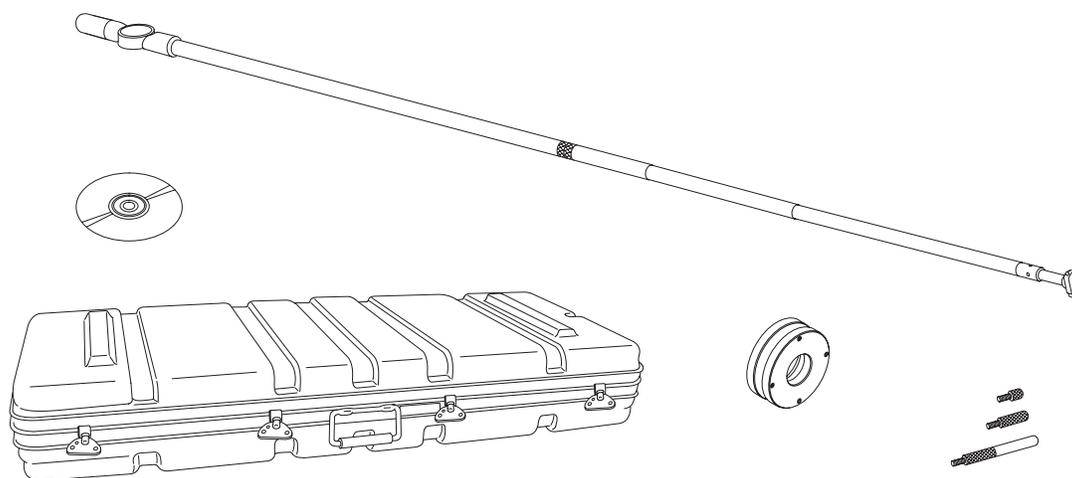


TM 9-4933-274-23&P

TECHNICAL MANUAL

FIELD MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST FOR

CANNON BORE EROSION GAGE SET NSN 5280-01-560-1762



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Date of issue for the original manual is:

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TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 24 AND TOTAL NUMBER OF WORK PACKAGES IS 18 CONSISTING OF THE FOLLOWING:

Page/WP No.	Change No.	Page/WP No.	Change No.
Title	0	Chapter 4 title page	0
i - iii	0	Blank	0
iv blank	0	WP 0011 (8 pgs).....	0
Chapter 1 title page	0	WP 0012 (12 pgs).....	0
Blank.....	0	WP 0013 (2 pgs).....	0
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TECHNICAL MANUAL
FIELD MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST
FOR
CANNON BORE EROSION GAGE SET
NSN 5280-01-560-1762

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any errors, or if you would like to recommend improvements to the procedures in this publication, please let us know. The preferred method is to submit your DA Form 2028 (Recommended Changes to Publications and Blank Forms) through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <https://aeprs.ria.army.mil>. The DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. 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, email, or fax your comments or DA Form 2028 directly to U.S. Army TACOM Life Cycle Management Command. The postal mail address is U.S. Army TACOM Life Cycle Management Command, ATTN: AMSTA-LCL-MPP / TECH PUBS, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is tacomlmc.daform2028@us.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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TABLE OF CONTENTS

	Page No.
	<u>WP Sequence No.</u>
HOW TO USE THIS MANUAL	
CHAPTER 1 — GENERAL INFORMATION, EQUIPMENT DESCRIPTION AND THEORY OF OPERATION	
General Information	WP 0001
Equipment Description and Data	WP 0002
Figure 1. Major Components	WP 0002-2
Theory of Operation	WP 0003

TABLE OF CONTENTS - Continued

	Page No.
	<u>WP Sequence No.</u>
CHAPTER 2 — FIELD TROUBLESHOOTING PROCEDURES	
Troubleshooting Procedures	WP 0004
CHAPTER 3 — FIELD MAINTENANCE INSTRUCTIONS	
Service Upon Receipt	WP 0005
Table 1. Service Upon Receipt of Materiel	WP 0005-1
Preventive Maintenance Checks and Services (PMCS) Introduction	WP 0006
Preventive Maintenance Checks and Services (PMCS), Including Lubrication Instructions.....	WP 0007
Table 1. Preventive Maintenance Checks and Services for Cannon Bore Erosion Gage Set	WP 0007-1
Operating Procedures	WP 0008
Figure 1. Establishment of Zero Measurement	WP 0008-1
Figure 2. Change of Measurement on Dial Face	WP 0008-2
Figure 3. Insertion of Dial Bore Gage into Cannon Tube	WP 0008-3
Figure 4. Measurement of Inside Diameter	WP 0008-3
Dial Bore Gage, 60mm, 81mm, 120mm Maintenance	WP 0009
Figure 1. Disassembly/Assembly of Dial Bore Gage	WP 0009-1
Inspection Gage Set Maintenance	WP 0010
Figure 1. Disassembly/Assembly of Inspection Gage Set	WP 0010-1
CHAPTER 4 — PARTS INFORMATION	
Introduction to Repair Parts and Special Tools List (RPSTL)	WP 0011
Table 1. SMR Code Explanation	WP 0011-2
Cannon Bore Erosion Gage Set 12901228 Repair Parts List	WP 0012
Figure 1. Cannon Bore Erosion Gage Set 12901228	WP 0012-2
Figure 2. Connecting Rod Gage 12901325	WP 0012-4
Figure 3. Dial Bore Gage 12901220	WP 0012-6
Figure 4. Dial Indicating Depth Gage 12901222	WP 0012-8
Figure 5. Inspection Gage Set 12901281	WP 0012-10
National Stock Number Index	WP 0013
Part Number Index	WP 0014
CHAPTER 5 — SUPPORTING INFORMATION	
References	WP 0015
Maintenance Allocation Chart (MAC) Introduction	WP 0016
Maintenance Allocation Chart (MAC)	WP 0017
Table 1. MAC for Cannon Bore Erosion Gage Set	WP 0017-1
Table 2. Tools and Test Equipment for Cannon Bore Erosion Gage Set	WP 0017-1
Table 3. Remarks for Cannon Bore Erosion Gage Set	WP 0017-2
Expendable and Durable Items List	WP 0018
Table 1. Expendable and Durable Items List	WP 0018-1

Index

HOW TO USE THIS MANUAL

The safest, easiest, and best way to maintain the Cannon Bore Erosion Gage Set is to use this manual. Learning to use this technical manual (TM) is as easy as reading through the next few pages of this section. Knowing what is in this manual and how to use it will save you time and work and will help you to avoid exposing yourself to unnecessary hazards while performing your job.

So where do you start?

Right here, if this is the first time you are using this TM. Be sure to completely read this section on how to use this manual first. There's a lot of information here that you need to know.

Organization

This manual covers the maintenance of the gage set. The manual itself is divided into five chapters. Chapters are divided into Work Packages. The five chapters, and what they contain, are found in the Table of Contents in the front of this manual. For example, to learn about field maintenance of the gage set, you would look in the table of contents and discover that Chapter 3 provides all pertinent information about the field maintenance of the weapon. Since Chapter 3 covers a great deal of information, you will have to scan the chapter to find the specific information you will need.

In the final chapter of this manual, you will find supporting information. Each work package provides specific information that will assist you in performing the various operational tasks. The work packages provide such information as additional references (i.e., other TMs or FMs), as in WP 0015, and Maintenance Allocation Chart (MAC), as in WP 0017. Others provide information unique to the needs of the weapon. Become familiar with all supporting information before beginning any maintenance task.

Am I ready to use this TM?

If you've taken the time necessary to read this section, and are sure of the location and arrangement of the different sections of this TM, you are ready to begin. Remember, this TM has been arranged with you, the user, in mind. Your safety and ability to perform the maintenance tasks in the most efficient manner hinge on your ability to perform and understand the information contained in this manual. If you fully understand the arrangement and purpose of this TM, and have taken the time to read through this section, you will have no trouble maintaining this weapon in the manner for which it was designed.

CHAPTER 1

**GENERAL INFORMATION,
EQUIPMENT DESCRIPTION,
AND THEORY OF OPERATION
FOR
CANNON BORE EROSION GAGE SET**

FIELD MAINTENANCE
GENERAL INFORMATION

SCOPE

Type of Manual. Field maintenance manual.

Model Number and Equipment Name. Cannon Bore Erosion Gage Set.

Purpose of Equipment. The purpose of the cannon bore erosion gage set is to provide cannon tube inside diameter measurements for 60mm, 81mm, and 120mm mortars. Measurements determine the continued usability of the cannon tube.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your cannon bore erosion gage set 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. If you have Internet access, the easiest and fastest way to report problems or suggestions is to go to <https://aeps.ria.army.mil/aepspublic.cfm> (scroll down and choose the "Submit Quality Deficiency Report" bar). The Internet form lets you choose to submit an Equipment Improvement Recommendation (EIR), a Product Quality Deficiency Report (PQDR), or a Warranty Claim Action (WCA). You may also submit your information using an SF 368 (Product Quality Deficiency Report). You can send your SF 368 via e-mail, regular mail, or facsimile using the addresses/facsimile numbers specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual. We will send you a reply.

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.

Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation of metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is the rusting of iron. Corrosion damage in metals can be seen, depending on the metal, as tarnishing, pitting, fogging, surface residue, and/or cracking.

Plastics, composites, and rubbers can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), solvation (solvents), or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling, and/or breaking.

If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion", "rust", "deterioration", or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Procedures and materials used for the destruction of the cannon bore erosion gage set in order to prevent enemy use will be found in TM 750-244-7.

PREPARATION FOR STORAGE OR SHIPMENT

Storage of the cannon bore erosion set will be in accordance with instructions contained in SB 740-95-1.

NOMENCLATURE CROSS-REFERENCE LIST

<u>Common Name</u>	<u>Official Nomenclature</u>
Dial Bore Gage, 60mm, 81mm, 120mm	Connecting Rod Gage
Dial Unit Assembly	Dial Indicating Depth Gage
Extension Housing Assembly	Straight Shaft
Extension Housing Assembly	Rod Connecting Gage
Gaging Head Assembly	Indicating Gage
Head Extension	Threaded Standoff

LIST OF ABBREVIATIONS/ACRONYMS**Abbreviation/Acronym**

CPC	Corrosion Prevention and Control
EIR	Equipment Improvement Recommendation
ID	Inside diameter
PQDR	Product Quality Deficiency Report
SF	Standard Form
WCA	Warranty Claim Action

QUALITY OF MATERIAL

Material used for replacement, repair, or modification must meet the requirements of this TM 9-4933-274-23&P. If quality of material requirements is not stated in this TM 9-4933-274-23&P, the material must meet the requirements of the drawings, standards, specifications, or approved engineering change proposals applicable to the subject equipment.

END OF WORK PACKAGE

FIELD MAINTENANCE
EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The cannon bore erosion gage set is used for the dimensional inspection of the inside diameter of the cannon tubes for the 60mm, 81mm, and 120mm mortars. A head extension for each mortar is included in the gage set. The head extension secures the dial bore gage at the desired position in the inspection gage set.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

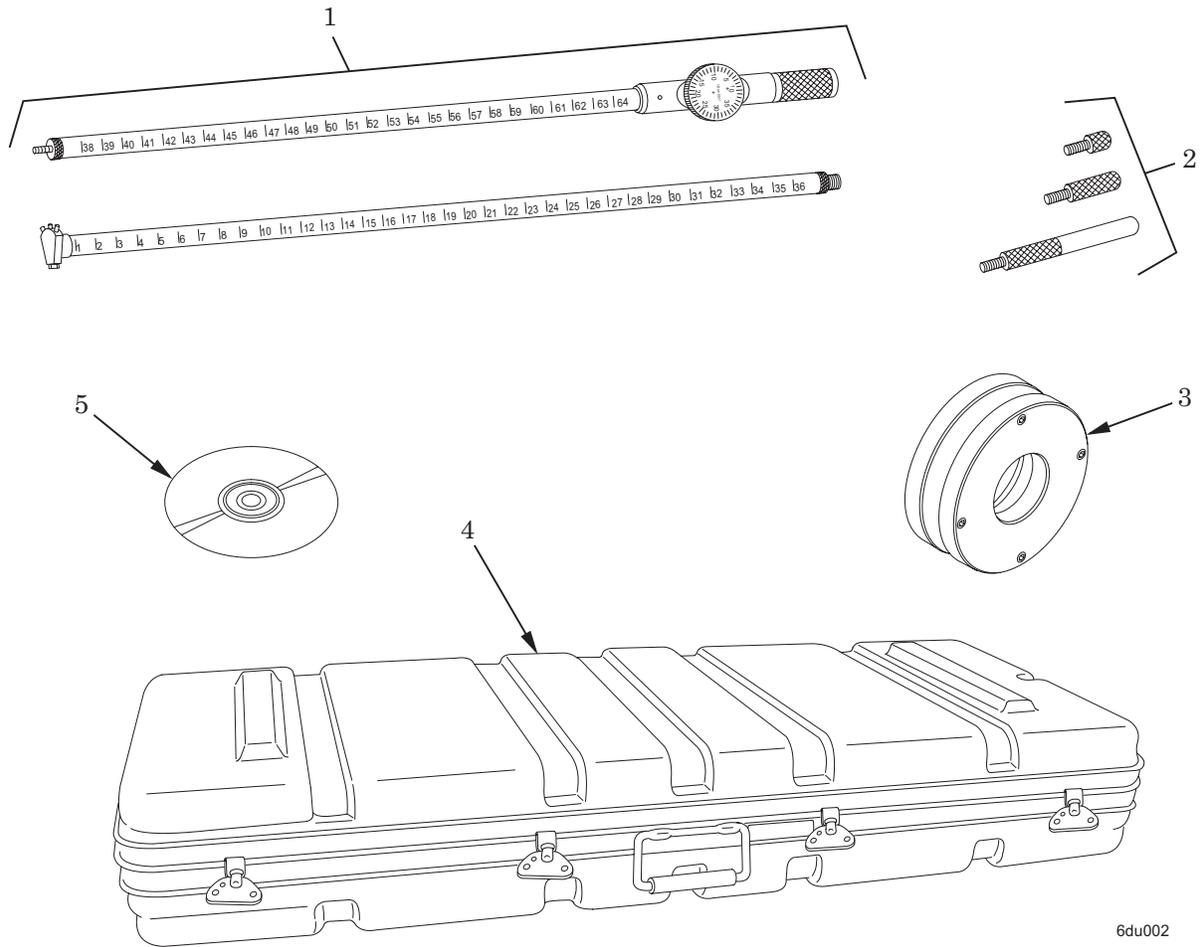


Figure 1. Major Components.

Dial Bore Gage (1). Includes extension housing with dial unit assembly and second extension housing with gaging head assembly.

Head Extensions (2). Three head extensions provide stability for the dial bore gage according to mortar diameter.

Inspection Gage Set (3). Provides a guide for obtaining a reading of "0" on the dial unit assembly.

Shipping and Storage Container (4). Protects cannon bore erosion gage set parts during shipping and storage.

DVD (5). Provides instruction for use and maintenance of cannon bore erosion gage set. If DVD is lost or damaged, contact item manager for replacement DVD.

EQUIPMENT DATA

PHYSICAL CHARACTERISTICS

Weight (without container) 18.5 lb (8.4 kg)
Weight (with container)..... 33.5 lb (15.2 kg)
Length (assembly) 73.97 in. (187.88 cm)
Container dimensions..... 45.5 in. x 14.25 in. x 7.4 in. (115.6 cm x 36.2 cm x 18.8 cm)

END OF WORK PACKAGE

FIELD MAINTENANCE**THEORY OF OPERATION**

THEORY

After selection of the appropriate head extension for the cannon tube to be inspected, the extension is installed to the gaging head assembly. The dial bore gage is positioned in the inspection gage set and moved back and forth until the lowest reading can be established. The "0" marking on the dial unit assembly is moved to align with this lowest reading. The dial bore gage is removed from the inspection gage set and is inserted into the cannon tube, using the marked graduations to identify specific locations within the length of the cannon tube. The dial unit assembly is used to measure the inside diameter of the cannon tube.

END OF WORK PACKAGE

CHAPTER 2

FIELD
TROUBLESHOOTING PROCEDURES
FOR
CANNON BORE EROSION GAGE SET

**FIELD MAINTENANCE
TROUBLESHOOTING PROCEDURES**

TROUBLESHOOTING PROCEDURES

There are no required procedures for field troubleshooting.

END OF WORK PACKAGE

CHAPTER 3

**FIELD
MAINTENANCE INSTRUCTIONS
FOR
CANNON BORE EROSION GAGE SET**

FIELD MAINTENANCE
SERVICE UPON RECEIPT

INITIAL SETUP:

Materials/Parts

General purpose lubricating oil (GPL) (WP 0018, item 1)

References

DA PAM 750-8

SF 361

WP 0008

GENERAL

This work package contains instructions for services to be performed by the using organization upon receipt of a new or overhauled cannon bore erosion gage set. These services include unpacking, reprocessing, and checking gage set.

SERVICE UPON RECEIPT OF MATERIEL

Checking Unpacked Equipment

Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 361, Transportation Discrepancy Report.

Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions (e.g., for Army instructions, see DA PAM 750-8).

Check to see whether the equipment has been modified.

Table 1. Service upon Receipt of Materiel.

Location	Item	Action	Remarks
1. Container	Dial Bore Gage	Remove dial bore gage from container. Inspect for burrs and rust. Apply light film of GPL (WP 0018, item 1) to threads of extension housing assemblies.	Reject if burrs or rust are present on working surfaces.
2. Cannon Bore Erosion Gage Set	a. Extension Housing Assemblies	Inspect for bent, rusty, or damaged extension housing assembly.	Reject if extension housing assembly is bent, markings are illegible, or threads are damaged.
	b. Inspection Gage Set	Ensure calibration document is present and indicates that calibration is current.	If calibration is not current, calibrate as required.

SERVICE UPON RECEIPT OF MATERIEL - Continued

Checking Unpacked Equipment - Continued

Table 1. Service upon Receipt of Materiel - Continued.

Location	Item	Action	Remarks
2. Cannon Bore Erosion Gage Set (Cont)	b. Inspection Gage Set (Cont)	Inspect inspection gage set for burrs, rust, and deformation.	Reject if burrs, rust, or deformation is evident.

END OF TASK

INSTALLATION INSTRUCTIONS

See WP 0008.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION
GENERAL, EXPLANATION OF COLUMN ENTRIES**

GENERAL

Preventive Maintenance Checks and Services (PMCS) (WP 0007) must be performed by field maintenance personnel to be sure the Cannon Bore Erosion Gage Set is in good operating condition and ready for its primary mission.

To ensure maximum operational readiness, it is necessary that the gage set be inspected at regular intervals so that any defects can be discovered and corrected before serious damage or failure occurs.

EXPLANATION OF COLUMN ENTRIES

Item No. Column. Checks and services are numbered in disassembly sequence. This column shall be used as a source of item numbers for the "TM Number" column on DA Form 5988-E, Equipment Inspection and Maintenance Worksheet - Electronic, or DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

Interval Column. This column gives the designated interval when each check is to be performed.

Man-Hour Column. This column indicates the amount of time required to perform the check or service.

Item To Be Checked or Serviced Column. This column lists the items to be checked or serviced.

Procedure Column. This column contains a brief description of the procedure by which the check is to be performed. It contains all the information required to accomplish the checks and services.

Equipment Not Ready/Available If: Column. This column contains a brief statement of the condition (e.g., malfunction, deficiency) that would cause the covered equipment to be unavailable to perform its assigned mission.

END OF WORK PACKAGE

FIELD MAINTENANCE

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS),
INCLUDING LUBRICATION INSTRUCTIONS

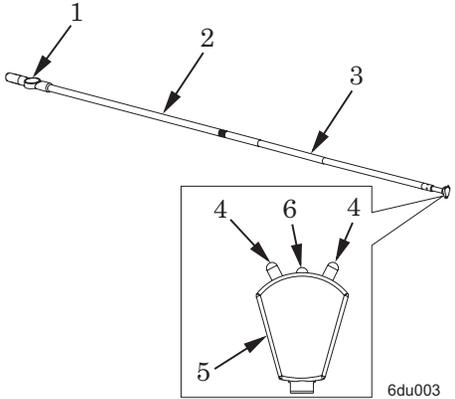
INITIAL SETUP:

Materials/Parts

General purpose lubricating oil (GPL) (WP 0018, item 1)

PMCS PROCEDURES

Table 1. Preventive Maintenance Checks and Services for
Cannon Bore Erosion Gage Set.

Item No.	Interval	Man-Hour	Item To Be Checked or Serviced	Procedure	Equipment Not Ready/Available If:
1	Before		Dial Bore Gage	 <p>6du003</p> <ol style="list-style-type: none"> Inspect for rust and illegible markings on extension housing assembly (2) and extension housing assembly (3). Inspect face of dial unit assembly (1) for illegible markings. Visually inspect extension housing assemblies (2 and 3) for condition of internal and external threads. 	<ol style="list-style-type: none"> Markings are illegible or surface of extension housing assembly has rust present. Markings are illegible. Internal or external threads are damaged.

PMCS PROCEDURES - Continued

Table 1. Preventive Maintenance Checks and Services for Cannon Bore Erosion Gage Set - Continued.

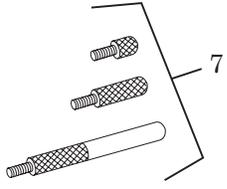
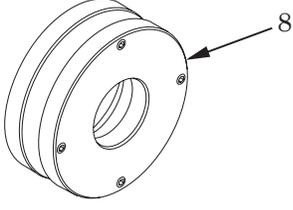
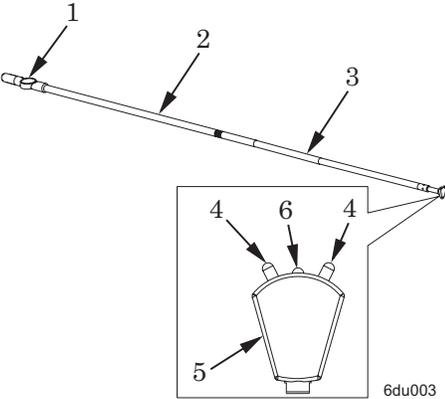
Item No.	Interval	Man-Hour	Item To Be Checked or Serviced	Procedure	Equipment Not Ready/Available If:
1 (Cont)	Before (Cont)		Dial Bore Gage (Cont)	d. Check for loose or missing parts. e. Inspect gaging head assembly (5) for spring movement of two centering contacts (4). f. Assemble extension housing assembly (2) and extension housing assembly (3). Push down on measuring contact (6) and ensure that needle on dial unit face moves and makes one complete revolution.	d. Parts are loose or missing. e. Centering contacts do not move under spring tension. f. Needle on dial unit face does not make complete revolution.
2	Before		Head Extensions	 <p>6du004</p> <p>Inspect for rust or burrs and damaged threads on head extensions (7).</p>	<p>Threads are damaged, or rust or burrs are present.</p>
3	Before		Inspection Gage Set	 <p>6du005</p> <p>a. Check for burrs or rust on measuring surfaces of inspection gage set (8).</p>	<p>a. Burrs or rust are present on measuring surfaces.</p>

Table 1. Preventive Maintenance Checks and Services for Cannon Bore Erosion Gage Set - Continued.

Item No.	Interval	Man-Hour	Item To Be Checked or Serviced	Procedure	Equipment Not Ready/Available If:
3 (Cont)	Before (Cont)		Inspection Gage Set (Cont)	b. Check for loose or missing parts. c. Check for presence of calibration document and indication of current date.	b. Parts are loose or missing. c. Calibration is not current.
4	Before		Shipping and Storage Container	a. Inspect container shell, latches, handle, and gasket for damage. b. Inspect polyethylene foam cushioning for tears.	a. Container exhibits damage which limits serviceability. b. Cushioning exhibits tears which prohibit secure placement of components.
5	Semi-annually		Dial Bore Gage	 <p>6du003</p> a. Inspect for rust and illegible markings on extension housing assembly (2) and extension housing assembly (3). b. Inspect face of dial unit assembly (1) for illegible markings.	a. Markings are illegible or surface of extension housing assembly has rust present. b. Markings are illegible.

PMCS PROCEDURES - Continued

Table 1. Preventive Maintenance Checks and Services for Cannon Bore Erosion Gage Set - Continued.

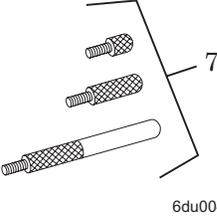
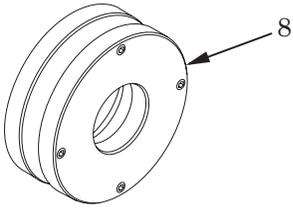
Item No.	Interval	Man-Hour	Item To Be Checked or Serviced	Procedure	Equipment Not Ready/Available If:
5 (Cont)	Semi-annually (Cont)		Dial Bore Gage (Cont)	c. Visually inspect extension housing assemblies (2 and 3) for condition of internal and external threads. d. Check for loose or missing parts. e. Inspect gaging head assembly (5) for spring movement of two centering contacts (4). f. Assemble extension housing assembly (2) and extension housing assembly (3). Push down on measuring contact (6) and ensure that needle on dial unit face moves and makes one complete revolution.	c. Internal or external threads are damaged. d. Parts are loose or missing. e. Centering contacts do not move under spring tension. f. Needle on dial unit face does not make complete revolution.
6	Semi-annually		Head Extensions	 <p>Inspect for rust or burrs and damaged threads on head extensions (7).</p>	<p>Threads are damaged, or rust or burrs are present.</p>

Table 1. Preventive Maintenance Checks and Services for Cannon Bore Erosion Gage Set - Continued.

Item No.	Interval	Man-Hour	Item To Be Checked or Serviced	Procedure	Equipment Not Ready/Available If:
7	Semi-annually		Inspection Gage Set	 <p>6du005</p> <ul style="list-style-type: none"> a. Check for burrs or rust on measuring surfaces of inspection gage set (8). b. Check for loose or missing parts. c. Check for presence of calibration document and indication of current date. 	<ul style="list-style-type: none"> a. Burrs or rust are present on measuring surfaces. b. Parts are loose or missing. c. Calibration is not current.
8	Semi-annually		Shipping and Storage Container	<ul style="list-style-type: none"> a. Inspect container shell, latches, handle, and gasket for damage. b. Inspect polyethylene foam cushioning for tears. 	<ul style="list-style-type: none"> a. Container exhibits damage which limits serviceability. b. Cushioning exhibits tears which prohibit secure placement of components.

END OF TASK

LUBRICATION INSTRUCTIONS

Apply light film of GPL (WP 0018, item 1) to threads of extension housing assemblies and all exposed metal surfaces, including inspection gage set.

END OF TASK

END OF WORK PACKAGE

**FIELD MAINTENANCE
OPERATING PROCEDURES**

INITIAL SETUP:**References**

TM 9-1000-202-14

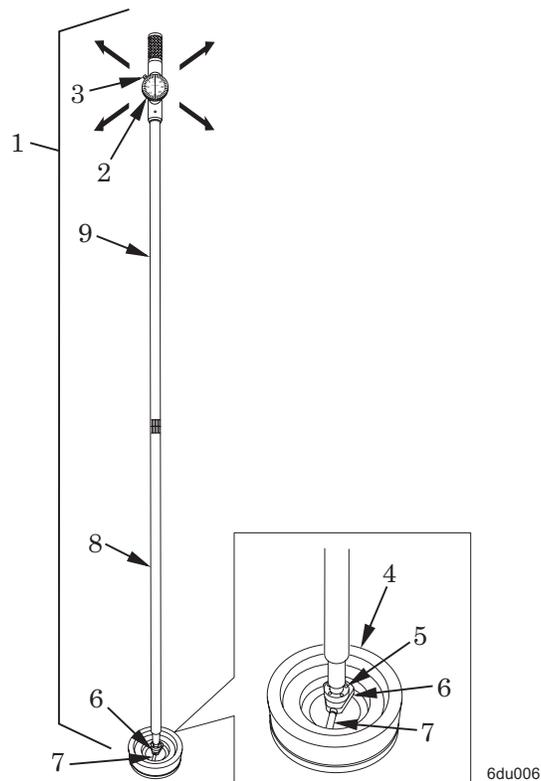
USE OF GAGE SET

Figure 1. Establishment of Zero Measurement.

1. Install extension housing assembly (Figure 1, item 8) to extension housing assembly (9) and hand tighten.

NOTE

81mm head extension is being shown as an example.

2. Choose head extension (7) appropriate to size of cannon tube to be inspected. Install head extension to gaging head assembly (6).
3. Place inspection gage set (4) on flat floor surface, with the smallest diameter down.
4. While tilting gaging head assembly (6) to depress two centering contacts (5), place gaging head assembly into appropriate diameter of inspection gage set (4).

USE OF GAGE SET - Continued

NOTE

When the dial bore gage is exactly perpendicular to the inspection gage set the gaging head assembly is measuring the true diameter. Moving the gage head through the inspection gage set establishes a reading and sets the gage to the inspection gage set diameter.

Measurements on face of dial bore gage are in 0.001 in. increments with a range of 0.000 in. to 0.040 in.

Smallest and largest measurements in illustrations are only examples.

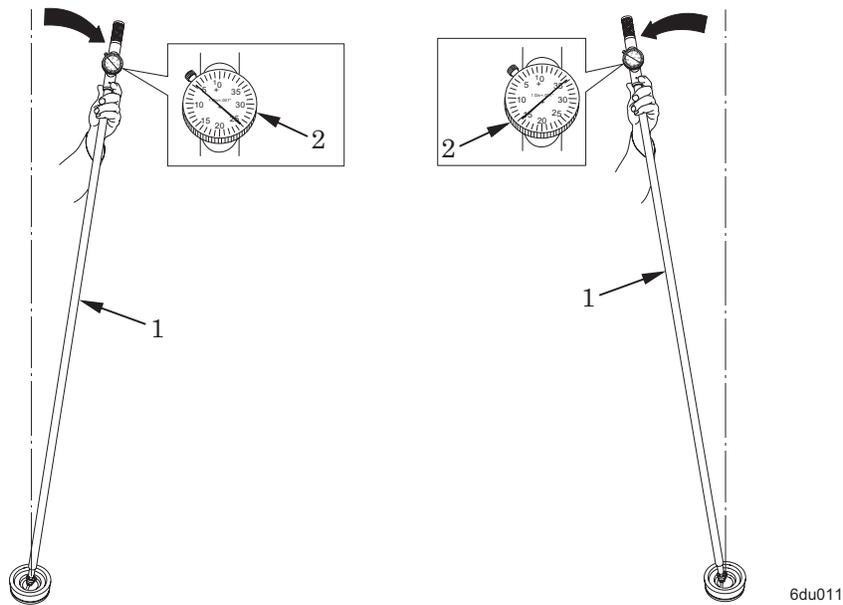


Figure 2. Change of Measurement on Dial Face.

5. Move the dial bore gage (Figure 2, item 1), pushing dial unit assembly (2) farther from user (5 to 7 degrees from vertical) and then pulling dial unit assembly closer to user (5 to 7 degrees from vertical). While making this motion, observe the motion of the indicator needle. As gage moves slowly from one position to another, the indicator needle will go from a large diameter reading through the smallest diameter reading back to a large diameter reading. The smallest diameter reading is the actual inspection gage set diameter.
6. To set the smallest reading on face of dial unit assembly (Figure 1, item 2), unlock face lock (3) and rotate face. Align "0" on face with position of indicator needle.
7. Repeat the movement several times, setting the face of dial unit assembly (2) to the smallest diameter. When certain of correct position, tighten face lock (3). Move dial bore gage (1) several times to ensure correct setting.
8. Remove dial bore gage (1) from inspection gage set (4).

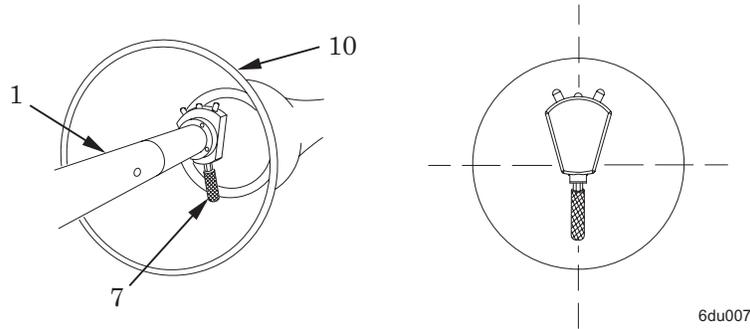


Figure 3. Insertion of Dial Bore Gage into Cannon Tube.

NOTE

False readings may occur if gaging head assembly is not vertical in cannon tube.

9. Insert dial bore gage (Figure 3, item 1) into cannon tube (10) of mortar, with head extension (7) down and centered vertically on inside of tube.
10. Push dial bore gage (1) into cannon tube (10) to measure inside diameter (ID). Observe graduations on dial bore gage to measure depth.

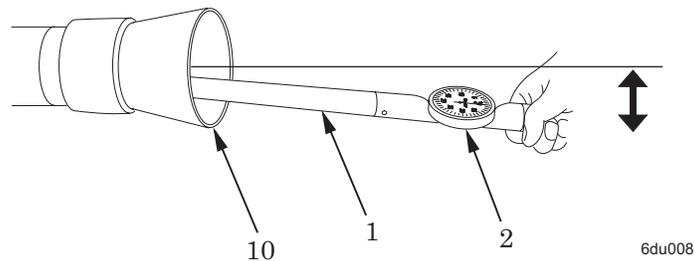


Figure 4. Measurement of Inside Diameter.

NOTE

Inside diameter measurement should be equal to or greater than the basic bore diameter of cannon tube. If a measurement less than the basic bore diameter is shown, inspect cannon tube for debris or fouling. Clean cannon tube and repeat measurements.

11. Lift and lower dial bore gage (Figure 4, item 1) while observing indicator needle of dial unit assembly (2). The smallest diameter reading is the actual ID of cannon tube (10).
12. Add measurement from dial unit assembly (2) to basic bore diameter of cannon. Refer to TM 9-1000-202-14, Evaluation of Cannon Tubes, for basic bore diameter of cannon.
13. Repeat measurements as required at different depths.
14. Refer to TM 9-1000-202-14 for condemnation criteria.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

DIAL BORE GAGE, 60MM, 81MM, 120MM MAINTENANCE
DISASSEMBLY, REPAIR OR REPLACEMENT, ASSEMBLY

INITIAL SETUP:

Tools and Special Tools

Small Arms Tool Kit (SC 9999-01-SKO)

References

WP 0012

DISASSEMBLY

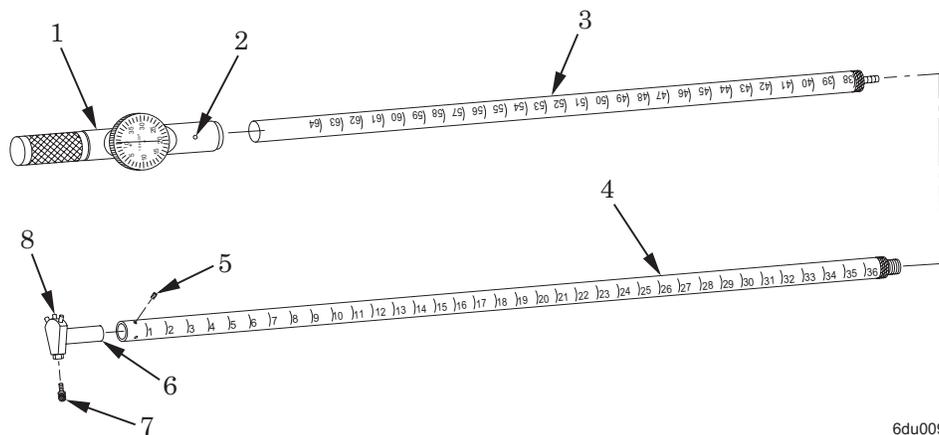


Figure 1. Disassembly/Assembly of Dial Bore Gage.

NOTE

Three head extensions are included in cannon bore erosion gage set to accommodate use in 60mm, 81mm, and 120mm mortars. The 60mm head extension is shown.

1. Remove head extension (Figure 1, item 7) from gaging head assembly (6).
2. Loosen two screws (5) and remove gaging head assembly (6) from extension housing assembly (4).
3. Remove extension housing assembly (4) from extension housing assembly (3).
4. Remove two setscrews (2) and remove dial unit assembly (1) from extension housing assembly (3).

END OF TASK

REPAIR OR REPLACEMENT

1. Inspect components for serviceability.
2. Replace defective parts as authorized by WP 0012.
3. If gaging head assembly is replaced, engrave or etch marking in 1/8 in. characters. Marking will read:
"1NUW7 – 12901221
MFR –".
4. If dial unit assembly is replaced, engrave or etch marking on flat surface underneath dial face in 1/8 in. characters. Marking will read:
"1NUW7 – 12901222
1NUW7 – ASSY – 12901325".
Also apply the serial number "1XXX" which matches the part that is being replaced.

END OF TASK**ASSEMBLY**

1. Install gaging head assembly (Figure 1, item 6) onto extension housing assembly (4) and tighten two screws (5).
2. Install extension housing assembly (4) onto extension housing assembly (3) and tighten, ensuring alignment of graduation markings.
3. Turn dial face until needle aligns with 0. Install two setscrews (2) but do not tighten. Install dial unit assembly (1) onto extension housing assembly (3) until needle begins to move. Ensure that dial face and graduation markings on extension housing assembly are aligned. Continue installation of dial unit assembly onto extension housing assembly. Observe rotation of needle for approximately 1-1/2 rotations. Ensuring no movement of dial unit assembly, fully tighten setscrews.
4. Select appropriate head extension (7) and install onto gaging head assembly (6).
5. Depress measuring contact (8) and ensure that needle on dial unit assembly rotates at least one complete revolution.

END OF TASK**END OF WORK PACKAGE**

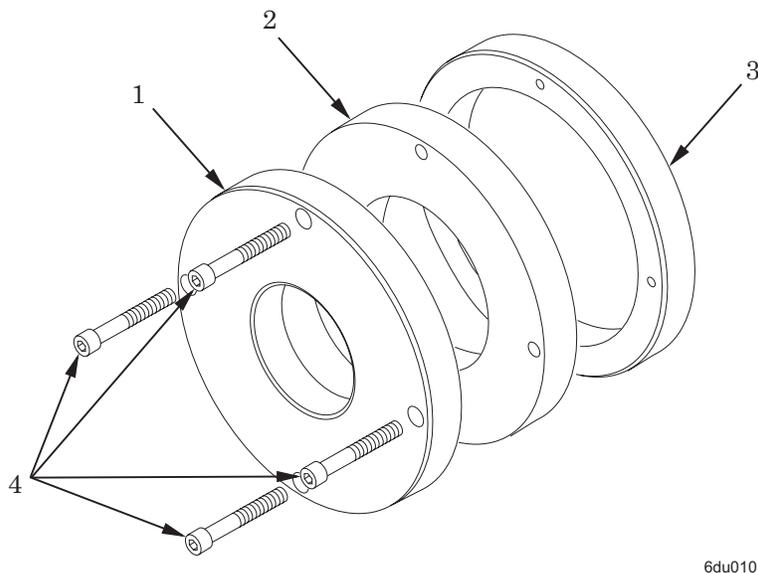
FIELD MAINTENANCE
INSPECTION GAGE SET MAINTENANCE
DISASSEMBLY, REPAIR OR REPLACEMENT, ASSEMBLY

INITIAL SETUP:**Tools and Special Tools**

Small Arms Tool Kit (SC 9999-01-SKO)

References

WP 0012

DISASSEMBLY

6du010

Figure 1. Disassembly/Assembly of Inspection Gage Set.

Remove four hexagon socket head capscrews (Figure 1, item 4) and carefully separate plain ring gage (3), plain ring gage (2), and plain ring gage (1).

END OF TASK**REPAIR OR REPLACEMENT**

1. Inspect three plain ring gages for burrs, rust, or other damage. Minor damage to external surfaces is acceptable.
2. Replace defective parts as authorized by WP 0012.

END OF TASK

ASSEMBLY

1. Assemble plain ring gage (Figure 1, item 1), plain ring gage (2), and plain ring gage (3).
2. Install four hexagon socket head capscrews (4) and tighten until heads of screws are flush with surface of plain ring gage (1).

NOTE

Check calibration document and calibrate as required.

END OF TASK**END OF WORK PACKAGE**

CHAPTER 4
PARTS INFORMATION
FOR
CANNON BORE EROSION GAGE SET

FIELD MAINTENANCE**INTRODUCTION TO REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)**

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 field maintenance of the Cannon Bore Erosion Gage Set. 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 work package, this RPSTL is divided into the following work packages.

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 at the end of the individual work packages. 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 are two cross-reference indexes work packages in this RPSTL: the National Stock Number (NSN) Index work package and the Part Number (P/N) Index work package. The National Stock Number Index work package refers you to the figure and item number. The Part Number Index work package refers you to the figure and item number.

Explanation of Columns in the Repair Parts List and Special Tools List Work Packages

ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

SMR CODE (Column (2)). The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout. This entry may be subdivided into 4 subentries, one for each service.

Explanation of Columns in the Repair Parts List and Special Tools List Work Packages - Continued

Table 1. SMR Code Explanation.

<u>Source Code</u>	<u>Maintenance Code</u>	<u>Recoverability Code</u>
—	—	—
xx	xx	x
—	—	—
1st two positions: How to get an item.	3rd position: Who can install, replace, or use the item.	4th position: Who can do complete repair* on the item.
		5th position: Who determines disposition action on unserviceable items.

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

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

Source Code

Application/Explanation

PA
PB
PC
PD
PE
PF
PG
PH
PR
PZ

NOTE

Items coded PC are subject to deterioration.

Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the third position of the SMR code.

KD
KF
KB

Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.

MF-Made at field
MH-Made at below depot/
sustainment level
ML-Made at SRA
MD-Made at depot
MG-Navy only

Items with these codes are not to be requisitioned/requested individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.

AF-Assembled by field AH-Assembled by below depot/ sustainment level AL-Assembled by SRA AD-Assembled by depot AG-Navy only	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the third position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA	Do not requisition an XA-coded item. Order the next higher assembly. (Refer to NOTE below.)
XB	If an item is not available from salvage, order it using the CAGEC and part number.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's part number.
XD	Item is not stocked. Order an XD-coded item through local purchase or 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.

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 level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to the following levels of maintenance:

Maintenance

<u>Code</u>	<u>Application/Explanation</u>
F -	Field maintenance can remove, replace, and use the item.
H -	Below Depot Sustainment maintenance can remove, replace, and use the item.
L -	Specialized repair activity can remove, replace, and use the item.
G -	Afloat and ashore intermediate maintenance can remove, replace, and use the item (Navy only).
K -	Contractor facility can remove, replace, and use the item.
Z -	Item is not authorized to be removed, replaced, or used at any maintenance level.
D -	Depot can remove, replace, and use the item.

Explanation of Columns in the Repair Parts List and Special Tools List Work Packages - Continued

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 level with the capability to do complete repair (perform all authorized repair functions).

NOTE

Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

Maintenance

Code

Application/Explanation

F -	Field is the lowest level that can do complete repair of the item.
H -	Below Depot Sustainment is the lowest level that can do complete repair of the item.
L -	Specialized repair activity is the lowest level that can do complete repair of the item.
D -	Depot is the lowest level that can do complete repair of the item.
G -	Both afloat and ashore intermediate levels are capable of complete repair of item. (Navy only)
K -	Complete repair is done at contractor facility.
Z -	Nonreparable. No repair is authorized.
B -	No repair is authorized. No parts or special tools are authorized for the maintenance of "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 shown in the fifth position of the SMR code as follows:

<u>Recoverability Code</u>	<u>Application/Explanation</u>
Z -	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
F -	Reparable item. When uneconomically repairable, condemn and dispose of the item at the field level.
H -	Reparable item. When uneconomically repairable, condemn and dispose of the item at the below depot sustainment level.
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot level.
L -	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
A -	Item requires special handling or condemnation procedures because of specific reasons (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.
G -	Field level repairable item. Condemn and dispose at either afloat or ashore intermediate levels. (Navy only)
K -	Reparable item. Condemnation and disposal to be performed at contractor facility.

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 five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity 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 part number from the number listed.

DESCRIPTION AND USABLE ON CODE (UOC) (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 of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.

Explanation of Columns in the Repair Parts List and Special Tools List Work Packages - Continued

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 work packages.

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 functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

Explanation of Cross-Reference Indexes Work Packages Format and Columns

1. National Stock Number (NSN) Index Work Package. NSNs in this index are listed in National Item Identification Number (NIIN) sequence.

STOCK NUMBER Column. This column lists the NSN in NIIN sequence. The NIIN consists of the last nine digits of the NSN. 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.

For example, if the NSN is 5385-01-574-1476, the NIIN is 01-574-1476.

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 list and special tools list work packages.

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 (P/N) Index Work Package. Part numbers in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

PART NUMBER Column. Indicates the part number assigned to the item.

FIG. Column. This column lists the number of the figure where the item is identified/located in the repair parts list and special tools list work packages.

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

Special Information

UOC. The UOC 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 first line under the applicable item/nomenclature. Uncoded items are applicable to all models.

Fabrication Instructions. Bulk materials required to manufacture items are listed in the bulk material functional group of this RPSTL. Part numbers for bulk materials are also referenced in the Description Column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in the appropriate maintenance work packages of this manual.

Index Numbers. Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the NSN / Part Number (P/N) Index work packages and the bulk material list in the repair parts list work package.

How To Locate Repair Parts

1. When NSNs or Part Numbers 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 Part Number Is Known.

First. If you have the part number and not the NSN, look in the PART NUMBER column of the part number index work package. Identify the figure and item number.

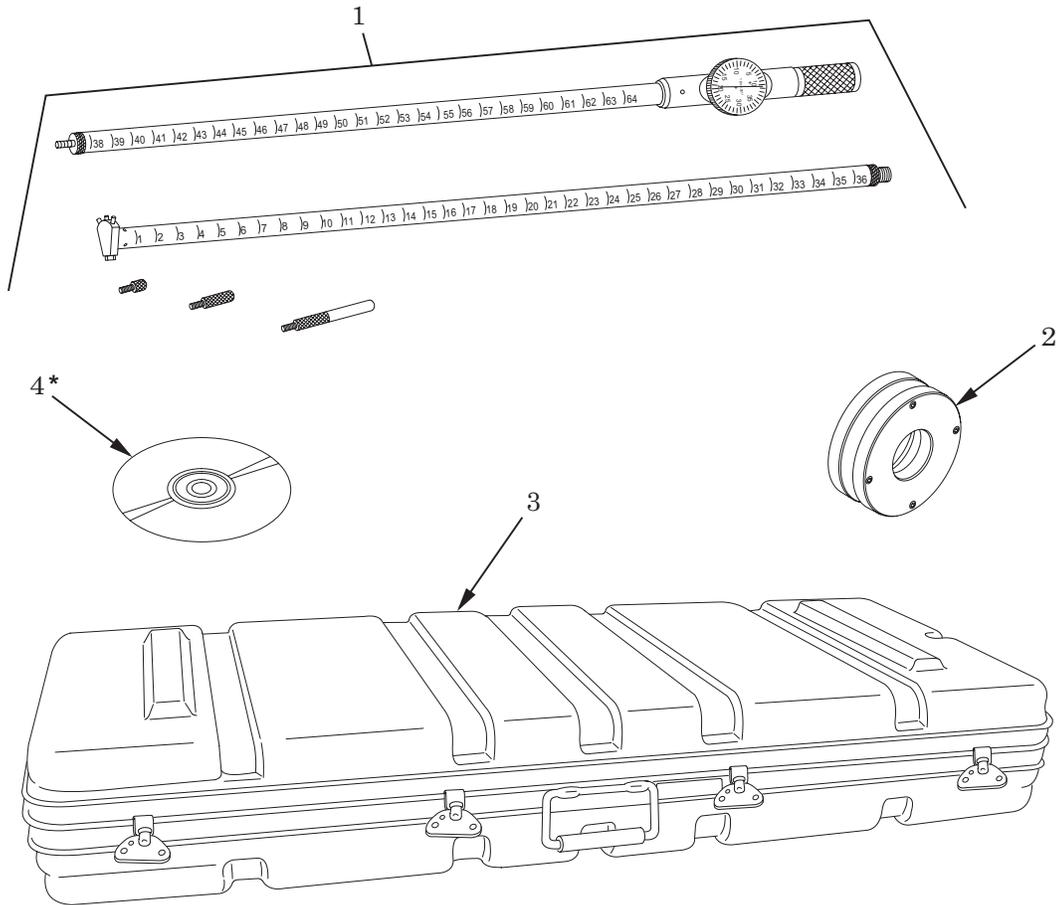
Second. Look up the item on the figure in the applicable repair parts list work package.

END OF WORK PACKAGE

FIELD MAINTENANCE

CANNON BORE EROSION GAGE SET 12901228

REPAIR PARTS LIST

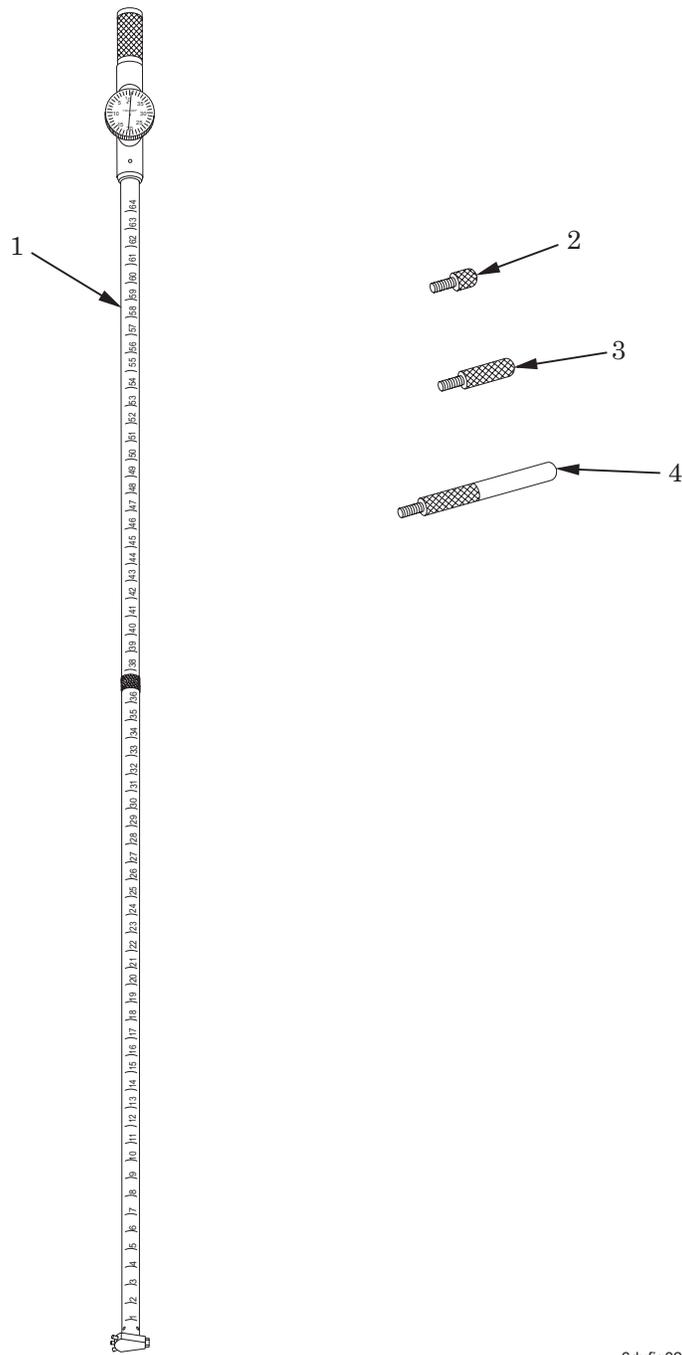


*** NOTE**
For replacement of
DVD, see instruction
in WP 0002.

6dufig01

Figure 1. Cannon Bore Erosion Gage Set 12901228.

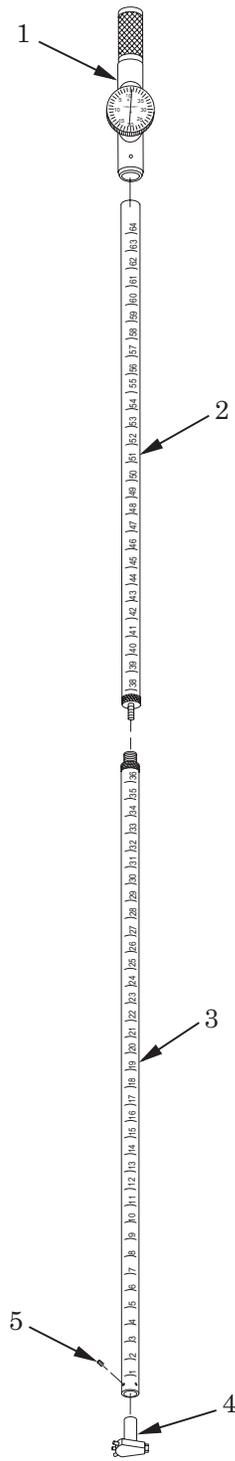
(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 00	
					FIG. 1 CANNON BORE EROSION GAGE SET 12901228	
1	PAFFF	5210-01-560-3403	1NUW7	12901325	GAGE, CONNECTING ROD (FOR ASSY BREAKDOWN SEE FIG. 2).....	1
2	PEFFF	5280-01-560-3404	1NUW7	12901281	GAGE SET, INSPECTION (FOR ASSY BREAKDOWN SEE FIG. 5).....	1
3	PAFZZ	8145-01-560-3411	1NUW7	11581897	SHIPPING AND STORAGE CONTAINER	1
					END OF FIGURE	



6dufig02

Figure 2. Connecting Rod Gauge 12901325.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 01	
					FIG. 2 CONNECTING ROD GAGE 12901325	
1	XAFFF		1NUW7	12901220	GAGE, DIAL BORE (FOR ASSY BREAKDOWN SEE FIG. 3).....	1
2	PAFZZ	5340-01-560-3413	1NUW7	12901223	STANDOFF, THREADED (60MM).....	1
3	PAFZZ	5340-01-560-3406	1NUW7	12901224	STANDOFF, THREADED (81MM).....	1
4	PAFZZ	5340-01-560-3410	1NUW7	12901225	STANDOFF, THREADED (120MM)....	1
					END OF FIGURE	



6dufig03

Figure 3. Dial Bore Gage 12901220.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0101	
					FIG. 3 DIAL BORE GAGE 12901220	
1	PAFFF	5210-01-560-3402	1NUW7	12901222	GAGE, DEPTH, DIAL IND (FOR ASSY BREAKDOWN SEE FIG. 4).....	1
2	PAFZZ	3040-01-560-3401	1NUW7	12901226	SHAFT, STRAIGHT (30 IN.)	1
3	PAFZZ	5210-01-560-3409	1NUW7	12901227	GAGE, CONNECTING, ROD (34 IN.).....	1
4	PAFFF	5210-01-560-3412	1NUW7	12901221	GAGE, INDICATING, INT	1
5	PAFZZ	5305-01-573-9380	1NUW7	12901355	SCREW, SET	2
					END OF FIGURE	

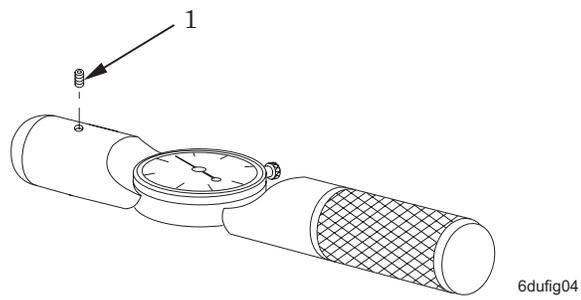
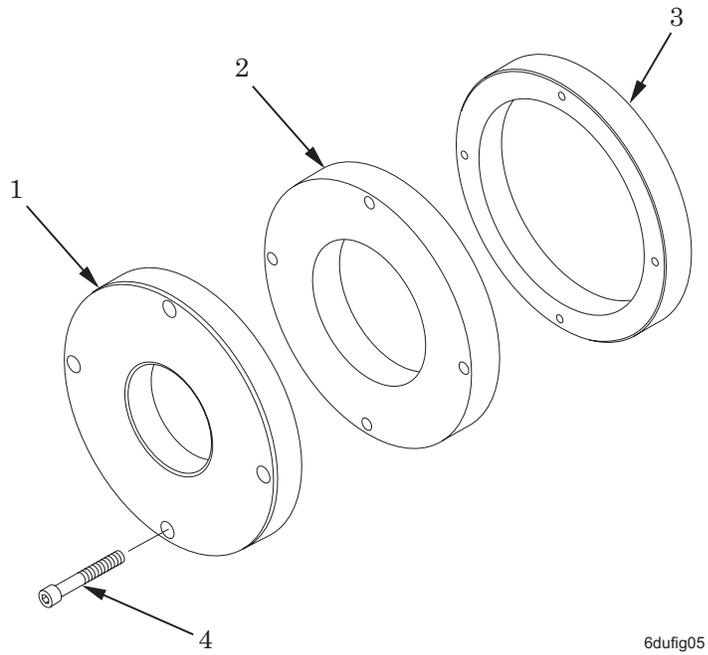


Figure 4. Dial Indicating Depth Gage 12901222.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 010101	
					FIG. 4 DIAL INDICATING DEPTH GAGE 12901222	
1	PAFZZ		07BY4	91375A555	SCREW, SET	2

END OF FIGURE



6dufig05

Figure 5. Inspection Gage Set 12901281.

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC) GROUP 02	(7) QTY
					FIG. 5 INSPECTION GAGE SET 12901281	
1	PAFZZ	5220-01-567-7314	1NUW7	12901328-1	GAGE, RING, PLAIN, DIA. 2.3930.....	1
2	PAFZZ	5220-01-567-7316	1NUW7	12901328-2	GAGE, RING, PLAIN, DIA. 3.2050.....	1
3	PAFZZ	5220-01-567-7317	1NUW7	12901328-3	GAGE, RING, PLAIN, DIA. 4.7470.....	1
4	PAFZZ		80205	ANSI B18.3- .250-20 UNC- 1.872	SCREW, CAP, HEXAGON H.....	4
					END OF FIGURE	

FIELD MAINTENANCE
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
3040-01-560-3401	3	2			
5210-01-560-3402	3	1			
5210-01-560-3403	1	1			
5280-01-560-3404	1	2			
5340-01-560-3406	2	3			
5210-01-560-3409	3	3			
5340-01-560-3410	2	4			
8145-01-560-3411	1	3			
5210-01-560-3412	3	4			
5340-01-560-3413	2	2			
5220-01-567-7314	5	1			
5220-01-567-7316	5	2			
5220-01-567-7317	5	3			
5305-01-573-9380	3	2			

END OF WORK PACKAGE

FIELD MAINTENANCE**PART NUMBER INDEX**

PART NUMBER	FIG.	ITEM	PART NUMBER	FIG.	ITEM
ANSI B-18.3-.250-20 UNC-1.872	5	4	12901328-1	5	1
11581897	1	3	12901328-2	5	2
12901220	2	1	12901328-3	5	3
12901221	3	4	12901355	3	2
12901222	3	1	91375A555	4	1
12901223	2	2			
12901224	2	3			
12901225	2	4			
12901226	3	2			
12901227	3	3			
12901281	1	2			
12901325	1	1			

END OF WORK PACKAGE

CHAPTER 5
SUPPORTING INFORMATION
FOR
CANNON BORE EROSION GAGE SET

FIELD MAINTENANCE**MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION**

INTRODUCTION**The Army Maintenance System MAC**

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

This MAC (immediately following the introduction) 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 shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Field - Includes two subcolumns, Crew (C) and Maintainer (F).

Sustainment - Includes two subcolumns, Below Depot (H) and Depot (D).

The maintenance to be performed at field and sustainment levels is described as follows:

1. Crew maintenance. The responsibility of a using organization to perform maintenance on its assigned equipment. It normally consists of inspecting, servicing, lubricating, adjusting, and replacing parts, minor assemblies, and subassemblies. The replace function for this level of maintenance is indicated by the letter "C" in the third position of the SMR code. A "C" appearing in the fourth position of the SMR code indicates complete repair is possible at the crew maintenance level.
2. Maintainer maintenance. Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter "F" appearing in the third position of the SMR code. An "F" appearing in the fourth position of the SMR code indicates complete repair is possible at the field maintenance level. Items are returned to the user after maintenance is performed at this level.
3. Below depot sustainment. Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter "H" appearing in the third position of the SMR code. An "H" appearing in the fourth position of the SMR code indicates complete repair is possible at the below depot sustainment maintenance level. Items are returned to the supply system after maintenance is performed at this level.
4. Depot sustainment. Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter "D" or "K" appearing in the third position of the SMR code. Depot sustainment maintenance can be performed by either depot personnel or contractor personnel. A "D" or "K" appearing in the fourth position of the SMR code indicates complete repair is possible at the depot sustainment maintenance level. Items are returned to the supply system after maintenance is performed at this level.

The tools and test equipment requirements table (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 Army Maintenance System MAC - Continued

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

Maintenance Functions

Maintenance functions are 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). This includes scheduled inspection and gaugings and evaluation of cannon tubes.
2. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.
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. This includes scheduled exercising and purging of recoil mechanisms. The following are examples of service functions:
 - a. **Unpack.** To remove from packing box for service or when required for the performance of maintenance operations.
 - b. **Repack.** To return item to packing box after service and other maintenance operations.
 - c. **Clean.** To rid the item of contamination.
 - d. **Touch up.** To spot paint scratched or blistered surfaces.
 - e. **Mark.** To restore obliterated identification.
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 of 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. **Paint (ammunition only).** To prepare and spray color coats of paint so that the ammunition can be identified and protected. The color indicating primary use is applied, preferably, to the entire exterior surface as the background color of the item. Other markings are to be repainted as original so as to retain proper ammunition identification.

9. **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 third position code of the Source, Maintenance and Recoverability (SMR) code.
10. **Repair.** The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions 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 (i.e., identified as maintenance significant).

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

11. **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. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
12. **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 materiel 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 (FGC) numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

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

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

Explanation of Columns in the MAC - Continued

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 manhours 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 varies 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 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 MAC. The symbol designations for the various maintenance levels are as follows:

Field:

- C - Crew maintenance
- F - Maintainer maintenance

Sustainment:

- L - Specialized Repair Activity (SRA)
- H - Below depot 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 of 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 Equipment Reference Code. Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

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

Explanation of Columns in the Tools and Test Equipment Requirements

Column (1) - Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

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.

Column (4) - National Stock Number (NSN). The NSN of the tool or test equipment.

Column (5) - Tool Number. The manufacturer's part number.

Explanation of Columns in the Remarks

Column (1) - Remarks Code. The code recorded in column (6) of the MAC.

Column (2) - Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

FIELD MAINTENANCE
MAINTENANCE ALLOCATION CHART (MAC)

MAINTENANCE ALLOCATION CHART (MAC)

Table 1. MAC for Cannon Bore Erosion Gage Set.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
00	Cannon Bore Erosion Gage Set 12901228	Inspect		0.1				
		Remove/Install		0.1			1	
		Repair		0.3			1	
01	Connecting Rod Gage 12901325	Inspect		0.2				
		Repair		0.2			1	
0101	Dial Bore Gage 12901220	Inspect		0.2				
		Repair		0.5			1	
010101	Dial Indicating Depth Gage 12901222	Inspect		0.1				
		Remove/Install		0.1			1	
		Repair		0.3			1	
02	Inspection Gage Set 12901281	Inspect		0.1				
		Replace		0.1				
		Repair		0.2			1	
03	Shipping and Storage Container 11581897	Inspect		0.1				
		Replace		0.1				

Table 2. Tools and Test Equipment for Cannon Bore Erosion Gage Set.

(1) TOOL OR TEST EQUIPMENT REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER	(5) TOOL NUMBER
1	F	Small Arms Tool Kit	5180-01-506-8287	SC 9999-01-SKO

MAINTENANCE ALLOCATION CHART (MAC) - Continued**Table 3. Remarks for Cannon Bore Erosion Gage Set.**

REMARKS CODE	REMARKS
	Not Applicable.

END OF WORK PACKAGE

**FIELD MAINTENANCE
EXPENDABLE AND DURABLE ITEMS LIST**

INTRODUCTION

Scope

This work package lists expendable and durable items that you will need to operate and maintain the Cannon Bore Erosion Gage Set. This list 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); CTA 50-909, Field and Garrison Furnishings and Equipment; or CTA 8-100, Army Medical Department Expendable/Durable Items.

Explanation of Columns in the Expendable/Durable Items List

Column (1) Item No. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., Use general purpose lubricating oil (WP 0018, item 1)).

Column (2) Level. This column identifies the lowest level of maintenance that requires the listed item (C = Crew, F = Maintainer).

Column (3) National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) Item Name, Description, Part Number/(CAGEC). This column provides the other information you need to identify the item. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (5) U/I. Unit of Issue (U/I) code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

EXPENDABLE AND DURABLE ITEMS LIST

Table 1. Expendable and Durable Items List.

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER (NSN)	(4) ITEM NAME, DESCRIPTION, PART NUMBER/(CAGEC)	(5) U/I
1	F	9150-00-292-9687	LUBRICATING OIL, GENERAL PURPOSE (GPL) MIL-L-3150 (81349)	QT

END OF WORK PACKAGE

INDEX

<u>Subject</u>	<u>WP Sequence No. - Page No.</u>
A	
Abbreviation/Acronym	WP 0001-2
C	
Checking Unpacked Equipment	WP 0005-1
Corrosion Prevention and Control (CPC)	WP 0001-1
D	
Dial Bore Gage, 60mm, 81mm, 120mm Maintenance	
Assembly	WP 0009-2
Disassembly	WP 0009-1
Repair or Replacement	WP 0009-2
Destruction of Army Materiel to Prevent Enemy Use	WP 0001-2
E	
Equipment Characteristics, Capabilities, and Features	WP 0002-1
Equipment Data	WP 0002-3
Expendable and Durable Items List	WP 0018-1
Explanation of Column Entries - Preventive Maintenance Checks and Services (PMCS) Introduction	WP 0006-1
F	
Forms	WP 0015-1
G	
General Information	WP 0001-1
General - Preventive Maintenance Checks and Services (PMCS) Introduction	WP 0006-1
General - Service upon Receipt	WP 0005-1
H	
How To Use This Manual	iii
I	
Inspection Gage Set Maintenance	
Assembly	WP 0010-2
Disassembly	WP 0010-1
Repair or Replacement	WP 0010-1
Installation Instructions	WP 0005-2
Introduction to Repair Parts and Special Tools List (RPSTL)	WP 0011-1

INDEX - Continued

<u>Subject</u>	<u>WP Sequence No. - Page No.</u>
L	
List of Abbreviations/Acronyms	WP 0001-2
List of Effective Pages/Work Packages	A
Location and Description of Major Components	WP 0002-2
Lubrication Instructions	WP 0007-5
M	
Maintenance Allocation Chart (MAC)	WP 0017-1
Maintenance Allocation Chart (MAC) Introduction	WP 0016-1
Maintenance Forms, Records, and Reports	WP 0001-1
Miscellaneous Publications	WP 0015-1
N	
National Stock Number Index	WP 0013-1
Nomenclature Cross-Reference List	WP 0001-2
P	
Part Number Index	WP 0014-1
Physical Characteristics	WP 0002-3
PMCS Procedures	WP 0007-1
Preparation for Storage or Shipment	WP 0001-2
Preventive Maintenance Checks and Services (PMCS), Including Lubrication Instructions	WP 0007-1
Preventive Maintenance Checks and Services (PMCS) Introduction	WP 0006-1
Q	
Quality of Material	WP 0001-2
R	
References	WP 0015-1
Repair Parts and Special Tools List (RPSTL), Introduction	WP 0011-1
Repair Parts List	
Cannon Bore Erosion Gage Set	WP 0012-2
Connecting Rod Gage	WP 0012-4
Dial Bore Gage	WP 0012-6
Dial Indicating Depth Gage	WP 0012-8
Inspection Gage Set	WP 0012-10
Reporting Equipment Improvement Recommendations (EIR)	WP 0001-1

INDEX - Continued

<u>Subject</u>	<u>WP Sequence No. - Page No.</u>
S	
Scope - General Information	WP 0001-1
Scope - References	WP 0015-1
Service upon Receipt of Materiel	WP 0005-1
T	
Table of Contents	i
Technical Manuals	WP 0015-1
Theory - Theory of Operation	WP 0003-1
Troubleshooting Procedures	WP 0004-1
U	
Use of Gage Set	WP 0008-1

<p>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</p> <p>For use of this form, see AR 25-30; the proponent agency is ODISC4.</p>	<p>Use Part II (<i>reverse</i>) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).</p>	<p>DATE</p> <p>Date you filled out this form</p>
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<p>TO: (<i>Forward to proponent of publication or form</i>) (Include ZIP Code) U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630</p>	<p>FROM: (<i>Activity and location</i>) (Include ZIP Code)</p> <p>Your mailing address</p>
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PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER TM 9-4933-274-23&P	DATE 14 May 2010	TITLE Field Maint. Manual for Cannon Bore Erosion Gage Set
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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended changes, if possible).</i>
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1	0012-3			1		<p>This TM and the training DVD should be listed as part of this end item.</p> <div style="text-align: center; font-size: 4em; font-weight: bold; opacity: 0.5; transform: rotate(-15deg);"> SAMPLE </div>
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**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE Your Name	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE Your Signature
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TO: <i>(Forward direct to addressee listed in publication)</i> U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i> Your address	DATE Date you filled out this form
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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 9-4933-274-23&P	DATE 14 May 2010	TITLE Field Maint. Manual for Cannon Bore Erosion Gage Set
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

SAMPLE

TYPED NAME, GRADE OR TITLE Your Name	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE Your Signature
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<p>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</p> <p>For use of this form, see AR 25-30; the proponent agency is ODISC4.</p>	<p>Use Part II (<i>reverse</i>) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).</p>	<p>DATE</p>
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<p>TO: (<i>Forward to proponent of publication</i>) U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630</p>	<p>FROM: (<i>Activity and location</i>) (<i>Include ZIP Code</i>)</p>
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PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

<p>PUBLICATION/FORM NUMBER TM 9-4933-274-23&P</p>	<p>DATE 14 May 2010</p>	<p>TITLE Field Maint. Manual for Cannon Bore Erosion Gage Set</p>
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**Reference to line numbers within the paragraph or subparagraph.*

<p>TYPED NAME, GRADE OR TITLE</p>	<p>TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION</p>	<p>SIGNATURE</p>
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TO: <i>(Forward direct to addressee listed in publication)</i> U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MLL/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

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TO: <i>(Forward direct to addressee listed in publication)</i> U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS 1 Rock Island Arsenal, Rock Island, IL 61299-7630	FROM: <i>(Activity and location) (Include ZIP Code)</i>	DATE
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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

A handwritten signature in black ink that reads "Joyce E. Morrow". The signature is written in a cursive style with a large, stylized initial "J".

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
1011708

DISTRIBUTION: To be distributed in accordance with the Initial Distribution Number (IDN) 401259, requirements for TM 9-4933-274-23&P.

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meter = 0.3937 Inch
 1 Decimeter = 10 Centimeters = 3.94 Inches
 1 Meter = 10 Decimeters = 100 Centimeters
 = 1000 Millimeters = 39.37 Inches
 1 Dekameter = 10 Meters = 32.8 Feet
 1 Hectometer = 10 Dekameters = 328.08 Feet
 1 Kilometer = 10 Hectometers = 1000 Meters
 = 0.621 Mile = 3,280.8 Feet
 Millimeters = Inches times 25.4
 Inches = Millimeters divided by 25.4

WEIGHTS

1 Centigram = 10 Milligrams = 0.154 Grain
 1 Decigram = 10 Centigrams = 1.543 Grains
 1 Gram = 0.001 Kilogram = 10 Decigrams
 = 1000 Milligrams = 0.035 Ounce
 1 Dekagram = 10 Grams = 0.353 Ounce
 1 Hectogram = 10 Dekagrams = 3.527 Ounces
 1 Kilogram = 10 Hectograms = 1000 Grams
 = 2.205 Pounds
 1 Quintal = 100 Kilograms = 220.46 Pounds
 1 Metric Ton = 10 Quintals = 1000 Kilograms
 = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liter = 0.034 Fluid Ounce
 1 Centiliter = 10 Milliliters = 0.34 Fluid Ounce
 1 Deciliter = 10 Centiliters = 3.38 Fluid Ounces
 1 Liter = 10 Deciliters = 1000 Milliliters
 = 33.82 Fluid Ounces
 1 Dekaliter = 10 Liters = 2.64 Gallons
 1 Hectoliter = 10 Dekaliters = 26.42 Gallons
 1 Kiloliter = 10 Hectoliters = 264.18 Gallons

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inch
 1 Sq Decimeter = 100 Sq Centimeters = 15.5 Sq Inches
 1 Sq Meter (Centare) = 10 Sq Decimeters
 = 10,000 Sq Centimeters = 10.764 Sq Feet
 1 Sq Dekameter (Are) = 100 Sq Meters = 1,076.4 Sq Feet
 1 Sq Hectometer (Hectare) = 100 Sq Dekameters
 = 2.471 Acres
 1 Sq Kilometer = 100 Sq Hectometers
 = 1,000,000 Sq Meters = 0.386 Sq Mile

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.061 Cu Inch
 1 Cu Decimeter = 1000 Cu Centimeters = 61.02 Cu Inches
 1 Cu Meter = 1000 Cu Decimeters
 = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9 (°F - 32°) = °C$
 $(9/5 x °C) + 32° = °F$
 -35° Fahrenheit is equivalent to -37° Celsius
 0° Fahrenheit is equivalent to -18° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 100° Fahrenheit is equivalent to 38° Celsius
 212° Fahrenheit is equivalent to 100° Celsius

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>	<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches	Centimeters	2.540	Centimeters	Inches	0.394
Feet	Meters	0.305	Meters	Feet	3.280
Yards	Meters	0.914	Meters	Yards	1.094
Miles	Kilometers	1.609	Kilometers	Miles	0.621
Square Inches	Square Centimeters	6.451	Square Centimeters ...	Square Inches	0.155
Square Feet	Square Meters	0.093	Square Meters	Square Feet	10.764
Square Yards	Square Meters	0.836	Square Meters	Square Yards	1.196
Square Miles	Square Kilometers	2.590	Square Kilometers	Square Miles	0.386
Acres	Square Hectometers	0.405	Square Hectometers ...	Acres	2.471
Cubic Feet	Cubic Meters	0.028	Cubic Meters	Cubic Feet	35.315
Cubic Yards	Cubic Meters	0.765	Cubic Meters	Cubic Yards	1.308
Fluid Ounces	Milliliters	29.573	Milliliters	Fluid Ounces	0.034
Pints	Liters	0.473	Liters	Pints	2.113
Quarts	Liters	0.946	Liters	Quarts	1.057
Gallons	Liters	3.785	Liters	Gallons	0.264
Ounces	Grams	28.349	Grams	Ounces	0.035
Pounds	Kilograms	0.454	Kilograms	Pounds	2.205
Short Tons	Metric Tons	0.907	Metric Tons	Short Tons	1.102
Pound-Feet	Newton-Meters	1.356	Newton-Meters	Pound-Feet	0.738
Pounds-Inches	Newton-Meters	0.11375	Kilopascals	Pounds per Square Inch	0.145
Pounds per Square Inch ..	Kilopascals	6.895	Kilometers per Liter ...	Miles per Gallon	2.354
Ounce-Inches	Newton-Meters	0.007062	Kilometers per Hour ...	Miles per Hour	0.621
Miles per Gallon	Kilometers per Liter	0.425	°Fahrenheit	°Celsius	$°C = (°F - 32) \times 5/9$
Miles per Hour	Kilometers per Hour	1.609	°Celsius	°Fahrenheit	$°F = (9/5 \times °C) + 32$

PIN: 086187-000