URGENT

TB 1-2835-216-20-2

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

ALL AH-64 SERIES AIRCRAFT, REMOVAL OF AUXILIARY POWER UNIT (APU) POWER TAKEOFF (PTO) CLUTCH, P/N 3886200-1 AND MAINTENANCE AND INSPECTION REQUIREMENTS OF THE CLUTCH P/N 3886000-5

Headquarters, Department of the Army, Washington, D. C.
20 August 1999

NOTE

THIS PUBLICATION IS EFFECTIVE UNTIL RESCINDED OR SUPERSEDED.

1. Priority Classification. Urgent

a. Aircraft in Use. Upon receipt of this Technical Bulletin (TB) the condition status symbol of the cited aircraft will be changed to a **red horizontal dash //-//.** The **red horizontal dash //-//** entry shall state "Complete the inspection and correction procedures in accordance with TB 1-2835-216-20-2 prior to next flight and/or APU start." The **red horizontal dash //-//** entry may be cleared when the inspections in paragraph 8 and correction procedures in paragraph 9 are completed.

b. Aircraft in Depot Maintenance. Aircraft will not be issued until compliance with this TB has been completed.

c. Aircraft Undergoing Maintenance. Aircraft will not be issued until compliance with this TB has been completed.

d. Aircraft in Transit.

(1) Surface/Air Shipment. Same as paragraph 1.a.

(2) Ferry Status.

(a) Same as paragraph 1.a.

(b) Those aircraft that have a DD 250 and are at Boeing will be inspected prior to ferry to final destination.

e. Maintenance Trainers (Category A and B). Same as paragraph 1.a.

f. Component/Parts in Stock at All Levels (Depot and Others) Including War Reserves. PTO clutch, P/N 3886200-1 will not be issued. Upon receipt of this TB, all serviceable P/N 3886200-1 items (Condition

This TB supersedes USAAMCOM 092058Z Aug 99 Message (AH-64-99-03), and TB 1-2835-216-20-1.

Codes //A//, //B//, //C//, //D//, and //E//) located in all levels of storage shall be placed in Condition Code //J// and tagged with a Suspended Tag/Label - Material, DD Form 1575/DD Form 1575-1. Do not remove original condition tags. Report compliance with this TB in accordance with paragraph 14.d.(1).

g. Components/Parts in Work (Depot Level and Others). Same as paragraph 1.f.

2. Task/inspection Suspense Date. Prior to next flight and/or APU start.

3. Reporting Compliance Suspense Date. No later than 27 August 1999 in accordance with paragraph 14.a. of this TB.

4. Summary of the Problem.

a. There have been numerous failures of the PTO clutch, P/N 3886200-1, including two in-flight. Engineering investigation is ongoing to determine corrective action. Until implementation of corrective action, PTO clutch, P/N 3886200-1, will not be used. In addition, requirements must be provided to the field for use of PTO clutch, P/N 3886000-5 on the AH-64D, and corrections and clarification to existing maintenance procedures for use of the clutch on the AH-64A.

b. For manpower/downtime and funding impacts, see paragraph 12.

c. The purpose of this TB is:

(1) To supersede the information provided in AH-64-99-ASAM-05, AH-64-MIM-99-001, AH-64-MIM-99-006 and TB 1-2835-216-20-1.

(2) To direct the removal of clutch, P/N 3886200-1.

(3) To provide removal, installation, servicing procedures, special and phase inspection requirements for the PTO clutch, P/N 3886000-5.

(4) To provide Operator Manual (-10 and Operator Checklist (-CL) changes requiring the activation of the fire bottles when the APU fire light illuminates in flight.

5. End items to be inspected. All AH-64 series aircraft.

6. Assembly Components to be inspected. N/A.

7. Parts to be inspected.

NOMENCLATURE	PART NUMBER	NSN
PTO Clutch	3886200-1	2835-01431-8327
PTO Clutch	3886000-5	2835-01-164-5786

8. inspection Procedures. Prior to next flight and/or APU start, conduct a records review to determine which PTO clutch is installed.

a. PTO clutch, PIN 3886200-1 - lf installed, change the aircraft status symbol to a red //X//. Remove and replace with PTO clutch, P/N 3886000-5.

(1) Prior to clutch removal, take an Army Oil Analysis Program (AOAP) oil sample. Package the oil sample with the clutch.

(2) Do not clean the magnetic plug. Leave the magnetic plug installed on the clutch.

(3) Note the number of aircraft operating hours for each clutch on the DA Form 2410.

b. PTO clutch, P/N 3886000-5 - Required inspections:

(1) AH-64D only - Perform the inspections in paragraph 8.b.(3) (ULLS-A users will use inspection number A131 on the DA Form 2408-18) and 8.b.(4) every 50 flight hours (ULLS-A units will use inspection number A132 on the DA Form 2408-18) and paragraph 8.b.(5) every 125 flight hours (ULLS-A units will use inspection number A229 on the DA Form 2408-18).

(2) AH-84A only - Perform the inspections in paragraph 8.b.(3) (ULLS-A units will use inspection number A223 on the DA Form 2408-18) and paragraph 8.b.(5) (ULLS-A units will use inspection number A229 on the DA Form 2408-18) every 125 hours. Perform the inspections in paragraph 8.b.(4) every 50 flight hours (ULLS-A users will use inspection number A131 on the DA Form 2408-18).

(3) All AH-84 series aircraft:

(a) Check APU PTO clutch for external oil or grease leaks, heat discoloration, and cracks.

1. Fluorescent-penetrant inspect if cracks are suspected.

2. Grease discharge from covered port. None allowed.

NOTE

Grease discharge from the covered port at the bottom of the PTO clutch housing is not acceptable. This is an indication of internal leakage which will contaminate clutch surfaces. If grease discharge is noted at the covered port, the clutch assembly shall be replaced. Wetness from oil seepage at the covered port is acceptable.

NOTE

External grease leakage is most likely to be at the forward lip seal and duplex vent and will usually appear at the vent within the first 15 hours of operation of a new clutch. Do not confuse grease at the covered port with grease coming from the duplex vent. Grease from the duplex vent will migrate to the covered port area. Grease may vent through the duplex vent under certain conditions such as overfilling or operating under high ambient temperatures. Under these conditions, wipe grease away from the housing and perform APU MOC. Continue to use the PTO clutch assembly in accordance with paragraph 8-d. of this TB.

3. Inspect for heat discoloration. None allowed.

NOTE

Heat discoloration is usually confined to the duplex bearing housing area.

(b) Visually inspect the duplex bearing area.

1. Remove anti-flail bracket and APU driveshaft in accordance with appropriate technical manual (TM) or Integrated Electronic Technical Manual (IETM).

2. Inspect the output bearing grease seal for damage. None allowed.

3. Manually rotate the clutch output shaft in both directions. The rotating motion should be smooth with no roughness or binding. A light amount of drag, caused by the shaft seal, is to be expected.

(c) Visually inspect the needle bearing area.

1. Remove the spiral retaining ring from the inside of the clutch output drive shaft.

2. Using a suitable tool (allen wrench or equivalent), remove the aluminum plug, P/N 3886028-1. Ensure plug is not damaged or lost. Retain plug for re-installation.

3. Inspect the bearing cavity for burnt, dry or blackened grease. None allowed.

4. Inspect for the presence of metal particles or other contamination in the needle-bearing cavity. None allowed.

5. Inspect for damage to the visible portion of the needle-bearing and shaft. None allowed.

6. Rotate the output drive on the clutch while observing the needle-bearing with a flashlight. If the output shaft does not rotate smoothly, or the needle-bearing and/or pilot shaft does not remain centered during rotation, replace the clutch assembly.

7. Visually inspect for signs of overheating. Check for bluing or yellowing of metal surfaces. None allowed.

8. Verify bearing cavity is properly packed with lubricant MIL-G-81322/Mobil 28. Pack lubricant approximately one-half cubic inch (1cc) around inside diameter.

9. Lightly lubricate new packing (M83248/1-113) with grease MIL-G-81322/Mobil 28 and put on plug, P/N 3886028-1. Install plug into clutch output shaft. Install lock ring ensuring that it has positive engagement.

10. Install anti-flail bracket and APU drive shaft. Check circumferential clearance.

11. Perform an APU MOC. Replace clutch if the oil leakage rate exceeds one drop per minute from the covered port with APU running.

(4) PTO clutch, P/N 3886000-5 - 50 flight hour inspections.

(a) Inspect duplex vent and forward lip seal for grease. If present, remove grease and clean PTO clutch exterior. Record findings on DA Form 2408-13-1 that grease was found during the 50 flight hour inspection and requires a re-inspection in 50 flight hours. This entry can be transcribed to the DA Form 2408-14-1.

NOTE

Grease will usually appear within 15 hours of operation after clutch replacement. If grease is noted after two consecutive 50 flight hour inspections following the initial finding, remove and replace PTO clutch and initiate Category 1 Deficiency Report. Wetness from the duplex vent is acceptable.

(b) Check clutch output housing bolts for proper torque (50 inch-pounds).

(5) PTO clutch, P/N 3886000-5 - Installation and 125 flight hour inspections.

(a) Visually check PTO clutch for cracks, leaks, heat discoloration, and corrosion.

(b) Visually check clutch mounting pad (with PTO clutch installed) for cracks and corrosion. None allowed.

(c) Visually check friction disk for wear.

1. Remove one screw from name plate.

2. Loosen remaining screw.

3. Carefully swing name plate and gasket upward and secure screw.

4. Push disk backwards until it bottoms.

NOTE

Friction disk has four uniformly spaced radial grooves cut into its surface. Measurements must be taken in area between grooves.

5. Replace clutch if gap between disk and plate will accept a 9/64 socket head screw key (allen wrench).

6. Loosen screw and carefully swing name plate and gasket back into position.

7. Install and tighten screw.

(d) Inspect the APU mounts for cracks, dents, distortion, loose bolts and corrosion. Specific attention must be given to the welded joints. Inspect the entire length of each weld line for cracks and any other abnormalities in accordance with TM 1-2835-213-23. Inspection mirror and non-explosive flashlight may be required for proper inspection.

1. Inspect all attachment lugs for cracks and/or looseness. None allowed.

2. Inspect all attachment points for loose or missing hardware. All bushings must be in place and hardware must be properly torqued. Reference appropriate TM tasks for hardware installation.

3. Verify the aft strut support length, 5.35 inches for AH-64A and 4.80 inches for AH-64D.

c. Time Between Overhaul (TBO) for P/N 3886000-5 PTO clutch is 500 aircraft hours. Check the DA Form 2408-16 to ensure it is correct.

d. Perform recurring phase inspection procedures of the APU mounting hardware, mounts and mounting lugs/surfaces for cracks, corrosion, distortion or elongation. Removal of APU is required.

9. Correction Procedures.

a. When APU PTO clutch, P/N 3886200-1 is replaced as a result of this TB, it will be returned using normal material return program procedures to Routing Identifier Code (RIC) "AF6" (Alpha-Foxtrot-Six) in Condition Code CC71 "E' (Echo).

b. When installing P/N 3886000-5, the following removal and installation procedures apply. Inspection procedures will be in accordance with paragraph 8.e. of this TB.

(1) Removal Procedures.

WARNING

If battery is connected, the APU will start with the battery switch off. Death or serious injury could result. Be sure to disconnect battery before continuing work.

(a) Remove APU drive shaft and anti-flail bracket.

(b) Remove fuel control unit from APU. For removal of P/N 3886200-1 only - discard packing (M83248/1-036).

(c) Remove clamp from APU vent hose and PTO clutch.

(d) Remove lockwire from connector P10 (PTO clutch solenoid), and detach connector from J10 receptacle.

(e) Remove PTO clutch from APU.

1. Loosen six nuts that retain PTO clutch to APU gearbox.

2. Turn clutch to align large end slots with nuts. Remove PTO clutch from APU.

3. Remove and discard packing (M83248/1-241).

(2) Installation procedures:

CAUTION

Ensure that no chaffing condition exists between clutch and fire extinguisher tubes after installation.

(a) Install PTO clutch on APU.

1. Lubricate new packing (P/N M83248/1-241). Use petroletum (P/N VV-P-236).

2. Install packing on clutch.

3. Align PTO clutch on APU. Turn clockwise until seated.

4. Torque six nuts to 100 inch-pounds. Use 1/4-inch drive and 3/8-inch crowfoot.

(b) Install clamp on APU vent hose and PTO clutch.

1. Install clamp on hose.

2. Align hole on clamp with hole on clutch.

3. Install bolt through clamp, washer, and clutch.

4. Install nut on bolt and torque to 50 inch-pounds.

(c) Attach connector P10 to PTO clutch solenoid connector J10.

(d) Lockwire connector P10 to connect J10. Use 0.020-inch lockwire.

(e) Install new packing (M83248/1-036) on fuel control unit and install fuel control unit on APU.

(9 Rotate hard "Z" fuel line, P/N 3888224-1, 180 degrees and torque per appropriate TM tasks. This step only required for initial installation of P/N 3886000-5 on AH-64D.

(g) Install APU drive shaft and anti-flail bracket.

(h) Check and service APU oil level.

(i) Reconnect battery.

(j) Perform APU MOC.

c. Make changes in accordance with paragraph 12.e. of this TB to TM 1-1520-238-10 (page 9-12, paragraph 9.10.2) and -CL for the AH-64A "APU Fire Handle Illumination in Flight."

(1) APU Fire Pull Handle - PULL.

(2) Fire Bottle Switch - ACTIVATE.

(3) Environmental Control System (ECS) - OFF.

(4) Land as soon as possible.

d. Make changes in accordance with paragraph 12.e. of this TB to TM 1-1520-251-10 (page 9-14, paragraph 9.17.2.b.) and -CL for the AH-64D "APU Fire Button Illuminates in Flight."

(1) Illuminated APU Fire Button - PRESS APU fire button and the "RDY" light illuminates.

(2) "PRI DISCH" Button - PRESS.

(3) Environmental Control System (ECS) - OFF.

NOTE

If fire button remains illuminated:

(4) “RES DISCH” Button - PRESS.

(5) Land as soon as possible.

10. Supply/Parts and Disposition.

a. Parts required. P/N 3886000-5 will be required to replace defective items.

b. Requisitioning instructions. All units, regardless of priority status, shall submit requisitions for replacement parts for their effected aircraft within 30 days of receipt of this TB. Requisition replacement parts using normal supply procedures. Requisitioning activities will pay standard price when ordering parts; however, retail SMA activities will provide 100 percent credit for turn-ins reflecting the defective Army-managed NSN and Project Code “XFQ” (Xray-Foxtrot-Quebec). AMCOM will provide 100 percent credit to Army National Guard Units and retail SMA activities that return the defective part using this same criteria. All requisitions and turn-ins shall use Project Code (CC 57-59) “XFQ” (Xray-Foxtrot-Quebec) and Condition Code (CC71) "E" (Echo). In order to provide the overhaul facility a steady supply of defective assets, it is imperative that turn-ins be processed and shipped immediately upon removal from the aircraft.

NOTE

100 percent credit will be established at the MACOM level. Project code "XFQ" is required to track and establish a database of stock fund expenditures incurred by the field as a result of safety of flight actions.

c. Bulk and consumable materials.

NOMENCLATURE	NSN	PART NUMBER
Grease, Aircraft	9150-01-262-3356	MIL-G-81322 Mobil 28
Petrolatum	9150-00-250-0933	VV-P-236
Lockwire 0.020	9505-00-221-2650	MS20995C20
Packing	5331-00-166-1062	M83248/1-113
Packing	5331-00-165-1959	M83248/1-241
Packing	5331-00-172-7187	M83248/1-036
Aluminum Plug	2835-01-177-9982	3886028-1

d. Disposition. Return parts/components using normal material return program procedures. All turn-in documents must include Project Code (CC 57-59) "XFQ" (Xray-Foxtrot-Quebec) and Condition Code (CC71) "E" (Echo). A Cat 1 QDR will only be submitted for PTO clutch, P/N 3886200-1, that have been removed as a result of failure. An "Information Only" Cat 2 QDR will be submitted for all PTO clutch, P/N 3886200-1 that have been removed as a result of the inspection criteria in paragraph 8 of this TB.

e. Disposition of hazardous material. In accordance with environmental protection agency directives as implemented by your servicing environmental coordinator (AR 200-1).

11. Special Tools, Jigs and Fixtures Required. As required.

12. Application.

a. Category of Maintenance. AVUM. Aircraft downtime will be charged to AVUM.

b. Estimated time required:

(1) Records review - Total of 0.5 hours using one person.

(2) APU PTO clutch replacement:

(a) Total of three man-hours using one person.

(b) Total of three hours downtime for one end item.

c. Estimated Cost Impact to the Field:

NOMENCLATURE	PART NO/NSN	QUANTITY	COST EACH
PTO Clutch	3886000-5/2835-01-164-5786	1	$27,000.00
		Total cost per aircraft =	$27,000.00

d. TB/Maintenance Work Orders (MWOs) to be Applied Prior to or Concurrently With This Inspection. N/A.

e. Publications Which Require Change as a Result of This Inspection. A copy of this TB shall be inserted in the appropriate publication as authority to implement the change until the printed change is received.

(1) TM 1-1520-238-PM

(2) TM 1-1520-238-23-1

(3) TM 1-1520-251-10

(4) TM 1-1520-251-CL

(5) TM 1-1520-251-MTF

(6) IETM for AH-64D

(7) TM 1-2835-213-23

13. References.

a. IETM for AH-64D

b. TM 1-1520-238-23

c. TM 1-2835-213-23

14. Recording and Reporting Requirements.

a. Reporting Compliance Suspense Date (Aircraft). Upon entering requirements of this TB on DA Form 2408-13-1 on all subject MDS aircraft, forward a priority message, datafax or E-Mail to Commander, AMCOM, ATTN: AMSAM-SF-A (SOF Compliance officer), Redstone Arsenal, AL 35898-5000, in accordance with AR 95-1. Datafax number is DSN 897-2111, or commercial (256) 313-2111, E-Mail address is "SAFEADM@ redstone.army.mil". The report will cite this TB number, date of entry in DA Form 2408-13-1, the aircraft mission design series and serial numbers of aircraft in numerical order.

b. Task/Inspection Reporting Suspense Date (Aircraft). N/A.

c. Reporting TB Receipt (Spares). N/A.

d. Task/Inspection Reporting Suspense Date (Spares). N/A.

e. The following forms areapplicable and are to be completed in accordance with DA PAM 738-751,15 March 1999:

NOTE

ULLS-A users will use applicable "E" forms.

(1) DA Form 2408-5-1, Equipment Modification Record (PTO clutch).

(2) DA Form 2408-13, Aircraft Status Information Record.

(3) DA Form 2408-13-1, Aircraft Inspection and Maintenance Record.

(4) DA Form 2406-13-2, Related Maintenance Actions Records.

(5) DA Form 2408-14-1, Uncorrected Fault Record (Aircraft).

(6) DA Form 2408-15, Historical Record for Aircraft (Annotate serial number of APU and PTO clutch).

(7) DA Form 2408-16, Aircraft Component Historical Record.

(8) DA Form 2406-18, Equipment Inspection List.

(9) DA Form 2410, Component Removal and Repair/Overhaul Record (Only if APU and/or PTO clutch is removed for maintenance and/or replaced).

(10) DD Form 1575/DD Form 1575-1, Suspended Tag/Label Material.

(11) DD Form 1577-2/DD Form 1577-3, Unserviceable (Reparable) Tag/Label - Materiel (Color Green). Annotate Remarks block with "Unserviceable in accordance with TB 1-2835-216-20-2."

15. Weight and Balance. N/A.

16. Points of Contact.

a. Technical points of contact for this TB are:

(1) Primary: Mr. Andy Fabery, AMSAM-AR-E-I-P-A, DSN 897-4802 or commercial (256) 313-4802. Datafax is DSN 897-4923 or commercial (256) 313-4923. E-mail is “fabery-aj@redstone.army.mil”.

(2) Alternate: Mr. Stewart Chen, AMSAM-AR-E-P-TD, DSN 897-4963 or commercial (256) 313-4983. Datafax is DSN 897-4961 or commercial (256) 313-4961. E-mail is “chens@redstone.army.mil”.

b. Logistical points of contact for this TB are:

(1) Primary: Mr. Jim Mason, SFAE-AV-AAH-LF, DSN 897-4242 or commercial (256) 313-4242. Datafax is DSN 897-4343 or commercial (256) 313-4343. E-mail is “masonj@peoavn.redstone.army.mil”.

(2) Alternate: Mr. John Patton, SFAE-AV-AAH-LF, DSN 897-4244 or commercial (258) 313-4244. Datafax is DSN 897-4343 or commercial (256) 313-4343. E-Mail is “pattonj@redstone.army.mil”.

c. Wholesale material point of contact (spares) is Ms. Debra Barton, AMSAM-MMC-VS-AB, DSN 897-1355 or commercial (256) 313-1355. Datafax is DSN 897-1556 or commercial (256) 313-1556. E-mail is "barton-dj@exchange1.redstone.army.mil”.

d. Forms and records point of contact for this TB is Ms. Ann Waldeck, AMSAM-MMC-RE-FF, DSN 746-5564 or commercial (256) 876-5564. Datafax is DSN 746-4904 or commercial (256) 876-4904. E-mail is “waldeck-ab@redstone.army.mil”.

e. Safety point of contact for this TB is Mr. Howard Chilton, AMSAM-SF-A, DSN 897-2068 or commercial (256) 313-2068. Datafax is DSN 897-2111 or commercial (256) 313-2111. E-mail is "howard.chilton@redstone.army.mil”.

f. Foreign Military Sales (FMS) recipients requiring clarification of action advised by this TB should contact CW5 Joseph L. Wittstrom, Security Assistance Management, AMSAM-SA, DSN 897-0681 or commercial (256) 313-0681. E-mail is “wittstrom-jl@redstone.army.mil”; or Mr. Ronnie W. Sammons, AMSAM-SA-CS-NF, DSN 897-0869 or commercial (256) 313-0869. Datafax is DSN 897-0411 or commercial (256) 313-0411. E-mail is “sammons-rw@redstone.army.mil”. Huntsville, AL is GMT minus 6 hours.

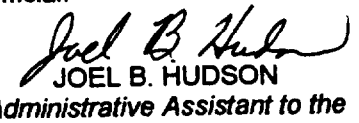
g. After hours, contact the AMCOM Command Operations Center (COC) at DSN 897-2066/7 or commercial (256) 313-2066/7.

17. Reporting of Errors and Recommending Improvements. You can improve this TB. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and blank Forms) directly to: Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5000. You may also submit your recommended changes by e-mail directly to <ls-lp@redstone.army.mil>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual.

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
9923003

DISTRIBUTION:
To be distributed in accordance with Initial Distribution Number (IDN) 313849, requirements for TB 1-2835-216-20-2.

PIN: 077497-000

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: <ls-lp@redstone.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-DEC-98
8. ***Pub no:*** 1-2835-216-20-1
9. ***Pub Title:*** TB
10. ***Publication Date:*** 1-JUN-99
11. *Change Number:* N/A
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:* 2
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

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH PUBLICATION

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

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

THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

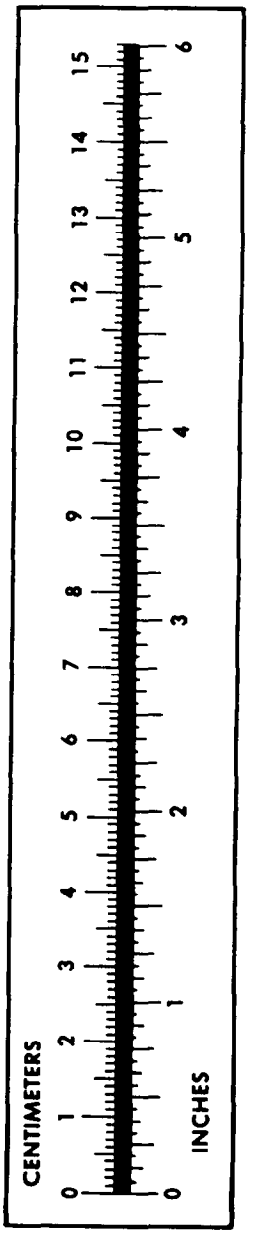
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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