-7.99 (i.e., if conductivity is 100 µS and TDS is 75 ppm, you would adjust to 0.75). (ref. Conductivity Conversion to TDS).

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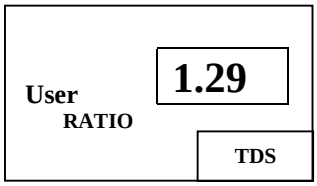
a. While in "USER" mode, press **<TDS>** .



b. Press **<CAL/MCLR>** twice; (to skip over tempco adjustment), and "RATIO" will appear. (See figure to the right).

c. Adjust with **< ▲ /MS>** or **< ▼ /MR>** keys until new conversion ratio is displayed.

d. Press **<CAL/MCLR>** twice (to skip over calibration adjustment) to accept new conversion ratio. You are now ready to measure samples with the new conductivity/TDS ratio.

NOTE

In these first five sections you have learned all you need to make accurate measurements. The following sections contain calibration, advanced operations and technical information.

CALIBRATION

A. Calibration Intervals. Generally, calibration is recommended about once per month with Conductivity or TDS solutions. Calibration with pH solutions should be checked twice a month. Calibration of ORP is not necessary. It is recommended to maintain a Calibration Log to record Calibration Dates.

B. Rules for Calibration in the Ultrameter

1. Calibration Steps

a. Starting Calibration

Calibration is begun by pressing **<CAL/MCLR>** while measuring Conductivity, TDS or pH. Measuring continues, but the CAL icon is on, indicating calibration is now changeable.

The reading is changed with the **< ▲ /MS>** or **< ▼ /MR>** to match the known value. The calibration for each of the 4 solution types may be performed from either conductivity or TDS mode.

The **<CAL/MCLR>** becomes an "ACCEPT" key. At each point, pressing **<CAL/MCLR>** accepts the new calibration value and steps you to the next adjustment (or out of CAL mode if there are no more steps).

To bypass a calibration step just press **<CAL/MCLR>** to accept the present value, as is.

b. Leaving Calibration

You know you are finished when the "CAL" icon goes out. Pressing any measurement key abandons changes not yet accepted and exits calibration mode.

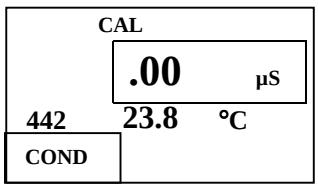
2. Calibration Limits

There are calibration limits. A nominal "FAC" value is an ideal value stored by the factory. Attempts to calibrate too far from there will cause the displayed value to be replaced with "FAC". This means if you accept it, you get the original default factor calibration back for this measurement. The necessity to calibrate so far out that "FAC" appears indicates a procedural problem, wrong standard solution, a very dirty cell cup or a dying pH/ORP sensor.

C. Calibration Procedures

1. Conductivity of TDS Calibration

a. Rinse conductivity cell three times with proper standard (KCL, NaCl, or 442). (ref. Cond./TDS Standard Solutions. For user calibration see User Calibration Conductivity/TDS.



b. Refill conductivity cell with same standard.

c. Press **< ▲ /MS>** or **< ▼ /MR>**, then press **<CAL/MCLR>**, "CAL" icon will appear on the display. (See figure to the right).

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d. Press <▲ **/MS**> or <▼ **/MR**> to step the displayed value toward the standard's value or hold a key down to cause rapid scrolling of the reading.

e. Press <**CAL/MCLR**> once to confirm new value and end the calibration sequence for this particular solution type.

If another solution type is also to be measured, change solution type now and repeat this procedure.

2. User Calibration Conductivity/TDS

Instrument must be in USER mode, see Solution Selection section.

a. Rinse conductivity cell three times with your standard.

b. Refill conductivity cell with same standard.

c. Press <**COND**> or <**TDS**>, then press <**CAL/MCLR**> twice in COND/three times in TDS, "CAL" icon will appear on the display.

d. Press <▲ **/MS**> or <▼ **/MR**> to step the displayed value toward the standard's value or hold a key down to cause rapid scrolling of the reading.

e. Press <**CAL/MCLR**> once to confirm new value and end the calibration sequence for this particular solution type.

3. Resistivity Calibration

Resistivity is the reciprocal of Conductivity. Resistivity is calibrated only if conductivity is calibrated for the same solution type.

4. Reloading Factory Calibration (Cond or TDS)

If calibration is suspect or known to be wrong, and no standard solution is available, the calibration value can be replaced with the original factory value for that solution. This "FAC" value is the same for all Ultrameters, and returns you to a known state without solution in the cell. The "FAC" internal electronics calibration (which bypasses the electrodes and cell) is not intended to replace calibration with conductivity standard solutions. If another solution type requires resetting, change solution type and repeat this procedure.

a. Press <**COND**> or <**TDS**>.

b. Press <**CAL/MCLR**>. [If in USER solution mode, press CAL key twice if in Conductivity, and three times if in TDS to skip over tempco and ratio adjustments].

c. Press <▲ **/MS**> key until "FAC" appears and release.

d. Press <**CAL/MCLR**> to accept the factory calibration setting.

5. pH Calibration

Important: Always "zero" your Ultrameter with a pH 7 buffer solution before adjusting the gain with acid or base buffers, i.e., 4 and/or 10, etc.

a. pH Zero Calibration

- Rinse sensor well 3 times with 7 buffer solution.
- Refill sensor well with 7 buffer solution.
- Press <**pH**> to verify the pH Calibration. (If the display reads 7.0 Skip the pH Zero Calibration.

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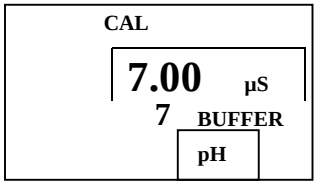
- Press **<CAL/MCLR>** to enter calibration mode. The "CAL", "BUFFER" and "7" annunciators will appear (see figure to the right). Displayed value will be the uncalibrated sensor.



NOTES: If a wrong buffer is added (outside of 6-8 pH), "7" and "BUFFER" will flash, and the Ultrameter will not adjust. The uncalibrated pH value displayed in Step 4 will assist in determining the accuracy of the pH sensor. If the pH reading is above 8 with pH 7 buffer solution, the sensor well needs additional rinsing or the pH sensor is defective and needs to be replaced.

- Press **<▲/MS>** or **<▼/MR>** until the display reads 7.0.

NOTE: Attempted calibration of >1 pH point from factory calibration will cause "FAC" to appear. This indicates the need for sensor replacement or fresh buffer solution. The "FAC" internal electronic calibration is not intended to replace calibration with pH buffers. It assumes an ideal pH sensor. Each "FAC" indicates a factory setting for that calibration step (i.e., 7, acid, base).

***You can press* <CAL/MCLR> *to accept the preset factory value, or you can reduce your variation from factory setting by pressing* <▲/MS> *or* <▼/MR>.**

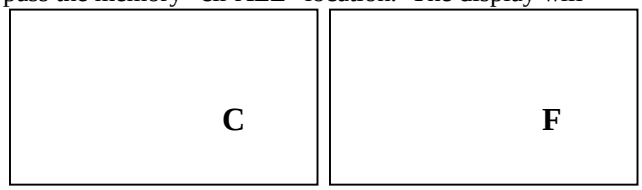
- ***Press* <CAL/MCLR> *to accept the new value. The pH Zero Calibration is now complete. You may exit by pressing any measurement key.***

CHANGING FROM CENTIGRADE TO FAHRENHEIT

1. Press **<COND>**

2. Press **<▼/MR>** to display the stored memory records.

3. Press **<▼/MR>** repeatedly until you pass the memory "clr ALL" location. The display will show a "C" or "F". (See figure to the right).



4. Press **<CAL/MCLR>**, the display will change to the other unit.

5. Press **<COND>**, all temperature readings are now in degrees last shown.

NOTE: Units symbol "°F" is not displayed in Fahrenheit mode. Tempco will still be shown in %/°C.

TOTAL RETURN to FACTORY SETTINGS "FAC SEL"

There may come a time when it would be desirable to quickly reset all the recorded calibration values in the instrument back to the factory settings. This might be to ensure all calibrations are set to a known value, or to give the instrument to someone else free of adjustments or recorded data for a particular application.

1. Press **<COND>**.

2. Press **<▼/MR>** to display the stored memory records.

3. Press **<▼/MR>** repeatedly until you pass theCLR ALL and the C-F locations. The display will show a "FAC SEL" (See figure to the right).

4. Press **<CAL/MCLR>** to accept the resetting.

CALIBRATION INTERVALS

There is no simple answer as to how often one should calibrate an instrument. The Ultrameter is designed to not require frequent recalibration. The most common sources of error were eliminated in the design, and there are no mechanical adjustments. Still, to ensure specified accuracy, any instrument has to be checked against chemical standards occasionally.

A. Suggested Intervals

On the average, we expect calibration need only be checked monthly for the Conductivity, RES or TDS functions. The pH function should be checked every 2 weeks to ensure accuracy. Measuring some solutions will require more frequent intervals.

B. Calibration Tracking Records

To minimize your calibration effort, keep records. If adjustments you are making are trivial for your application, you can check less often. Changes in conductivity calibration should be recorded in percent. Changes in pH calibration are best recorded in pH units.

Calibration is purposely limited in the Ultrameter to ±5% for the conductivity cell because more than that indicates damage, not drift. Likewise, calibration changes are limited to ±1 pH unit because more than that indicates the end of the sensor lifetime, and it should be replaced.

C. Conductivity, RES, TDS Practices to Maintain Calibration

1. Clean oily films or organic material from the cell electrodes with foaming cleaner or mild acid. Do not scrub inside the cell.

2. Calibrate with solutions close to the measurements you make.

Readings are compensated for temperature based on the type of solution. If you choose to measure tap water with a KCL compensation, which is often done, and you calibrate with 442 solution because it is handy, the further away from 25°C you are, the more error you have. Your records of calibration changes will reflect temperature changes more than the instrument's accuracy.

3. Rinse out the cell with pure water after making measurements. Allowing slow dissolving crystals to form in the cell contaminates future samples.

4. For maximum accuracy, keep the pH sensor cap on tight so no fluid washes into the conductivity cell.

D. pH and ORP Practices to Maintain Calibration

1. Keep the sensor wet with Storage Solution.

2. Rinse away caustic solutions immediately after use.

CARE and MAINTENANCE

Ultrameters should be rinsed with clean water after use. Solvents should be avoided. Shock damage from a fall may cause instrument failure.

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A. Temperature Extremes.

Solutions in excess of 160°F/71°C should not be placed in the cell cup area; this may cause damage. The pH sensor may fracture if the Ultrameter temperature is allowed to go below -10°C (14°F). Care should be exercised not to exceed rated operating temperature.

Leaving the Ultrameter in a vehicle or storage shed on a hot day can easily subject the instrument to over 150°F. This will void the warranty.

B. Battery Replacement

Dry Instrument THOROUGHLY. Remove the four (4) bottom screws. Open instrument carefully, it may be necessary to rock the bottom slightly side to side to release it from the RS-232 connector. Carefully detach battery from circuit board. Replace with 9 volt alkaline battery. Replace bottom, ensuring the sealing gasket is installed in the groove of the top half of case. Re-install screws, tighten evenly and securely.

NOTE: Because of nonvolatile EEPROM circuitry, all data stored in memory and all calibration settings are protected even during power loss or battery replacement.

C. pH/ORP Sensor Replacement

Order model RPR. When ordering, be sure to include the model and serial number of your instrument to ensure receiving the proper type. Complete installation instructions are provided with each replacement sensor.

D. Cleaning Sensors

1. Conductivity/TDS/Resistivity

The conductivity cell cup should be kept as clean as possible. Flushing with clean water following use will prevent buildup on electrodes. However, if very dirty samples, particularly scaling types – are allowed to dry the cell cup, a film will form. This film reduces accuracy. When there are visible films of oil, dirt, or scale in the cell cup or on the electrodes, use a foaming non-abrasive household cleaner. Rinse out the cleaner and your Ultrameter is ready for accurate measurements.

2. pH/ORP

The unique pH/ORP sensor in your Ultrameter is a non-refillable combination type which features a porous Teflon* liquid junction (covered by U.S. Patent No. 4128468). It should not be allowed to dry out. If it does, the sensor can sometimes be rejuvenated by first cleaning the sensor well with a liquid spray cleaner such as Windex ™ or Fantastic ™, to clean it. The sensor bulb is very thin and delicate. Do not scrub or wipe the pH/ORP sensor.

Then use one of the following methods:

Pour a HOT salt solution ~60°C (140°F), preferably potassium chloride (KCL) solution . HOT tap water with table salt (NaCl) will work fine in the sensor well and allow to cool. Retest.

Or

Pour DI water in the sensor well and allow to stand for no more than 4 hours (longer can deplete the reference solution and damage the glass bulb). Retest. If neither method is successful, sensor must be replaced.

"Drifting" can be caused by a film on the pH sensor bulb. Spray a liquid cleaner such as Windex ™ or Fantastic ™ into the sensor well, to clean it. The sensor bulb is very thin and delicate. Do not scrub or wipe the pH/ORP sensor.

Leaving high pH (alkaline) solutions in contact with the pH sensor for long periods of time can damage it. Rinsing such liquids from the pH/ORP sensor well and refilling well with storage solution, or at least one of the following; a saturated KCL solution or salty tap water will extend the sensors useful life.

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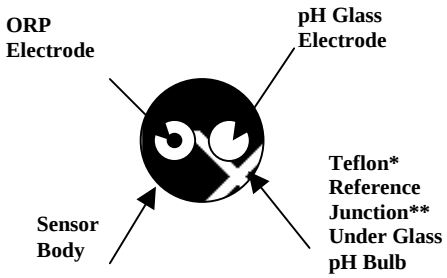
Samples containing chlorine, sulfur, or ammonia can "poison" any pH electrode. If it is necessary to measure the pH of any such sample, thoroughly rinse the sensor well with clean water immediately after taking the measurement. Any sample element which will reduce (add an electron to) silver, such as cyanide, will attack the reference electrode. Replacement sensors are available only from the Myron L. Company or our authorized distributors.

*™DuPont Company



pH/ORP Sensor Top View

pH AND ORP MEASURING

A. pH

1. pH as an Indicator

pH is the measurement of Acidity or Alkalinity of an aqueous solution. It is also stated as the Hydrogen Ion activity of a solution. pH measures the effective, not the total, acidity of a solution. A 4% solution of acetic acid (pH 4, vinegar) – can be quite palatable, but a 4% solution of sulfuric acid (pH 0), is a violent poison. pH provides the needed quantitative information by expressing the degree of activity of an acid or base. In a solution of one known component, pH will indicate concentration indirectly. However, very dilute solutions may be very slow reading, just because the very few ions take time to accumulate.

2. pH Units

The acidity or alkalinity of a solution is a measurement of the relative availabilities of hydrogen (H+) and hydroxide (OH-) ions. An increase in (H+) ions will increase acidity, while an increase in (OH-) ions will increase alkalinity. The total concentration of ions is fixed as a characteristic of water, and balance would be 10^{-7} mol/liter (H+) and (OH-) ions in a neutral solution (where pH sensors give 0 voltage and a pH of 7x).

pH is defined as a negative logarithm of hydrogen ion concentration. Where (h+) concentration falls below 10^{-7}, solutions are less acidic than neutral and so are alkaline, so a concentration of 10^{-9} mol/liter of (H+) would have 100 times less (H+) ions than (OH-) ions and be called an alkaline solution of pH 9.

3. The pH Sensor

The active part of the pH sensor is a thin glass surface which is selectively receptive to hydrogen ions. Available hydrogen ions in a solution will accumulate on this surface and a charge will build up across the glass interface. The voltage can be measured with a very high impedance voltmeter circuit; the trick is to connect the voltmeter to solution on each side. The glass surface encloses a captured solution of potassium chloride holding an electrode of silver coated with silver chloride. This is as inert a connection as can be made from metal to an electrolyte. It still can produce an offset voltage, but using the same materials to connect to the solution on the other side of the membrane allows the 2 equal offsets to cancel.

The trouble is, the other side of the membrane is some test solution, not potassium chloride. The outside electrode, also called the Reference Junction, is the same construction with a porous plug in place of a glass barrier to allow the junction fluid to contact the test solution without significant migration of liquids through the plug material. The pH/ORP Sensor Top View figure shows a typical component pair. Migration does occur, and this limits the lifetime of a pH junction, from depletion of solution inside the reference junction or from contamination. The junction is damaged by drying out because insoluble crystals may form in a layer, obstructing contact with test solutions.

4. The Integral pH Sensor

The sensor in the Ultrameter is a single construction in an easily replaceable package. The sensor body holds an oversize solution supply for long life. The reference junction "wick" is porous teflon to provide a very stable, low permeability interface. It is formed in a ring around the pH glass stem. The construction combines all the best features of any pH sensor known.

5. Sources of Error

The basics are presented in pH/ORP (see Section D 2, Page 10)

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a. Reference Junction

The most common sensor problem will be clogged junction because a cell was allowed to dry out. The symptom is a drift in the "zero" setting at 7 pH. This is why the Ultrameter does not allow more than 1 pH unit of offset during calibration. At that point the junction is unreliable.

b. Sensitivity Problems

Sensitivity is the receptiveness of the glass surface, which can be diminished by a film on the surface, or a crack in the glass. These problems also cause long response time.

c. Temperature Compensation

pH sensor glass changes its sensitivity slightly with temperature, so the further from pH 7 one is, the more effect will be seen. A pH of 11 at 40°C would be off by 0.2 units. The Ultrameter senses the cell temperature and compensates the reading.

B. ORP/Oxidation-Reduction Potential/REDOX

1. ORP as an Indicator

ORP is the measurement of the ratio of oxidizing activity to reducing activity in a solution. It is the potential of a solution to give up electrons (oxidize other things) or gain electrons (reduce).
Like acidity and alkalinity, the increase of one is at the expense of the other, so a single voltage is called the Oxidation-Reduction Potential, with a positive voltage showing a solution wants to steal electrons, (oxidizing agent). Chlorinated water will show a positive ORP value, for instance.

2. ORP Units

ORP is measured in milli-volts, with no correction for solution temperature. Like pH, it is not a measurement of concentration directly, but of activity level. In a solution of only one active component, ORP does indicate concentration. Also, as with pH, a very dilute solution will take time to accumulate a readable charge.

3. The ORP Sensor

An ORP sensor uses a small platinum surface to accumulate charge without reacting chemically. That charge is measured relative to the solution, so the solution "ground" voltage comes from a reference junction – same as the pH sensor uses.

4. The ORP Sensor

The pH/ORP Sensor Top View figure shows the platinum button in a glass sleeve. The same reference is used for both the pH and the ORP sensors. Both pH and ORP read out 0 for a neutral solution. Calibration at zero compensates for error in the reference junction.

A zero calibration solution for ORP is not practical, so the Ultrameter uses the offset value determined during calibration to 7 in pH calibration (pH 7 = 0 mV). Sensitivity of the ORP surface is fixed, so there is no gain adjustment either.

5. Sources of Error

The basics are presented in pH/ORP because sources of error are much the same as for pH. The junction side is the same, and though the platinum surface will not break like the glass pH surface, its protective glass sleeve can be broken. A surface film will slow the response time and diminish sensitivity. It can be cleaned off with detergent or acid, as with the pH glass.

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) DESCRIPTION AND USE OF CONTROLS AND INDICATORS FOR TURBIDITY METER

INTRODUCTION.

With the Turbidity Meter**,** turbidity measurements can be performed with high precision in the field as well as in the laboratory**.** the turbidity meter is a hand-held, microprocessor-based, battery operated instrument used to determine the turbidity of water and waste-water. The meter covers a 0-1000 FTU range in two scales: 0.00 to 50.00 FTU and 50 to 1000 FTU. The auto-ranging feature of the instrument sets the appropriate range for the measurement.

NOTE

The Turbidity Meter, has been designed according to the ISO 7027 International Standard, consequently the turbidity measurement unit is the FTU. FTU is identical to the other internationally recognized unit: NTU.

The Turbidity Meter is a portable turbidity meter with the ⊂ ∈ mark, in compliance with the European directives EN 50081-1 and EN 50082-1, ensuring low emission values and accurate measurements in presence of electromagnetic fields.

The meter is housed in a rugged and lightweight case, with an easy-to-read LCD. To save battery-life, the instrument is equipped with an automatic shut-off feature which is activated after 4-minutes of non-use.

The meter is very simple to use. All operations can be carried out with only four keys and trouble-shooting functions can be performed with displayed error code guides. An exclusive positive-locking system guarantees that the cuvette is firmly placed in the cell. The keypad is water-resistant and can be wiped with a moist cloth for quick cleanups.

The one-point calibration at 10 FTU* can be easily performed using the available standard. In addition, theTurbidity Meter is the first portable turbidity meter that allows storage of the last calibration date and to retrieve it at the user's convenience.

A 10 FTU* calibration point was chosen because it is the value that best fits the water turbidity measurements in different applications, from drinking water to wastewater treatment.
***1 FTU = 1 NTU**

The primary standard is a AMCO-AEPA-1 to avoid all formazine-related problems. Formazine is a very toxic, unstable substance, which requires particular care; its standards have to be prepared only a few minutes before performing the calibration, and cannot be reused because of their short life. These standards are extremely stable, can be reused, and last up to six months, if free from contamination. The Turbidity Meter can be used with both standards.

RULES OF OPERATION

The Turbidity Meter has been designed to perform measurements according to the ISO 7027 International Standard.

The instrument functions by passing a beam of infrared light through a vial containing the sample being measured.

A sensor, positioned at 90° with respect to the direction of light, detects the amount of light scattered by the undissolved particles present in the sample. The microprocessor converts such readings into FTU* values.

As noted above, FTU unit is equal to the NTU unit. However, there are other known measurement units for turbidity; Jackson Turbidity Unit (JTU) based on the old method of Jackson's candle, and Silica Unit (mg/L of $SiO_{2)}$. For reference, the conversion table between these measurement units is shown.

	JTU	FTU/NTU	SiO_2 (mg/L)
JTU	1	19	2.5
FTU/NTU	0.053	1	0.13
SiO_2 (mg/L)	0.4	7.5	1

***1 FTU = 1 NTU**

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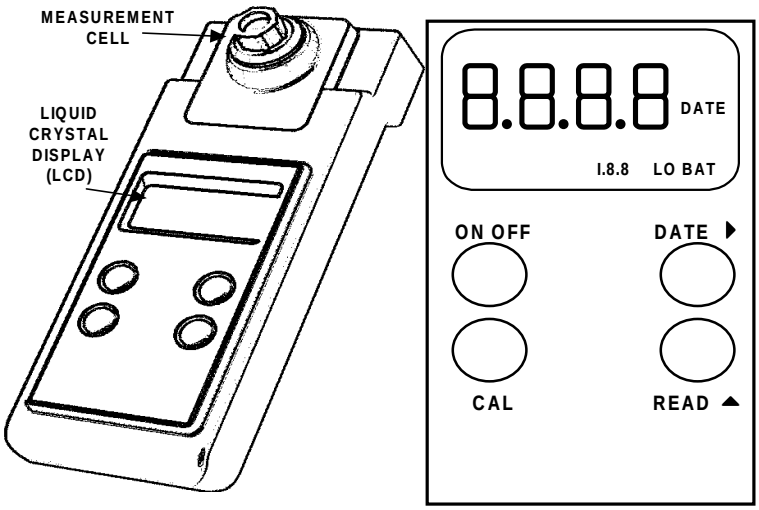
FUNCTIONAL DESCRIPTION

1) Measurement Cell (cuvette placement)
2) LCD (Liquid Crystal Display) (read-out)
3) ON/OFF Key (Power)
4) CAL Key (to enter the Calibration Mode)
5) READ/⇑ (Key to perform measurements and to set the date (day and month) of the last calibration)
6) DATE/⇒ (Key to display the last calibration date and to select either the month or the day of last calibration)



SPECIFICATIONS

Range	0.00 to 50.00 FTU* 50 to 1000 FTU*
Resolution	0.01 and 1 FTU*
Accuracy	±5% F.S. (0 to 10 FTU*) ±10% F.S. (10 to 50 FTU*) ±5% F.S. (50 to 1000 FTU*)
EMC Typical Deviation	±2% Full Scale
Light Source	High Emission Infrared LED
Light Source Life	Life of the instrument
Light Detector	Silicon Photocell
Power Source	4 x 1.5V AA batteries
Battery Life	60 hours or 900 measurements
Auto-Shut off	After 4 minutes
Operating Conditions	0 to 50°C (32 to 122°F); 0 to 95% RH (non-condensing)
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6”)
Weight	510 g (18 oz)

***1 FTU = 1 NTU**

OPERATIONAL GUIDE

To prepare the instrument for taking measurements, first install the batteries (see Battery Replacement section) and then turn the instrument on.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) DESCRIPTION AND USE OF CONTROLS AND INDICATORS FOR TURBIDITY METER

To maximize battery life the display is automatically switched off after 4 minutes of non-use. To reactivate the display, simply press the ON/OFF key.

MEASUREMENT PROCEDURE

A. Turn the meter on by pressing the ON/OFF key.

B. The meter will carry out a self-test displaying a full set of figures. After the test, the LCD will change to the measurement mode.

C. When the LCD displays "----" the meter is ready to measure.

D. Fill a clean cuvette up to one-quarter inch (0.5 cm) from its rim with the thoroughly agitated sample. Allow sufficient time for bubbles to escape before securing the cap.
Note: do not over tighten the cap.

E. Wipe the cuvette thoroughly with a lint-free tissue before inserting into the measurement cell. The cuvette must be completely free of fingerprints and other oil or dirt, particularly in the area where the light goes through (approximately the bottom 2 cm/1 inch of the cuvette).

F. Place the cuvette into the cell and check that the notch on the cap is positioned securely into the groove.

G. The mark on the cuvette cap should point towards the LCD.

H. Press the READ/⇑ key and the LCD will display a blinking "SIP" (Sampling in Process). The turbidity value will appear after approximately 25 seconds.

I. Samples exceeding 40 FTU* Standard Methods require dilution. In such cases, the correct amount of turbidity standard, 0 FTU or turbidity-free water to be added to the sample can be calculated as follows:

Vos = 3000/T

Where: Vos = volume of sample (ml) to be combined with turbidity standard, 0 FTU to obtain the final volume of 100 ml.

T = Turbidity Meter reading (exceeding 40 FTU*)

E.G.: Turbidity Meter reading = 200 FTU*
3000/200 = 15 ml (Vos)
15 mL (Vos) + 85 ml (turbidity standard, 0 FTU) = 100 ml.

At this point, take a sample of this solution and measure turbidity. The correct turbidity value of the original sample will be: **T_η x 100 ml/Vos = T_α**

Where: T_η = new Turbidity Meter reading
T_α = actual turbidity value of the original sample

E.g.: If T_η = 27 FTU*
T_α = 27 FTU* x 100 mL/15 ml = 180 FTU*

*1 FTU = 1 NTU

HOW TO ENSURE ACCURATE MEASUREMENTS

- Each time the cuvette is used, tighten the cap to the same degree.
- Discard the sample soon after the reading is taken to avoid permanently clouding the glass.

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- All glassware used to contain the standards and the samples should be maintained clean, washed with cleaning solution and rinsed with turbidity standard, 0 FTU or turbidity-free water.
- Collect the samples in clean glass or plastic bottles, fit stoppers and perform the analysis quickly. If unavoidable, store the sample in a cool, dark place, but not for longer than 24 hours . (the sample needs to be kept at room temperature prior to the analysis).
- To obtain a representative sample, gently, but thoroughly, mix it before samples are taken. Do not shake (to prevent air bubbles) and do not let the sample settle.
- It is recommended to calibrate the meter monthly with the supplied turbidity standards, 0 FTU and 10 FTU, or more frequently for greatest accuracy.
- Before inserting vials into the instrument, wipe them with a soft, lint-free tissue. Handle vials so that no fingerprints can get on the areas where light passes (approximately 2 cm/1 inch from the bottom of the vial).

SOURCES OF INTERFERENCE

- Presence of floating debris and course sediments which settle out rapidly will give false readings.
- The infrared light source used for turbidity meter, according to ISO 7027 International Standard, can effectively minimize errors due to colored dissolved substances. This effect, named “true color”, is a common interference for most commercially available instruments operating in the range of visible light.
- Air bubbles and the effect of vibrations that disturb the surface of the sample will give false results.
- Dirty glassware could also affect readings along with scratched or edged vials.

CALIBRATION

A monthly calibration is recommended. To check the date of last calibration, simply hold the DATE/⇒ key down.

A more frequent check of the instrument is suggested by using the supplied standard solution.

CALIBRATION PROCEDURE

- Turn the meter on and wait for the display to show “----“.
- Press the CAL key once, the “CAL” message will blink on the display for about 6 seconds, then the calibration mode stops.
- While the “CAL” message is still blinking, press CAL again. The instrument is now in the calibration mode and a “CL” will appear on the lower part of the display. The date of calibration can be edited now by simply pressing the DATE/⇒ key. To scroll to the correct number press the READ/⇑ key. The default blinking parameter is the month, on the left hand of the display (MM.DD).
- To confirm the displayed data values and to go to the next step, press the CAL key once. A blinking “ZERO” message will appear.
- Take the turbidity standard bottle containing the ZERO FTU* Standard (or turbidity-free dilution water) and fill the cuvette marked “0”, if not already filled..

  Note: in order to minimize any error introduced by the cuvette, it is recommended to use, during calibration, the same cuvette you are going to use to perform the measurement.
- Insert the cuvette with the turbidity standard ZERO FTU* standard solution (or turbidity-free dilution water) into the measurement cell and press the CAL key. A blinking “SIP” message indicates that the instrument is performing the measurement. After approximately 50 seconds the instrument will ask for the turbidity standard solution @ 10 FTU* by displaying “10.0”.
- Repeat the same procedure with turbidity standard @ 10 FTU* standard solution, using cuvette marked 10.
- Insert the cuvette with the turbidity standard at 10 FTU* into the measurement cell and press the CAL key again.
- After approximately 50 seconds the LCD will display “----“. Now the instrument is calibrated and ready for use.

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HOW TO ENSURE ACCURATE CALIBRATION

A. The instructions listed below should be carefully followed during testing and during calibration:

- All glassware that comes into contact with standards should be maintained clean. Wash with cleaning solution and rinse with turbidity standard, 0 FTU or turbidity-free water.

- Rinse the vial twice with 5 ml of the liquid to be tested. This removes the effect of any previous liquid and any dust or foreign matter that may be present inside. Gently pour the liquid down the side of the vial to reduce air bubbles (no mixing is required when turbidity standard, 0 FTU and turbidity standard 10 FTU AMCO-AEPA-1 standards are used).

- Before inserting the vial into the instrument, wipe it with soft, lint-free tissue. Handle vials so that no fingerprints can get on the areas where light passes (approximately 2 cm/1 inch from the bottom of the vial).

STANDARD SUSPENSION

A Presently, there are only two recognized primary standards: AMCO-AEPA-1 and formazine.

1. The Turbidity Meter is supplied with the AMCO-AEPA-1 which has a much longer shelf life at all concentrations (approximately six months, if free from contamination). In addition, no special handling or disposal is required and a much higher stability of suspended particles has been observed.

2. On the other hand, formazine is a very toxic substance, generated by a known carcinogen, its stability is poor (particles flocculate and settle quickly). Lower concentrations change value within a few days or hours after dilution from stock solutions.

3. The consistency of the Turbidity Meter readings by using both standards has been separately established by Advanced Polymer Systems and Hanna Instruments.

VIEWING THE CALIBRATION DATE

- Turn the meter on and wait for the display to show "----".

- Press and hold the DATE/⇒ key and a "MM.DD" message appears while the key is held.

Note: The displayed date is the date that was input by the user at the beginning of the last calibration.

BATTERY REPLACEMENT

A. All components have been selected to minimize current drain without compromising functionality.

B. In order to minimize the battery consumption, the meter is equipped with an auto-shut off function which switches the meter off after 4 minutes of non-use.

C. The power source is 4 x 1.5V batteries with an expected life of 60 hours, or over 900 measurements.

D. To always grant accurate measurements, the batteries are monitored to ensure that readings are not taken when there is insufficient power.

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E. A "LO BAT" indication will appear on the lower right hand side of the display when the batteries are weak and requirement replacement; at this point the instrument is able to perform only 50 more measurements.

F. A "-BA-" indication will appear on the display when the batteries are too weak to perform measurements; the message appears for a few seconds, and then the meter will automatically switch off; at this point it is absolutely necessary to replace the batteries to use the instrument.

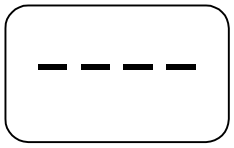
G. Battery replacement must only take place in a non-hazardous area using the battery types specified in this instruction manual.

H. To install or replace the batteries, turn the unit off and unscrew the 2 screws located on the back of the battery cover.

1. Remove the battery cover exposing the battery compartment.
2. Place the batteries in the compartment while paying attention to the polarity.
3. After the batteries have been installed, replace the battery cover on the back of the instrument and tighten the 2 screws.

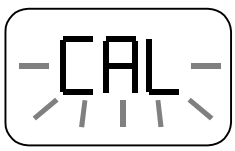
LCD AND ERROR CODES

The Turbidity Meter**,** will display several different LCD codes in different situations to help the user to operate the meter.

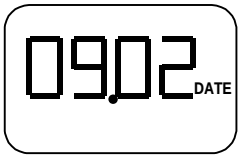


This indicates that the meter is in a ready state and measurement or calibration can be performed.

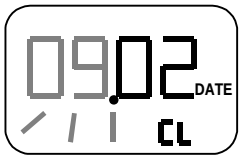
This indicates a 10 FTU* standard calibration is required.



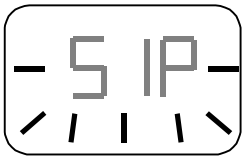
This indicates that the Calibration Mode is active. If the CAL key is not pressed within 6 seconds, the meter will automatically switch to the Measurement Mode.



This indicates the last calibration date (MM.DD).



This indicates that the Calibration Date Setting Mode is active.

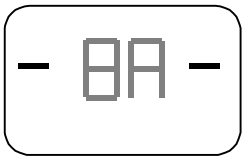


This indicates the measurement is performed.

This indicates a 0 FTU* standard calibration is required.

This indicates that batteries are weak and have to be replaced. When this message appears, the instrument is able to perform 50 more measurements.

This indicates that calibration is performed.



This indicates that batteries are too weak to perform measurements. The message appears for a few seconds, then the meter will automatically switch off. At this point it is absolutely necessary to replace the batteries.

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) DESCRIPTION AND USE OF CONTROLS AND INDICATORS FOR CHLORINE PHOTOMETER

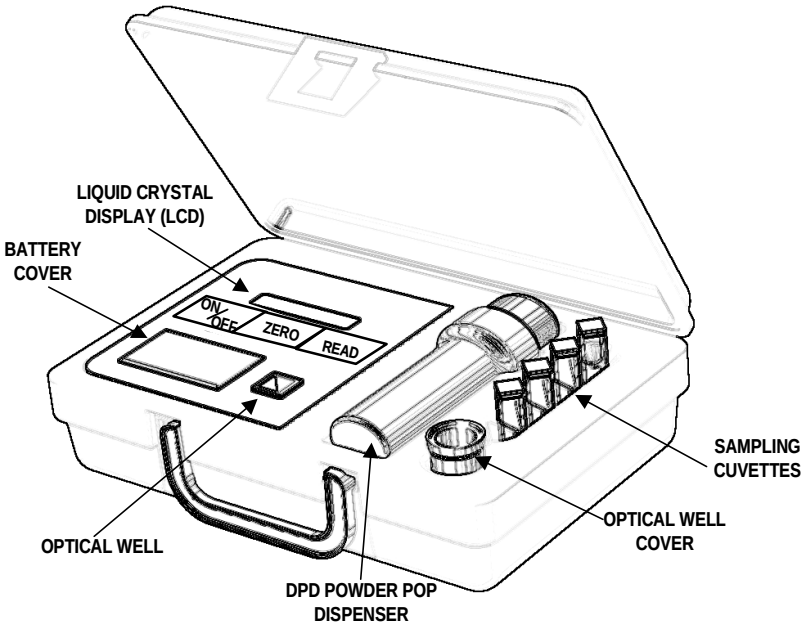
WARNING

CHEMICAL **VAPOR** **POISON**

This kit contains free chlorine reagents which is moderately toxic. Rash, irritation of eyes and respiratory tract. are signs of exposure. Emergency First Aid: Eyes and skin exposure: Immediately flush eye with water for 15 minutes call a physician. Wash skin with soap and water. If ingested give large quantities of water or milk and call physician.

GENERAL DESCRIPTION

The Photometer is an instrument used to measure the chlorine contents of water in milligrams per liter.



PRINCIPLES OF OPERATION/ZEROING THE INSTRUMENT

A. Turn the power on by depressing “ON/OFF” pad.
B. Rinse cuvette a minimum of three (3) times with sample water.
C. Fill the cuvette a maximum of ½ inch from the top. DO NOT OVERFILL. Ensure excess water is removed from the cuvette’s exterior.
D. Place the cuvette in optical well, ensuring clear portions are on left and right sides.
E. Place black optical cover over cuvette.
F. Depress “ZERO” pad.

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ADD REAGENT TO SAMPLE (**NOTE**: The Powder Pop Dispenser (PPD) is used to add reagent to the sample water.)

A. Invert the PPD to ensure the proper amount of powder is used.
B. Remove the optical top and cuvette from the optical well.
C. Remove the cap from the bottom of the PPD and from the top of the cuvette.
D. Place the PPD over the top of the cuvette and fully depress the button on the top of the PPD to dispense the reagent; replace cuvette and PPD covers.
E. Invert cuvette a minimum of three (3) times to mix solution.

MEASUREMENT

A. Place cuvette in optical well, ensuring clear portions are on left and right sides.
B. Place black optical cover over cuvette.
C. Immediately depress the “READ” pad.
(Measurements are in milligrams per liter [mg/l], [mg/l=ppm]

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) OPERATION UNDER USUAL CONDITIONS

PRINCIPLES OF OPERATION

CHEMICAL AGENTS: M272 WATER TESTING KIT

Water samples are taken and test chemicals added to cause a change in color within test tubes and or a chemical coated ticket. The color change is compared to a reference standard to determine hazardous levels of Lewisite, Nerve, Cyanide,and Mustard agents. (See TM 3-6665-319-10.)

ULTRAMETER

A. Measuring Conductivity/Total Dissolved Solids (TDS)

1. Rinse cell cup 3 times with sample to be measured. (This conditions the temperature compensation network and prepares the cell).

2. Refill cell cup with sample.

3. Press <**COND**> or <**TDS**>.

4. Take reading. A display of [----] indicates an over-range condition.

B. Measuring Resistivity

Resistivity is for low conductivity solutions. In a cell cup the value may drift from trace contaminants or absorption from atmospheric gasses, so measuring a flowing sample is recommended.

1. Make sure pH protective cap is secure to avoid contamination.

2. Hold instrument at 30° angle (cup sloping downward).

3. Let sample flow continuously into conductivity cell with no aeration.

4. Press <**RES**> key, use best reading.

NOTE: If reading is lower than 10 kilo-ohms display will be dashes: [----]. Use Conductivity

C. Measuring pH

1. Remove protective cap by squeezing its sides and pulling up.

2. Rinse sensor well 3 times with sample to be measured. Shake out each sample to remove any residual liquid.

3. Refill sensor well with sample.

4. Press <**pH**>.

5. Take reading.

6. IMPORTANT: After use, fill pH/ORP sensor well with storage solution, a strong KCl solution and replace protective cap. Do not allow pH/ORP sensor to dry out.

TURBIDITY METER

With the Turbidity Meter**,** turbidity measurements can be performed with high precision in the field as well as in the laboratory**.** the turbidity meter is a hand-held, microprocessor-based, battery operated instrument used to determine the

turbidity of water and waste-water. The meter covers a 0-1000 FTU range in two scales: 0.00 to 50.00 FTU and 50 to 1000 FTU. The auto-ranging feature of the instrument sets the appropriate range for the measurement.

A. Turn the meter on by pressing the ON/OFF key.

B. The meter will carry out a self-test displaying a full set of figures. After the test, the LCD will change to the measurement mode.

C. When the LCD displays "----" the meter is ready to measure.

D. Fill a clean cuvette up to one-quarter inch (0.5 cm) from its rim with the thoroughly agitated sample. Allow sufficient time for bubbles to escape before securing the cap.

Note
Do not over tighten the cap.

E. Wipe the cuvette thoroughly with a lint-free tissue before inserting into the measurement cell. The cuvette must be completely free of fingerprints and other oil or dirt, particularly in the area where the light goes through (approximately the bottom 2 cm/1 inch of the cuvette).

F. Place the cuvette into the cell and check that the notch on the cap is positioned securely into the groove.

G. The mark on the cuvette cap should point towards the LCD.

H. Press the READ/⇑ key and the LCD will display a blinking "SIP" (Sampling in Process). The turbidity value will appear after approximately 25 seconds.

CHLORINE PHOTOMETER

1. **PRINCIPLES OF OPERATION/ZEROING THE INSTRUMENT**
   - A. Turn the power on by depressing "ON/OFF" pad.
   - B. Rinse cuvette a minimum of three (3) times with sample water.
   - C. Fill the cuvette a maximum of ½ inch from the top. DO NOT OVERFILL. Ensure excess water is removed from the cuvette's exterior.
   - D. Place the cuvette in optical well, ensuring clear portions are on left and right sides.
   - E. Place black optical cover over cuvette.
   - F. Depress "ZERO" pad.
2. **ADD REAGENT TO SAMPLE** (**NOTE**: The PPD is used to add reagent to the sample water.)
   - A. Invert the PPD to ensure the proper amount of powder is used.
   - B. Remove the optical top and cuvette from the optical well.
   - C. Remove the cap from the bottom of the PPD and from the top of the cuvette.
   - D. Place the PPD over the top of the cuvette and fully depress the button on the top of the PPD to dispense the reagent; replace cuvette and PPD covers.
   - E. Invert cuvette a minimum of three (3) times to mix solution.
3. **MEASUREMENT**
   - A. Place cuvette in optical well, ensuring clear portions are on left and right sides.
   - B. Place black optical cover over cuvette.
   - C. Immediately depress the "READ" pad. (Measurements are in milligrams per liter [mg/l], [mg/l=ppm]

END OF WORK PACKAGE

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EXTREME COLD.

CAUTION

This kit must be protected from temperatures below 32°F (0°C):
- **The chemicals in the kit can be rendered useless and equipment damaged if allowed freezing.**
- **All tests must be performed with equipment and samples above 32°F (0°C).**

EXTREME HEAT.

All tests must be performed with equipment and samples below 125°F (51.70C).

DUSTY OR SANDY ENVIRONMENT.

a. Keep equipment in closed case or covered until ready to use.
b. Use covers (coat, blanket, etc.) if possible to protect test area.
c. Keep test equipment, water samples, and solutions as clean as possible during and between tests. Keep lids tightly closed and open only when needed. Cover beakers when in use.

SALT AIR OR SEA SPRAY.

a. Salt presents a serious corrosion problem and all equipment coming in contact with salt water or salt fog should be flushed or sponged with fresh clean water as soon as possible then dried thoroughly.
b. During tests, be careful not to contaminate samples or solutions with any salt water or spray. Perform tests as quickly as possible and clean equipment thoroughly between steps.

UNCONTROLLED FIELD CONDITIONS.

a. When demineralized or distilled water is not available, use cleanest water available (drinking water, clear Stream, etc.) to fill the wash bottle containing Demineralizer.
b. Use water from wash bottle whenever demineralized or distilled water is called for to clean equipment and prepare test solutions.
c. Test wash bottle water periodically to check effectiveness of Demineralizer. Test water-using Total Dissolved Solids meter. A reading above 750 PPM (750 mg/l) indicates that the Demineralizer is no longer effective and that the wash bottle must be replaced.

ELECTROMAGNETIC PULSE (EMP) ENVIRONMENT.

a. Keep all electronic equipment in its proper place inside the case, keep closed and latched.
b. Remove the electronic equipment from the case only when and if it is absolutely necessary and return it as soon as possible.

NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION.

NOTE

Detailed decon procedures can be found in: FM 3-3, FM 3-4, and FM 3-5.
a. General: The following emergency procedures can be performed until field NBC decon facilities are vailable.
b. Emergency Procedures: If NBC attack is known or suspected, mask at once and continue mission. If outside, follow decon procedures below to avoid taking contamination into controlled area. Do not unmask until told to do so.
(1) Nuclear decontamination: Brush fallout from skin, clothing, and equipment with available brushes, rags, and tree branches. Wash skin and have radiation check made as soon as tactical situation permits.

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(2) Biological decontamination: Remain masked and continue mission until told to unmask.
(3) Chemical detection and decontamination:

WARNING

Do not use decontamination spray on personnel. It could cause personal injury.
(a) Use M8 paper from the M256 Chemical Agent Detector Kit or M9 paper to determine if liquid agent is present on the equipment or case.
(b) If exposure to liquid agent is known or suspected, clean exposed skin, clothing, personal gear, and equipment, in that order using M258A1 kit. Use the buddy system. Wash exposed skin and thoroughly decontaminate as soon as tactical situation permits.
(c) If the M8 or M9 paper indicates that liquid chemical agent is present on the equipment or case, use the NBC-M11decon apparatus for decon of equipment and case.

END OF WORK PACKAGE

CHAPTER 3

OPERATOR TROUBLESHOOTING PROCEDURES

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) OPERATOR TROUBLESHOOTING PROCEDURES

GENERAL.

The following is a list of common malfunction symptoms that may occur with your equipment. Each symptom is followed by a branching logic tree for troubleshooting. Follow the actions given in the order presented. The following cannot list all the possible symptoms that may occur with your equipment or all the possible branches in each logic tree. If the symptom you are experiencing is not listed or actions given in the logic tree do not correct it, notify unit maintenance.

SYMPTOM

Ultrameter will not operate or gives erratic readings.

MALFUNCTION

Meter shows no display when switched on.

CORRECTIVE ACTION

Replace battery if it appears to be defective.

CORRECTIVE ACTION

If battery is not inserted properly (correct polarity) reverse connections.
If battery is inserted properly, notify unit maintenance.

MALFUNCTION

Meter shows inaccurate pH readings.

CORRECTIVE ACTION

Recalibrate Instrument. If problem is solved, continue operation.
If problem is not solved, check for cross-contamination from residual pH buffers or samples in sensor well.
If problem is not solved, recalibrate using fresh buffers.
If problem is not solved, check sensor for cracks. If cracks appear, replace the sensor.
If problem is not solved, notify unit maintenance.

MALFUNCTION

Meter shows erratic or out of range reading on display, Meter will not adjust down to pH7.

CORRECTIVE ACTION

Check, Clean and rejuvenate sensor and recalibrate. If problem is solved, continue operation.
If problem is not solved, replace the sensor. If problem is solved, continue operation.
If problem is not solved, notify unit maintenance.

MALFUNCTION

pH reading drift or respond slowly to changes in buffers/samples or FAC is displayed repeatedly.

CORRECTIVE ACTION

Check, Clean and rejuvenate sensor and recalibrate. If problem is solved, continue operation.
If problem is not solved, replace the sensor. If problem is solved, continue operation.
If problem is not solved, notify unit maintenance.

MALFUNCTION

Unstable Conductivity / TDS

CORRECTIVE ACTION

Clean cell cup and electrodes. If problem is solved, continue operation.
If problem is not solved, clean again using new solution. If problem is solved, continue operation.
If problem is not solved, notify unit maintenance.

MALFUNCTION

Resistivity readings much lower than expected.

CORRECTIVE ACTION

Rinse cell cup more thoroughly before measurement. Insure pH cap is snugly in place. If problem is solved, continue operation.
If problem is not solved, check for possible contamination from previous sample or from pH sensor well. Rinse cell again. If problem is not solved, notify unit maintenance.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)

OPERATOR TROUBLESHOOTING PROCEDURES

SYMPTOM

Turbidity meter shows no display when switched on or cannot be zeroed.

MALFUNCTION

Meter shows no display when switched on.

CORRECTIVE ACTION

Replace battery if it appears to be defective.

CORRECTIVE ACTION

If battery is not inserted properly (correct polarity) reverse connections.
If battery is inserted properly, notify unit maintenance.

MALFUNCTION

Meter will not calibrate.

CORRECTIVE ACTION

Ensure cuvette is thoroughly clean. If problem is solved, continue operation.
If problem is not solved, inspect cuvette for scratches, replace if necessary. If problem is solved, continue operation.
If problem is not solved, ensure cuvette is inserted properly. If problem is solved, continue operation.
If problem is not solved, ensure standards are fresh. If problem is solved, continue operation.
If problem is not solved, notify unit maintenance.

SYMPTOM

Photometer will not zero or give a reading when the read pad is depress.

MALFUNCTION

Meter will not give zero when READ pad is depressed.

CORRECTIVE ACTION

Replace battery if it appears to be defective.

CORRECTIVE ACTION

If battery is not inserted properly (correct polarity) reverse connections. If problem is solved, continue operation.
If battery is inserted properly, Inspect cuvette and rinse three times If problem is solved, continue operation.
If problem is not solved, notify unit maintenance.

MALFUNCTION

Meter will not give reading when READ pad is depressed.

CORRECTIVE ACTION

Ensure cuvette is properly placed in the meter ensuring clear portions are on left and right sides. If problem is solved, continue operation.
If problem is not solved, notify unit maintenance.

END OF WORK PACKAGE

CHAPTER 4

UNIT TROUBLESHOOTING PROCEDURES

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) UNIT TROUBLESHOOTING PROCEDURES

GENERAL

There are no troubleshooting procedures at unit level. If after completing all steps in the Operator troubleshooting section equipment is still inoperable, item should be replaced and/or returned for repair.

END OF WORK PACKAGE

CHAPTER 5

OPERATOR MAINTENANCE INSTRUCTIONS

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) OPERATOR PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

GENERAL.

Preventive Maintenance Checks and Services means systematic caring, inspection, and servicing of equipment to keep it in good condition and ready to use. As the operator, your mission is to:

(1) Be sure to perform your PMCS each time you use the WQAS-P.

(2) Do your "Before" PMCS just before you use the equipment.

(3) Do your "After" PMCS right after using the equipment.

(4) Use DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any faults that you discover before, during, or after use, unless you can fix the fault. You DO NOT need to record faults that you fix.

PMCS PROCEDURES.

a. Your Preventive Maintenance Checks and Services, Table 1, lists inspections and care required to keep the equipment in good operating condition.

b. The "Interval" column of Table 1 tells you when to do a certain check or service.

c. The "Procedure" column of table 1 tells you how to do required checks and services.

NOTE: Terms "ready/available" and "mission capable" refer to same status: Equipment is on hand and ready to perform its mission. (See DA Pam 738-750.)

d. The "Equipment Is Not Ready/Available If:" column in Table 1 tells you when your equipment is non mission capable and why it cannot be used.

e. If the equipment does not perform as required, notify supervisor.

f. If anything looks wrong and you can’t fix it, write it on your DA Form 2404 IMMEDIATELY, report it to your supervisor.

g. When you check for "operating condition", you look at the component to see if it is serviceable.

Table 1. Operator Preventive Maintenance Checks and Services for the WQAS-P

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
1	Before		Case assembly	Inspect case for cuts, dents, broken hardware, and missing or damaged gaskets.	Case damaged to cause possible leaks.
2	Before		Photometer	Check kit for any damage to equipment or missing supplies.	Missing or damage to equipment or supplies.
3	Before		Turbidity Meter	Check meter for any damage, missing solutions, or cuvettes.	Missing standard solutions, damage to meter or missing cuvettes.
4	Before		Ultrameter	Check meter for damage, missing pH standard, or damage to sensor.	Missing pH standard, damaged sensor, or damage to meter
				Check that storage/soaker bottle is topped off with storage solution.	Sensor tip is dry.

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
OPERATOR PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
5	Before		Water Testing Kit Chemical Agents M272	Check name on case (Water Testing Kit Chemical Agents M272)	Wrong kit
				Check.TM 3-6665-319-10 and perform PMCS	PMCS not performed
6	After		Case Assembly	Check for any missing supplies.	Missing supplies.
7	After		Photometer	Check for any missing supplies.	Missing supplies.
8	After		Ultrameter	Check for any missing standard solutions.	Missing standard solution.
				Check that sensor well is topped off with storage solution.	Sensor tip is dry
9	After		Chemical Agents Water Testing Kit	Check.TM 3-6665-319-10 and perform after PMCS	PMCS not performed

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) OPERATOR PROCEDURES

GENERAL INSTRUCTIONS

The procedures in this work package have been arranged in the order in which the items appear in the operator (C) maintenance level column on the Maintenance Allocation Chart (MAC).

Step-by-step procedures have been provided for all actions authorized to be performed by operator maintenance in the order in which they appear on the MAC.

EQUIPMENT	MAINTENANCE PROCEDURE
Turbidity Meter, Ultrameter, Photometer	WP 0013 00

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) INSPECTION, SERVICE, AND CALIBRATION

INITIAL SETUP
ULTRAMETER

Materials/Parts
Buffer 4.00 Detergent Rags Battery, 9v Screwdriver w/#2 Phillips

INSPECTION
(1) Check meter for any visible damage. If damaged, notify supervisor.
(2) Check sensor for any visible damage. If damaged, replace.

SERVICE
(1) Clean meter with a damp rag and detergent. Remove detergent residue with a damp rag and dry before repackaging.
(2) Clean sensor with buffer solution. Do not remove storage/soaker bottle.
(3) Fill storage/soaker bottle if solution level is below 3/4 full.
(a) Loosen cap on storage/soaker bottle and slide bottle off sensor.
(b) Fill storage/soaker bottle with prepared storage solution.
(c) Slide storage/soaker bottle onto sensor and tighten cap. Be sure sensor tip is immersed in storage solution.
(d) Change storage/soaker bottle solution if undissolved particles are apparent.
(e) Remove cover and battery, if installed. Store battery in one of the case battery storage areas unless immediate use of the meter is anticipated.
(f) Replace cover.
(g) If battery is suspected to be bad, replace it.
NOTE: Dispose of old batteries in accordance will local regulations/ordinances.

CALIBRATE
Reference WP 0005
Calibration is performed during use.
NOTE: Repairs are limited to replacement of batteries and sensor only.

REPLACE
Remove screws from back of unit, replace battery, and replace screws.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) INSPECTION, SERVICE, AND CALIBRATION

INITIAL SETUP
TURBIDITY METER

Materials/Parts
Rags Detergent Paper Towels
Pen, Permanent White Battery, AA 1.5v

TOOLS
Screwdriver, w/Phillips #2

INSPECTION
(1) Check turbidity meter for any visible damage. If damaged, notify supervisor.
(2) Check cuvette for any visible damage.
(3) Inspect case for serviceability.

SERVICE
(1) Clean turbidity meter with a damp rag and detergent. Remove detergent residue with a damp rag and dry before repackaging.
CAUTION: Use only a soft cloth or optical lens tissue to clean the cuvette. Scratches on cuvette can cause errors in readings when meter is used.
(2) Clean cuvette with a damp rag and detergent if necessary. The cuvette must be free of fingerprints and any other oil or dirt. Rinse with a damp rag and dry thoroughly before repackaging.
(3) Remove screws on back cover and remove battery, if installed. Store battery in one of the case battery storage areas unless immediate use of the meter is anticipated.
(4) Secure back cover using screws.
(5) If battery is suspected to be bad, replace it.
NOTE: Dispose of old batteries in accordance with local regulations/ordinances.

CALIBRATE
Reference WP 0004
Calibration is performed during setup for use.
NOTE: Repair is limited to replacement of cuvette and batteries only.

REPLACE
Remove screws from back of unit, replace batteries, and replace screws.
If cuvette cap replacement is required, marl with appropriate designator (“0”, “10”, or “S”) using permanent white ink

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) INSPECTION, SERVICE, AND CALIBRATION

INITIAL SETUP
CHLORINE PHOTOMETER
Materials/Parts
Rags Detergent Battery, 9v Screwdriver w/#2 Phillips

INSPECTION
(1) Check kit for any visible damage. Replace any damaged components.

SERVICE
(1) Clean individual components and case with a damp rag and detergent if necessary. Remove detergent residue with a damp rag and dry thoroughly before repackaging.
(2) Wash cuvette with water and detergent solution. Rinse with demineralized water and dry before repackaging.
(3) Remove battery and store battery in one of the battery storage areas unless immediate use of the meter is anticipated.
(4) If battery is suspected to be bad, replace it.
NOTE: Dispose of old batteries in accordance with local regulations/ordinances.

CALIBRATE
Reference WP 0006
Calibration is performed during setup for use.
NOTE: Repair is limited to replacement of cuvette and batteries only.

REPLACE
Remove battery cover, replace battery, and replace cover.

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
INSPECTION, SERVICE, AND CALIBRATION

INITIAL SETUP
CHEMICAL AGENTS WATER TESTING KIT.
See TM 3-6665-319-10

INITIAL SETUP
CARRYING CASE
Materials/Parts
Rags Detergent
INSPECTION
(1) Check case for any visible damage. If damaged, notify supervisor.
(2) Open case and remove all components. Note location for repackaging.
(3) Check foam liners for any visible damage. If damaged, notify supervisor.
(4) If case and liner are not damaged, repack all components as noted during removal. Close and secure case.

SERVICE
(1) Clean outside of case using rags with detergent and water. Remove detergent residue using rags with clear water. Dry thoroughly.

END OF WORK PACKAGE

CHAPTER 6

UNIT MAINTENANCE INSTRUCTIONS

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
UNIT MAINTENANCE-SERVICE UPON RECEIPT

SERVICE UPON RECEIPT

a. Remove the Water Quality Analysis Set from the packing container.
b. Open the case and inspect the equipment for damage incurred during shipment. If any equipment has been damaged, report the damage on SF 364, Report of Discrepancy.
c. Check that the set is complete.
d. See Operator Instructions for initial calibration of equipment.

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
UNIT MAINTENANCE INSTRUCTIONS
UNIT PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

INTRODUCTION

There are no PMCS procedures at the Unit level.

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
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FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
UNIT MAINTENANCE INSTRUCTIONS

COMMON TOOLS AND EQUIPMENT.

a. For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) CTA 50-970 or CTA 8-100 as applicable to your unit.

b. No special tools are required for unit maintenance. All tools needed are available in Automotive Organizational Number 1 Common Shop Equipment Tool Kit SC 4910-95-A74.

REPAIR PARTS.

a. There is no mandatory replacement parts listed in this manual.

b. Repair parts are listed in WP 0024 of this manual.

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
UNIT MAINTENANCE INSTRUCTIONS
UNIT PROCEDURES

INITIAL SETUP
CARRYING CASE, empty of contents

Materials/Parts
Foam Insert General Purpose Adhesive

REPLACE
Remove damaged foam insert and replace using general purpose adhesive.

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) PREPARATION FOR STORAGE OR SHIPMENT

CAUTION

This kit must be protected from temperatures below 32 degrees F (0 degrees C):

- **The chemicals in the kit can be rendered useless and equipment damaged if allowed freezing.**
- **All tests must be performed with equipment and samples above 32 degrees F (0 degrees C).**

PREPARATION FOR STORAGE.

Before placing the equipment in administrative storage, current Preventive Maintenance Checks and Services (PMCS) should be completed, shortcomings and deficiencies should be corrected, and all Modification Work Orders (MWO) should be applied.

a. Storage Site Selection. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers, and other containers may be used.

b. Administrative Storage. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period, appropriate maintenance records will be kept.

c. Intermediate Storage - 46 to 180 days. No special handling is required other than protection from damage and the elements.

d. Long Term or Flyable Storage. There is no time limit for this type of storage.

(1) Package in accordance with paragraphs 4-14 and 4-15.

(2) The valve on the front of the case must be opened before air flight and closed after air flight.

PREPARATION FOR SHIPMENT.

a. Secure all lids on bottles and boxes.

b. Inventory and secure all equipment in proper compartments per loading plan on placards.

c. Close case lid and secure all latches.

d. The valve on the front of the case must be opened before air flight and closed after air flight.

e. Check to see that battery is not installed in any meter. If it is, remove it.

f. The pH electrode tip is immersed in an attached bottle of storage/soaker solution. If this bottle is not full, refill it using prepared storage solution, which is non-hazardous and safe for any means of shipment.

g. The meters and sensors are precision equipment and must be handled appropriately. Package them to prevent any shipping damage due to rough handling or the elements.

h. Mark the shipping package to indicate that fragile electronic instruments are enclosed.

END OF WORK PACKAGE

CHAPTER 7

SUPPORTING INFORMATION

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) SUPPORTING INFORMATION REFERENCES

REFERENCES

SCOPE
This work package lists all forms, field manuals, and technical manuals referenced in this manual.

PAMPHLETS

DA PAM 738-750	The Army Maintenance Management System (TAMMS)

FORMS

DA 2028	Recommended Changes to Publications and Blank Forms
SF 368	Product Quality Deficiency Report
DA 2404	Equipment Inspection and Maintenance Worksheet
DA 2408-9	Equipment Control Record
SF 364	Report of Discrepancy

TECHNICAL MANUALS

TM 750-244-3	Destruction of Army Materiel to Prevent Enemy Use
TM 3-6665-319-10	Water Testing Kit, Chemical Agents: M272

FIELD MANUALS

FM 3-3	NBC Contamination Avoidance
FM 3-4	NBC Protection
FM 3-5	NBC Decontamination

ARMY REGULATIONS

AR 700-138	Army Logistics Readiness and Sustainability

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
SUPPORTING INFORMATION
MAINTENANCE ALLOCATION CHART INTRODUCTION

INTRODUCTION

THE ARMY MAINTENANCE SYSTEM MAC.

This introduction provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

The Maintenance Allocation Chart (MAC) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Unit - Includes two subcolumns, C (operator/crew) and O (unit) maintenance.

Direct Support - Includes an F subcolumn

General support - Includes an H subcolumn.

Depot - Includes a D subcolumn.

The tools and test equipment requirements (immediately following the MAC) lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

1. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.
3. Service. Operations required periodically to keep an item in proper operating condition, e.g., to clean (includes decontaminate when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.
4. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.
6. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
7. Remove/install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
8. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the 3rd position code of the SMR code.

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SUPPORTING INFORMATION
MAINTENANCE ALLOCATION CHART INTRODUCTION**

MAINTENANCE FUNCTIONS. - continued

9. Repair. The application of maintenance services
1, including fault location/troubleshooting
2, removal/installation, and disassembly/assembly
3 procedures, and maintenance actions
4 to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

NOTE

The following definitions are applicable to the "repair" maintenance function:

Services ---Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting---The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT)

Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (e.g., identified as maintenance significant).

Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

10. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

11. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

EXPLANATION OF COLUMNS IN THE MAC

Column 1. Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

Column 2. Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column 3. Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions refer to "Maintenance Functions" outlined above.)

Column 4. Maintenance Level. Column 4 specifies each level of maintenance authorized to perform each function listed in column 3, by indicating work time required (expressed as man-hours in whole hours or decimals) in the appropriate subcolumn. This work-time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work-time figures are to be shown for each level. The work-time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable

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SUPPORTING INFORMATION
MAINTENANCE ALLOCATION CHART INTRODUCTION

EXPLANATION OF COLUMNS IN THE MAC - continued

condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C _____ Operator or Crew Maintenance
O _____ Unit Maintenance
F _____ Direct Support Maintenance
H _____ General Support Maintenance
D _____ Depot Maintenance

NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

Column 5. Tools and Test Equipment Reference Code. Column 5 specifies, by code, those common tools sets (not individual tools), common TMDE, and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to tools and test equipment.

Column 6. Remarks. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries

EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS

Column 1. Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Column 5.

Column 2. Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

Column 3. Nomenclature. Name or identification of the tool or test equipment.

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Column 4. National Stock Number. The National stock number of the tool or test equipment.

Column 5. Tool Number. The manufacturer’s part number or type number.

EXPLANATION OF COLUMNS IN REMARKS.

a. Column 1. Remarks Code. The code recorded in column 6.
b. Column 2. Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
SUPPORTING INFORMATION
MAINTENANCE ALLOCATION CHART

Table 1. MAC for WQAS-P

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	REMARKS
			C	O	F	H	D		
00	WATER QUALITY ANALYSIS SET	Inspect	0.5						A, B
01	TURBIDITY METER	Inspect	0.1						A
		Service	0.3						D
		Calibrate	0.5						E
		Replace	0.1						D
02	ULTRAMETER	Inspect	0.1						A
		Service	0.5						B
		Calibrate	0.5						E
		Replace	0.1						D
03	PHOTOMETER	Inspect	0.2						A
		Service	0.3						B
		Calibrate	0.5						E
		Replace	0.1						D
04	CARRYING CASE								
		Inspect	0.3						A
		Service	0.2						B
		Replace		0.5				1,2	C

Table 2. Tool and Test Equipment for WQAS-P

TOOL OR TEST EQUIPMENT	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, General Mechanics	5180-00-177-7033	SC-5180-90-CL-N26
2	O	Tool Kit, Common No. 1	4910-00-754-0654	SC-4910-95-CL-A74

Table 3. Remarks for WQAS-P
MAINTENANCE ALLOCATION CHART

REMARKS CODE	REMARKS
A	External
B	Preventive maintenance checks and services (PMCS)
C	Refernce to tools only for assistance in foam insert removal/replacement.
D	If required by SMR code, send to special repair activity (SRA) for warranty work.
E	Replace chemicals, batteries and supplies as needed. Refer to RPSTL and Expendable and Durable Supplies List

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

INTRODUCTION

SCOPE.
This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit support maintenance of the Water Quality Analysis Set: Purification. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

GENERAL.
In addition to the Introduction, this Repair Parts and Special Tools List is divided into the following:

1. Repair Parts List Work Packages. Work packages containing lists of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. These work packages also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in FIG. BULK at the end of the work packages. Repair parts kits are listed separately in their own functional group and work package. Repair parts for reparable special tools are also listed in a separate work package. Items listed are shown on the associated illustrations.

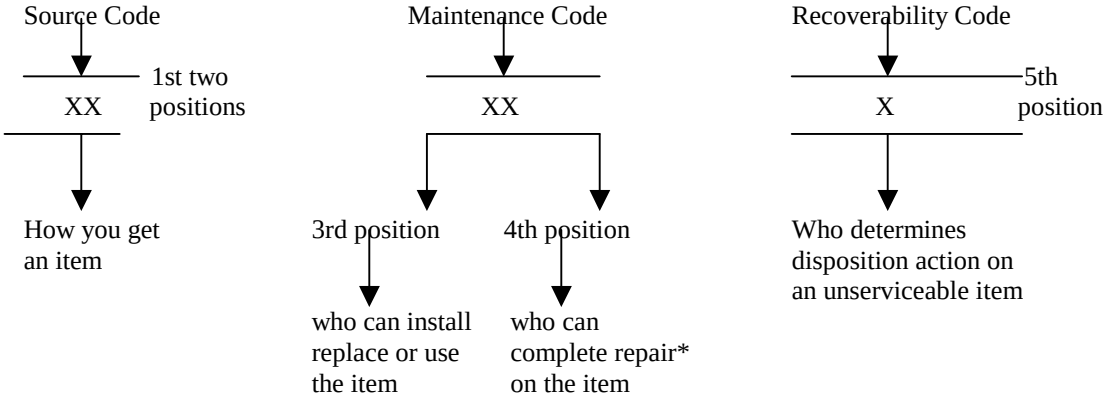
2. Special Tools List Work Packages. Work packages containing lists of special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or Class VII are not listed.

3. Cross-Reference Indexes Work Packages. There is one cross-reference indexes work packages in this RPSTL:

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGE.

Item No., Column (1). Indicates the number used to identify items called out in the illustration.

SMR Code, Column (2). The Source, Maintenance, and Recoverability (SMR) code is a five position code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instructions, as shown in the following breakout.

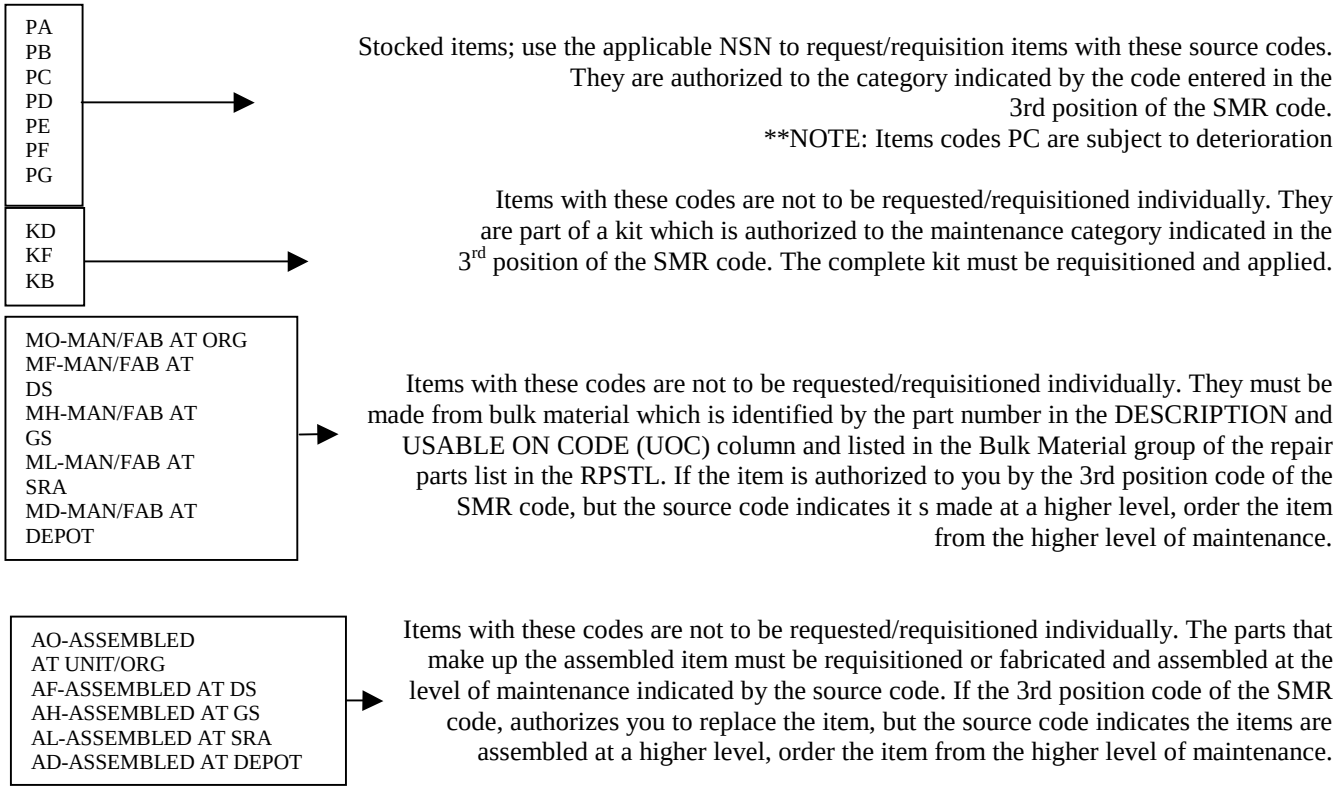


* Complete Repair: Maintenance capacity, capability, and authority to perform all the corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST .Continued

Source Code. The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow.



Code Explanation

XA - - Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)

XB - - If an "XB" item is not available from salvage, order it using the CAGEC and part number given.

XC - - Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer’s part number.

XD - - Item is not stocked. Order an "XD"-coded item through normal supply channels using the CAGEC and part number given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1 as contained in the maintenance management update.

Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

Third Position. The maintenance code entered in the third position tells you the lowest maintenance category authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following categories of maintenance.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST. (continued)

Code Application/Explanation

C - Crew or operator maintenance done within unit or aviation unit maintenance.

O - Unit or aviation unit category can remove, replace, and use the item.

F - Direct support or aviation intermediate category can remove, replace, and use the item.

H - General support level can remove, replace, and use the item.

L - Specialized repair activity can remove, replace, and use the item.

D - Depot category can remove, replace, and use the item.

Fourth Position. The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance category with the capability to do complete repair (i.e., perform all authorized repair functions). (NOTE: Some limited repair may be done on the item at a lower category of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following codes.

Code Application/Explanation

O - Unit or aviation unit is the lowest category that can do complete repair of the item.

F - Direct support or aviation intermediate is the lowest category that can do complete repair of the item.

H - General support is the lowest category that can do complete repair of the item.

L - Repair restricted to designated specialized repair activity.

D - Depot is the lowest category that can do complete repair of the item.

Z - Non-repairable. No repair is authorized.

B - No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item.) However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows.

Recoverability Definition

Codes

Z - Non-repairable item. When unserviceable, condemn and dispose of the item at the category of maintenance shown in third position of SMR Code.

O - Repairable item. When uneconomically repairable, condemn and dispose of the item at unit or aviation unit category.

F - Repairable item. When uneconomically repairable, condemn and dispose of the item at the intermediate direct support or aviation intermediate category.

H - Repairable item. When uneconomically repairable, condemn and dispose of the item at the intermediate general support category.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

D - Repairable item. When beyond lower category repair capability, return to depot. Condemnation and disposal of item not authorized below depot category.

L - Repairable item. Condemnation and disposal not authorized below specialized repair activity.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST. (continued)

A - Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

NSN (Column 3). The NSN for the item is listed in this column.

CAGEC, Column (4). The Commercial And Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

PART NUMBER Column (5). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different P/N from the number listed.

DESCRIPTION AND USABLE ON CODE, Column (6). This column includes the following information:

1. The Federal item name and, when required, a minimum description to identify the item.

2. Part numbers for bulk material are referenced in the description column in the line item entry for the item to be manufactured/fabricated.

3. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from electromagnetic pulse (EMP) damage during a nuclear attack.

4. The statement END OF FIGURE appears just below the last item description in column (6) for a given figure in both the repair parts list and special tools list.

QTY (Column (7)). The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a function group, subfunctional group, or an assembly. a "V" appearing in this column instead of a quantity indicates that the quantity is bvariable and quantity may change from application to application.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

EXPLANATION OF CROSS-REFERENCE INDEXES AND COLUMNS.

1. National Stock Number (NSN) Index Work Package.

Stock Number Column. This column lists the NSN by National Item Identification Number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN, i.e., NSN (5305-01-574-1467).
NIIN When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number

FIG. Column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in The repair parts lists and special tools list.

ITEM. Column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

2. Part Number Index Work Package. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers) through 9 and each following letter or digit in like order).

Part Number Column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

Fig. Column. This column lists the number of the figure where the item is identified/located in Sections II and III.

Item Column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

3. Figure and Item Number Index Work Package.

FIG. Column. This column lists the number of the figure where the item is identified/located in section II and III.

ITEM Column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

STOCK NUMBER Column. This column lists the NSN for the item.

CAGEC Column. The Commercial And Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

PART NUMBER Column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

SPECIAL INFORMATION.

USABLE ON CODE. The Usable On Code appears in the lower left corner of the description column heading. Usable On Codes are shown as "UOC: ..." in the Description Column (justified left) on the last line applicable item description/nomenclature. Uncoded items are applicable to all models.

ASSOCIATED PUBLICATIONS. See References.

HOW TO LOCATE REPAIR PARTS.

1. When NSNs or P/Ns Are Not Known.
First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the figure covering the functional group or the subfunctional group to which the item belongs.

Third. Identify the item on the figure and note the number(s).

Fourth. Look in the repair parts list work packages for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

2. When NSN Is Known.
First. If you have the NSN, look in the STOCK NUMBER column of the NSN index work package. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

3. When P/N Is Known.
First. If you have the P/N and not the NSN, look in the PART NUMBER column of the P/N index work package. Identify the figure and item number.

Second. Look up the item on the figure in the applicable repair parts list work package."
NOTE: Include 4 only if the RPSTL has a reference designator index work package.

4. When Reference Designator Is Known.
First. If you know the reference designator, look in the REFERENCE DESIGNATOR column of the reference designator index work package. Note the figure and item number.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

ABBREVIATIONS.

Abbreviations used in this manual are listed in MIL-STD-12. See glossary for unique abbreviations

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
REPAIR PARTS LIST

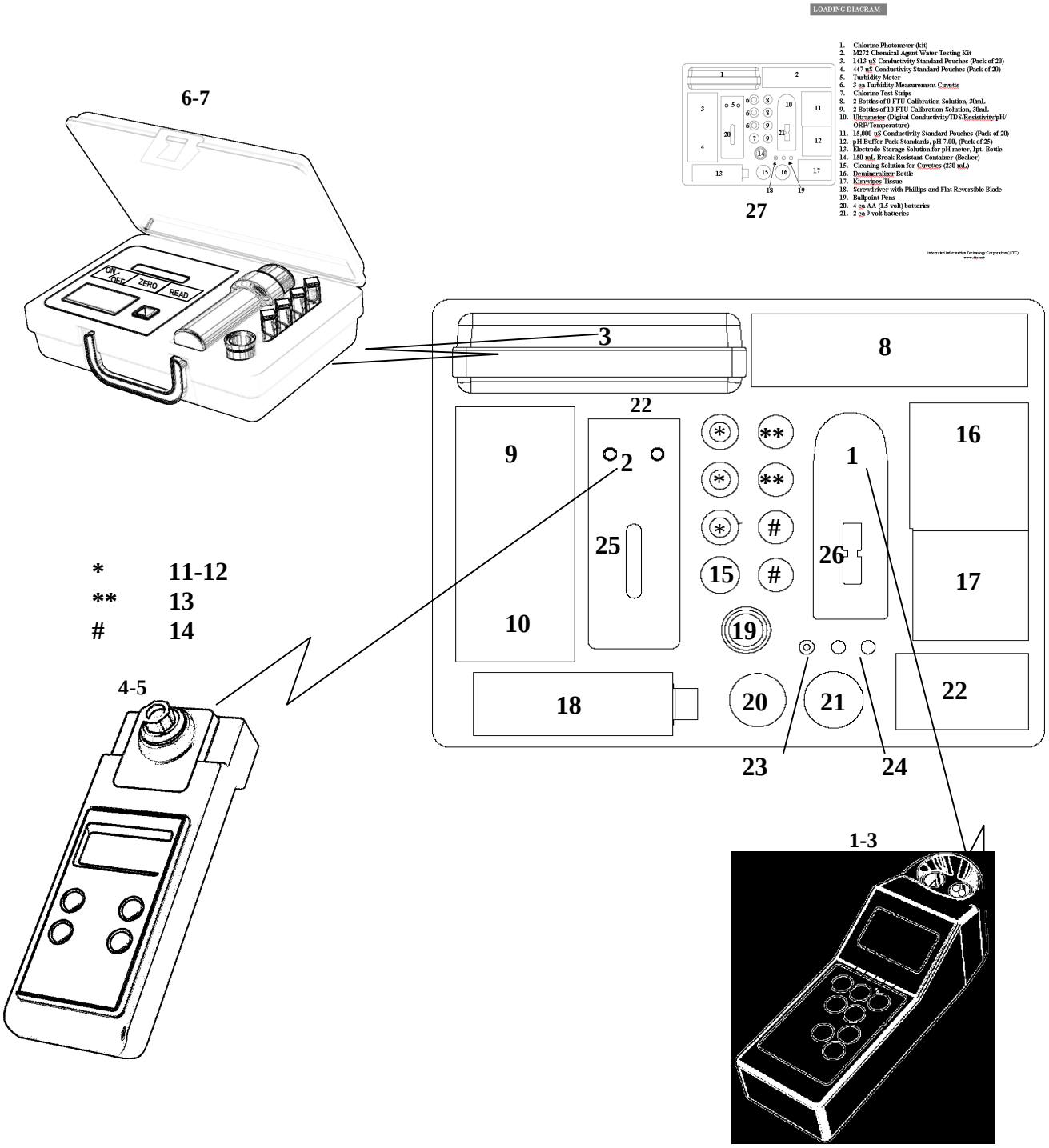


Figure 1. WQAS-P Chemicals and Supplies

OPERATOR AND UNIT' MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
REPAIR PARTS LIST

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 01 CHEMICAL AND SUPPLIES	
					FIG. 1 CHEMICALS AND SUPPLIES	
1	PFOLL	6630-01-491-2184	30053	6P	Ultrameter	1
2	PCOZA	6135-00-900-2139	90303	MN1604	Battery, Nonrechargeable (9V)	1
3	PFOZZ	6630-01-489-0307	30053	RPR	Electrode, pH ORP (Sensor)	1
4	PFOLL	6630-01-490-7581	06EF2	HI 93703	Test Set, Water Turbidity Meter	1
5	PCOZA	6135-00-985-7845	80204	20-0571-1988 NEDA 15A	Battery, Nonrechargeable (1.5V)	4
6	PFOLL	6850-01-487-8812	58177	10470	Photometer, Chlorine	1
7	PCOZA	6135-00-900-2139	90303	MN1604	Battery, Nomechargeable (9V)	1
8	PCOZA	6665-01-134-0885	81361	D5-77-2500	M272 Chemical Agents Water Testing Kit	1
9	PFOZZ	6640-01-491-0346	05668	35653-11	Pouch, Conductivity Standard (1413US) Pkg of 20	1
10	PFOZZ	6640-01-491-0344	05668	35653-10	Pouch, Conductivity Standard (447US) Pkg of 20	1
11	PAOZZ	6650-01-487-8738	06EF2	HI 73 1325	Cover, Spectrophotomer (Curvette Cap) Pkg of 4	3
12	PAOZZ	6630-01-490-7630	06EF2	HI 731321	Cuvette w/o Cap for Turbidity Meter (10ml) Pkg of 4	3
13	PFOZZ	6850-01-487-8860	06EF2	HI 93703-0	Turbidity Standard, 0 FTU, 30ml Bottle for Turbidity Meter	2
14	PFOZZ	6850-01-487-8875	06EF2	HI 93703-10	Turbidity Standard, 10 FTU, 30ml Bottle for Turbidity Meter	2
15	PFOZZ	6640-01-490-7587	91224	27450-50	Test Strips, Chlorine	1
16	PFOZZ	6640-01-491-0345	05668	35653-13	Pouch, Conductivity Standard (15000US) Pkg of 20	1
17	PFOZZ	6630-01-491-0691	30260	910725	Buffer Solution, Standard (pH7.00) Pkg of 25	1
18	PFOZZ	6630-01-359-3467	06EF2	HI 80300L	Filling Solution, Electrode (pH4.00 Buffer)	1
19	PAOZZ	6640-01-491-0335	15747	1744D	Beaker, Laboratory, 150ml (5oz) Pkg of 12	1
20	PFOZZ	6850-01-487-8862	06EF2	HI 93703-50	Cleaning Compound, Storage, for Cuvette, 230ml Bottle	1
21	PFOZZ	6640-01-490-7584	91224	14299-00	Dispenser, Demineralizer (16oz Bottle)	1
22	PAOZZ	7920-00-721-8884	80244	7920-00-721-8884	Towel, Paper 4.5" X 8.5" Box	1
23	PAOZZ	5120-01-490-2322	19756	0929	Screwdriver Set, Flat Tip Combination	1
24	XDOZZ		1DGX5	1-8028	Pen, Permanent Black Ink	1
25	PCOZA	6135-00-985-7845	80204	20-0571-1988 NEDA 15A	Battery, Nomechargeable (1.5V Spare)	4
26	PCOZA	6135-00-900-2139	90303	MN1604	Battery, Nonrechargeable (9V Spare)	2
27	XDOZZ		04NB0	1PACKET	Instruction Packet, Laminated, Loading Diagram, Conductivity, Conversion Chart	1

END OF FIGURE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS LIST

1-3

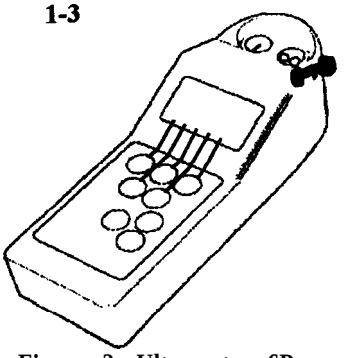


Figure 2. Ultrameter 6P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 02 ULTRAMETER	
					FIG. 2 ULTRAMETER	
1	PFOLL	6630-01-491-2184	30053	6P	ULTRAMETER	1
2	PCOZA	6135-00-900-2139	90303	MN1604	• BATTERY, NONRECHARGEABLE (9V)	1
3	PFOZZ	6630-01-489-0307	30053	RPR	. ELECTRODE, pH ORP	1 I
					END OF FIGURE	

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)

REPAIR PARTS LIST

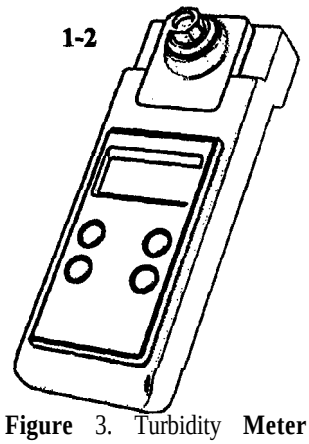


Figure 3. Turbidity **Meter**

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 03 TEST SET, WATER TURBIDITY METER	
					FIG. 3 TEXT SET, WATER TURBIDITY METER	
1	PFOLL	6630-01-490-7581	06EF2	HI93703	TURBIDITYMETER	1
2	PCOZA	6135-00-985-7845	80204	20-0571-1988 NEDA 15A	• BATTERY, NONRECHARGEABLE	4
3	PAOZZ	6630-01-490-7630	06EF2	HI 73 1321	• CUVETTE, MULTI-SAMPLING	3
4	PAOZZ	6650-01-487-8738	06EF2	HI731325	• COVER, SPECTROPHOTOMETER	3

END OF FIGURE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) REPAIR PARTS LIST

1-6

Figure 4. Photometer

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 04 PHOTOMETER	
					FIG. 4 CHLORINE PHOTOMETER	
1	PFOLL	6850-01-487-8812	58177	10470	PHOTOMETER, CHLORINE	1
2	PCOZA	6135-00-900-2139	90303	MN1604	• BATTERY, NONRECHARGEABLE	1
3	PAOZZ	6630-01-490-7541	58177	10431	• CUVETTE, MEASUREMENT W/ CAPS (5ML)	4
4	XAOZZ		58177	10435	• • CAPS, WHITE CUVETTE	4
5	PFOZZ	6640-01-491-6490	58177	10445	• DISPENSER, POWDER POP FOR FREE CHLORINE	1
6	PFOZZ	6650-01-487-7411	58177	21487	• CAP, LENS (OPTICAL WELL COVER)	1

END OF FIGURE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)

REPAIR PARTS LIST

1-2

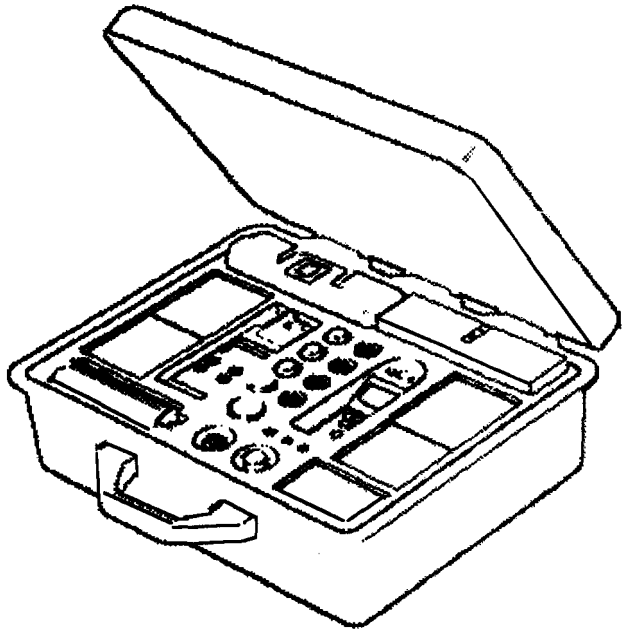


Figure 5. Carrying Case

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	
					GROUP 05 CARRYING CASE		
					FIG. 5 CARRYING CASE		
1	*PFOOO*	*4610-01487-6779*	04NB0	*1600*	*CASE, WATER PURIFICATION KIT*	*1*	
2	XDOZZ		04NB0	*1600-1*	*. FOAM INSERT, CUT*	*1*	*I*

END OF FIGURE

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
NSN INDEX

CROSS-REFERENCE INDEXES
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM
7920-00-721-8884	1	22
6135-00-900-2139	1	2
	1	7
	1	26
	2	2
	4	2
6135-00-985-7845	1	5
	1	25
	3	2
6665-01-134-0885	1	8
6630-01-359-3467	1	18
4610-01-487-6779	5	1
6650-01-487-7411	4	6
6650-01-487-8738	1	11
6850-01-487-8812	1	6
	4	1
6850-01-487-8860	1	13
6850-01-487-8862	1	20
6850-01-487-8875	1	14
6630-01-489-0307	1	3
	2	3
5120-01-490-2322	1	23
6630-01-490-7541	4	3
6630-01-490-7581	1	4
	3	1
6640-01-490-7584	1	21
6640-01-490-7587	1	15
6630-01-490-7630	1	12
6640-01-491-0335	1	19
6640-01-491-0344	1	10
6640-01-491-0345	1	16
6640-01-491-0346	1	9
6630-01-491-0691	1	17
6630-01-491-2184	1	1
	2	1
6640-01-491-6490	4	5

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
PART NUMBER INDEX

CROSS-REFERENCE INDEXES
PART NUMBER INDEX

CAGEC	PART NUMBER	FIG.	ITEM
19756	0929	1	23
58177	10431	4	3
58177	10435	4	4
58177	10445	4	5
58177	10470	1	6
		4	1
91224	14299-00	1	21
04NB0	1600	5	1
04NB0	1600-1	5	2
15747	1744D	1	19
1DGX5	1-8028	1	24
04NB0	1PACKET	1	27
80204	20-0571-1988 NEDA 15A	1	5
		1	25
		3	2
58177	21487	4	6
91244	27450-50	1	15
05668	35653-10	1	10
05668	35653-11	1	9
05668	35653-13	1	16
30053	6P	1	1
		2	1
80244	7920-00-721-8884	1	22
30260	910725	1	17
81361	D5-77-2500	1	8
06EF2	HI 731321	1	12
06EF2	HI 731325	1	11
06EF2	HI 93703	1	4
		3	1
06EF2	HI 93703-0	1	13
06EF2	HI 93703-10	1	14
06EF2	HI 80300L	1	18
06EF2	HI 93703-50	1	20
90303	MN1604	1	2
		1	7
		1	26
		2	2
		4	2
30053	RPR	1	3
		2	3

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LIST

INTRODUCTION

Scope.

This section lists components of end item (COEI) and basic issue items (BII) for the WQAS-P, to help you inventory the items required for safe and efficient operation of the equipment.

General.

The Components Of End Item (COEI) and Basic Issue Items (BII) Lists are divided into the following lists:

Components Of End Item. This listing is for information purposes only, and is not authority to requisition replacements. These items are part of the WQAS-P. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

Basic Issue Items. These essential items are required to place the WQAS-P in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the Water Quality Analysis Set: Purification during operation and when it is transferred between property accounts. This list is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

Explanation of Columns in the COEI List and BII List.

The following provides an explanation of columns found in the tabular listings.

Column (1), ___ Illus Number, gives you the number of the item illustrated.

Column (2),____ National Stock Number, identifies the stock number of the item to be used for requisitioning purposes.

Column (3), ___ Description, CAGEC, and Part Number. Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the Commercial And Government Entity Code (CAGEC) (in parentheses) and the part number.

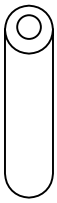
Column (4),____ Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment.

Column (5),____ U/M (unit of measure), indicates how the item is issued for the National Stock Number shown in column two.

Column (6), ___ Qty Rqr. Indicates the quantity required.

OPERATOR AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P) COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LIST

1



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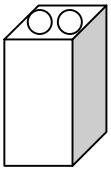


3

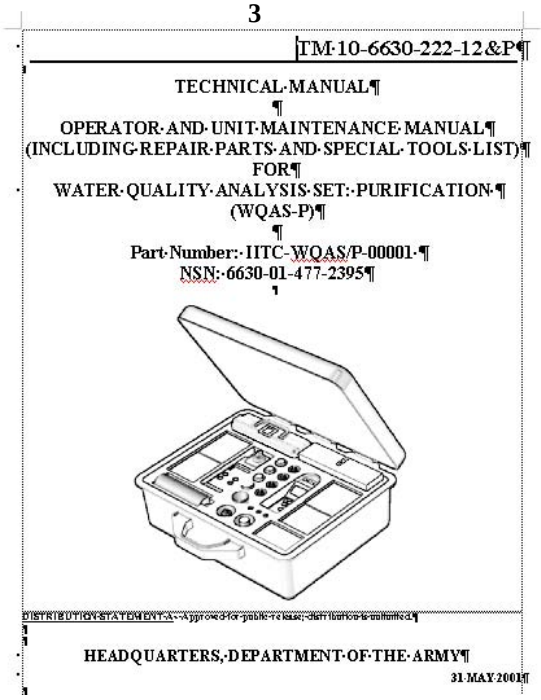


Table 1. Components of End Item List

1	2	3	4	5	6
ILLUS	NATIONAL	DESCRIPTION,	USABLE	U/M	QTY
NUMBER	STOCK NUMBER	CAGEC, AND PART NUMBER	ON CODE		RQR
NOT APPLICABLE					

		BASIC ISSUE ITEMS LIST			
1	2	3	4	5	6
ILLUS	NATIONAL	DESCRIPTION,	USABLE	U/M	QTY
NUMBER	STOCK NUMBER	CAGEC, AND PART NUMBER	ON CODE		RQR
1	6135-00-985-7845	Battery, Alkaline, AA (80204) 20-0571-1988 NEDA 15A		EA	4
2	6135-00-900-2139	Battery, Alkaline, 9 volt (90303) MN1604		EA	2
3		Technical Manual, Operator and Unit Maintenance Manual, TM 10-6630-222-12&P		EA	1

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (EDSML)

This section lists expendable and durable items that you will need to operate and maintain the Water Quality Analysis Set: Purification. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except medical, class V, repair parts, and heraldic items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

EXPLANATION OF COLUMNS.

Column 1. Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material.

Column 2. Level. This column identifies the lowest level of maintenance that requires the listed item.
Column 3. National Stock Number. This is the national stock number assigned to the item; which you can use to requisition it.

Column 4. Item name, description, Commercial and Government Entity Code (CAGEC), and part number. This provides the other information you need to identify the item.

Column 5. Unit of measure. This code shows that physical measurement or count of an item, such as gallon, dozen, gross, etc.

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Table 1. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER LEVEL	(2)	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGE, PART NUMBER	(5) U/M
1	C	6135-00-985-7845	Battery, Alkaline, AA, (80204) 20-0571-1988 NEDA 15A	PG
2	C	6135-00-900-2139	Battery, Alkaline, 9 volt, (90303) MN1604	PG
3	C	6640-01-490-7584	Bottle, Demineralizer, (91224) 14299-00	EA
4	C	6640-01-491-0335	Container, Beaker, 150ml, break resistant, (15747) 1744D	PG
5	C	6630-01-491-0691	pH Buffer Pack Standards, pH 700,package of 25, (30260) 910725	PG
6	C	6630-01-359-3467	Electrode Storage Solution for pH Meter, pint bottle, (06EF2) HI80300L	BT
7	C	6850-01-487-8862	Cleaning Solution,230ml, for Cuvette, (06EF2) HI 93703-50	BT
8	C	6850-01-487-8860	Turbidity Standard, 0 FTU, 30ml bt, for Turbidity Meter, (06EF2) HI 93703-0	BT
9	C	6850-01-487-8875	Turbidity Standard, 10 FTU, 30ml bt., for Turbidity Meter, (06EF2) HI 93703-10	BT
10		7920-00-721-8884	Towel, Paper, 4.5’’x 8.5” (80244)	BX

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (EDSML)

(1) ITEM NUMBER LEVEL	(2)	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGE, PART NUMBER	(5) U/M
11	C	6640-01-490-7587	Test Strips, Chlorine, (91224) 27450-50	BT
12	C	6640-01-491-0344	447uS Conductivity Standard Pouches, package of 20, (05668) 35653-10	PG
13	C	6640-01-491-0346	1413uS Conductivity Standard Pouches, package of 20, (05668) 35653-11	PG
14	C	6640-01-491-0345	15,000uS Conductivity Standard Pouches, package of 20, (05668) 35653-13	PG
15	C	7920-00-205-1711	Rags, (64067)	BE
16	C	7930-00-764-5066	Dishwashing Compound, Hand (74188) Joy	QT

END OF WORK PACKAGE

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
GLOSSARY

ABBREVIATIONS

442 ..... Natural Water Characteristic
AAL ..... Additional Authorization List
ATTN ..... Attention
BII ..... Basic Issue Items
Blvd ..... Boulevard
BOI ..... Basis Of Issue
C ..... Centigrade
CAGEC ..... Commercial And Government Entity Code
COEI ..... Components Of End Item
CPC ..... Corrosion Prevention and Control
CTA ..... Common Table of Allowances
DA ..... Department of the Army
DECON ..... Decontamination
DPD ..... N-Diethyl-P-Phenylanadiamine
e.g ..... for example
EDSML ..... Expendable/Durable Supplies and Materials List
EIR ..... Equipment Improvement Recommendation
EMP ..... Electro Magnetic Pulse
Equip ..... Equipment
Etc ..... etceteras
F ..... Fahrenheit
FIG ..... Figure
FM ..... Field Manual
FTU ..... Formazine Turbidity Units
g ..... Grams
in or " ..... inches
ISO ..... International Standard Organization
kΩ ..... kilohms
KCl ..... Potassium Chloride
l ..... litre
lbs ..... Pounds
LCD ..... Liquid Crystal Display
MAC ..... Maintenance Allocation Chart
mg ..... milligram
Ml ..... Milliliters
Mm ..... millimeter
MM.DD ..... Month Day
MTOE ..... Modified Table of Organization and Equipment
NaCl ..... Sodium Chloride
NBC ..... Nuclear, Biological, and Chemical
NIIN ..... National Item Identification Number
No ..... Number
NSN ..... National Stock Number
NTU ..... Nephelometric Turbidity Units
ODS ..... Ozone Depleting Substance
ORP ..... Oxidation-Reduction Potential or REDOX
oz ..... ounce
PMCS ..... Preventive Maintenance Checks and Services
PPM ..... Parts Per Million
QTY ..... Quantity

OPERATOR AND UNIT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR WATER QUALITY ANALYSIS SET: PURIFICATION (WQAS-P)
GLOSSARY

REDOX	Oxidation Reduction
Ref	Reference
RPSTL	Repair Parts and Special Tools List
SMR	Source Maintenance and Recoverability
SRA	Special Repair Activity
TDS	Total Dissolved Solids or total conductive ions in a solution
Tempco	Temperature Compensation
TM	Technical Manual
TMDE	Test Measurement and Diagnostic Equipment
U.S	.United States
UOC	Usable On Code
UUT	Unit Under Test
UUT	Unit Under Test
v	Volt
WP	Work Package
WQAS-P	Water Quality Analysis Set -Purification

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17 and 27.

From: **"Whomever" whomever@avma27.army.mil**
To: **TACOM-TECH-PUBS@ria.army.mil**

Subject: **DA Form 2028**

1. ***From:*** Joe Smith
2. ***Unit:*** home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19-OCT-93
8. ***Pub no:*** 55-1915-200-10
9. ***Pub Title:*** TM
10. ***Publication Date:*** 11-APR-88
11. ***Change Number:*** 12
12. ***Submitter Rank:*** MSG
13. ***Submitter Fname:*** Joe
14. ***Submitter Mname:*** T
15. ***Submitter Lname:*** Smith
16. ***Submitter Phone:*** 123-123-1234
17. ***Problem:*** 1
18. ***Page:*** 1
19. ***Paragraph:*** 3
20. ***Line:*** 4
21. ***NSN:*** 5
22. ***Reference:*** 6
23. ***Figure:*** 7
24. ***Table:*** 8
25. ***Item:*** 9
26. ***Total:*** 123
27. ***Text:***
This is the text for the problem below line 27.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

PFC JOHN DOE
Co S, 3d ENGINEER BN
FT. LEONARDWOOD, MO 63108

DATE:

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 10-5430-233-12&P	29 OCT 1993	3K TANK

BE EXACT. PIN-POINT WHERE IT IS				IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
6		2-1a		*In line 6 of paragraph 2-1a, the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.*
B1		4-3		*Callout number 6 in Figure 4-3 is identified as a bolt. In key for Figure 4-4, Item 6 is called a shim. Please correct: one or the other.*
125		Line 20		*I ordered a gasket, item 19 on Figure B-16 by NSN 2910-00-762-3001. I got a gasket, but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN.*

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE
JOHN DOE, PFC 9268) 317-7111	*John Doe*

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.
DRSTS-M Overprint3, 1 Nov 80

P.S.- - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A COPY OF THIS AND GIVE TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

FILL IN YOUR UNITS

FOLD

DEPARTMENT OF THE ARMY

_____

_____

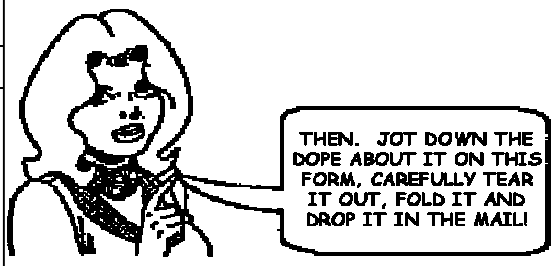
OFFICIAL BUSINESS

COMMANDER
U.S. TANK-AUTOMOTIVE AND ARMAMENTS COMMAND
ATTN: AMSTA-LC-CIP-WT
ROCK ISLAND, IL 61299-7630

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?



FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE:

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 10-6630-222-12&P	31 May 2001	Op&Unit Maint Manual WQAS-P

BE EXACT. PIN-POINT WHERE IT IS				IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	

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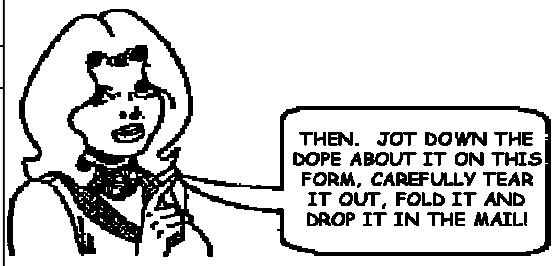

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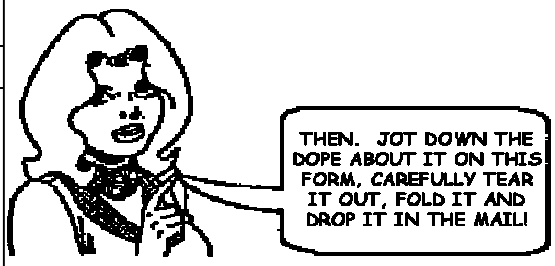

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1 Nov 80

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UNITS ADDRESS

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DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U.S. TANK-AUTOMOTIVE AND ARMAMENTS COMMAND
ATTN: AMSTA-LC-CIP-WT
ROCK ISLAND, IL 61299-7630

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0111602

To be distributed in accordance with the initial distribution number (IDN) 256672 requirements for TM 10-6630-222-12&P.

PIN: 079020-001