URGENT

TB 1-1520-251-20-01

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

AH-64D AIRCRAFT FLIGHT RESTRICTIONS AND EMERGENCY PROCEDURES FOR UNEXPECTED LOSS OF AIRCRAFT ELECTRICAL POWER

Headquarters, Department of the Army, Washington, D.C.

26 April 2000

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THIS PUBLICATION IS EFFECTIVE UNTIL RESCINDED OR SUPERSEDED.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, "Aircraft shall be inspected in accordance with TB 1-1520-251-20-01." Failure to comply with the requirements of this TB within the time frame specified will cause the status symbol of the affected aircraft to be upgraded to a **red //x//**. Aircraft in **red //x//** status will be maintained in flyable storage with ground run-ups authorized.

b. Aircraft in Depot Maintenance. N/A.

c. Aircraft Undergoing Maintenance. N/A.

d. Aircraft in Transit.

(1) Surface/Air Shipment. N/A.

(2) Ferry Status. N/A.

e. Maintenance Trainers (Category A and B). N/A.

f. Component/Parts in Stock at All Levels (Depot and Others) Including War Reserves. N/A.

(1) Wholesale Stock. N/A.

(2) Retail Stock. N/A.

This TB supersedes USAAMCOM Safety of Flight 132324Z APR 00 (AH-64-00-07).

g. Components/Parts in Work (Depot Level and Others). N/A.

2. **Task/Inspection Suspense Date.** Prior to next flight.

3. **Reporting Compliance Suspense Date**. No later than 5 May 2000 in accordance with paragraph 14.a. of this message.

4. **Summary of the Problem**.

a. Numerous electrical power failures have occurred due to conditions, some of which are unknown at this time. Loss of power has been observed for various lengths of time. In three instances, during such an event, all four MPDs, both HDUs, and the PNVS have gone blank resulting in the inability of the crew to monitor the aircraft through MPD switch functions. Boeing and AMCOM are conducting an investigation to determine the root cause and provide corrective action.

b. Improved stub shafts (star feature modified as a round collar), new material (Vespel, brown in color) spline and polygon adapters are being installed on all aircraft generators; however, a stub shaft shearing and multi–purpose display blanking issue still remain. The failure history indicates that, out of 33 total generator-related failures, 27 are related to the old style stub shaft design and the old spline and polygon adapter material (Torlon, yellow-green in color).

c. There are some high power switching modules (HPSM) that may exhibit contactor failures due to a manufacturing defect, causing a loss of electrical power to a particular bus.

d. As a prudent measure of safety, the Army is restricting the fleet of AH-64D aircraft that have been modified in accordance with this TB to day visual flight rules as an interim measure until a full investigation has been completed and corrective action is implemented. All AH-64D aircraft that have not been modified in accordance with this TB are grounded until the modifications have been completed as required.

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

f. The purpose of this TB is to:

(1) Verify that the improved stub shaft and splined/polygon adapters have been installed.

(2) Inspect and remove/replace suspect HPSMs.

(3) Restrict AH-64D aircraft to day VFR flight operations for aircraft that have incorporated generator drive modifications and replaced suspect HPSMs.

(4) Ground AH-64D aircraft that have not incorporated generator drive modifications and replaced suspect HPSMs.

(5) Provide emergency procedures in the event of the above electrical power deficiency and to update procedures for dual generator failure.

5. **End Items To Be Inspected**. All AH-64D Longbow aircraft.

6. **Assembly Components To Be Inspected.** HPSM #1 (P/N 7-511B11087-1) and HPSM #2 (P/N 7-511B11088-1).

7. **Parts To Be Inspected**. Adapter Spline, P/N 1593588–9, NSN 3040–01–382–2814.

8. **Inspection Procedures**. .

a. Enter the pilot's compartment, read the HPSM #1 and #2 data plates (which are located behind the pilot's seat), look for S/Ns 1 through 7, 9 through 36, and 38. On HPSM #2, look for S/Ns 1 through 37.

NOTE

HPSM #1 S/N 8 and 37 have been previously reworked to the correct configurations.

(1) If either HPSM #1 is numbered 1 through 38 (less S/N 8 and 37), or HPSM #2 is numbered 1 through 37, remove and replace in accordance with paragraph 9.c. Contact the logistical point of contact in paragraph 16.b to coordinate replacement of the HPSM.

(2) If both HPSM #1 is not numbered 1 through 38 (less S/N 8 and 37), and HPSM #2 is not numbered 1 through 37, proceed to paragraph 8.b.

b. Inspect the aircraft historical logbook, DA Form 2408−13, DA Form 2408−15, and DA Form 2408−5−1 (Generators) to verifiy the either Apache retrofit service notice (RSN) 97D155R2 or 97D155R3 have been applied to the aircraft generators.

(1) If the aircraft records verify that either RSN has been applied, proceed to paragraph 8.c.

(2) If the aircraft records do not verify that Apache RSN 97D155R2 or 97D155R3 have been applied, contact logistical point of contact listed in paragraph 16.b for further guidance.

c. After verification that HPSM #1 is not numbered 1 through 38 (less S/N 8 and 37), HPSM #2 is not numbered 1 throught 37, and the generator drive modification has been verified, proceed to paragraph 9.

d. Inspect retail repair parts stockage to determine is adapter, spline, P/N 1593588−9, NSN 3040−01−382−2814 is on hand and if it is yellow−green in color. If this part is on hand and is yellow−green in color, it is Torlon and is not to be used on the AH−64D. Proceed to paragraph 10 for disposition instructions.

9. **Correction Procedures.**

a. After verifying that AH-64D aircraft have received the generator drive modifications and suspect HPSMs have been replaced, change the condition status symbol of the cited aircraft to a circled **red *//x//***. The circled **red *//x//*** entry shall state “Aircraft restricted to day VFR flight operations in accordance with TB 1-1520-251-20-01.” While the aircraft is on a circled **red *//x//***, it may be reported as fully mission capable (FMC).

b. For AH-64D aircraft that have not received both the generator drive modifications and have not replaced suspect HPSMs as required, clear the **red dash *//−//*** and change the condition status symbol of the cited aircraft to a **red *//x//***. The **red *//x//*** entry shall state “Aircraft grounded in accordance with TB 1-1520-251-20-01. Aircraft status may be changed to a **circled red *//x//*** per paragraph 9.a above, when both the generator drive modifications and suspect HPSMs have been replaced.” Aircraft in **red *//x//*** status will be maintained in flyable storage with ground run-ups authorized.

c. Removal and replacement procedures for suspect HPSMs per reference 13.e:

(1) Perform IETM task module, switching high power, No. 1−

(a) System: Electrical power subsystem

(b) Subsystem: Power distribution system

(c) Data type: Task

(d) IETM element: Module, switching, high power No. 1

(e) Remove and install

(2) Perform IETM task module, switching high power, No. 2−

(a) System: Electrical power subsystem

(b) Subsystem: Power distribution system

(c) Data type: Task

(d) IETM element: Module, switching, high power No. 2

(e) Remove and install

d. The following is provided with regard to emergency procedures for the Apache Longbow.

NOTE

In the event of any electrical power anomolies, submit a category I deficiency report. Prior to powering the aircraft after such an incident, the flight management computer and both system processors shall be removed for analysis. Any deficient generators shall also be removed and held. Contact the logistical point of contact in paragraph 16.b. for disposition instructions.

NOTE

Unit commanders will provide an initial briefing on the contents of this TB to all AH-64D aviators assigned.

NOTE

Unit commanders will place a copy of this TB in the unit's aviators' reading file.

e. The following urgent action changes will be made to paragraph 9.18. of the Longbow Operator's Manual.

WARNING

In the event of a complete loss of electrical power or a failure of the electrical distribution system, the FMC SCAS and BUCS functions may not be available. False indication of a dual hydraulic failure may be experienced. The aircraft will become less stable but will remain controllable. Extreme caution must be used when manipulating the controls. In addition, all four MPDs, both HDUs, and the PNVS may blank, resulting in the inability of the crew to monitor the aircraft systems via the MPDs or to interact with the aircraft through MPD switch functions. Battery power will provide UFDs, floodlights, standby instruments, UHF/VHF/FM1 radios, ICS, Transponder Emergency Mode, force trim, and searchlight function. A battery charged at 80% will normally supply the battery bus for approximately 12 minutes as 25 degrees C. Time will decrease accordingly if the temperature is increased or decreased from 25 degrees C. The largest consumer of battery power is the searchlight. Battery power can be extended by minimizing use of external lighting.

f. Paragraph 9.18.1. of the Longbow Operator's Manual will be changed as follows (the following procedures are underlined):

9.18.1. Both Generator's Fail/Complete Loss of Electrical Power.

1. Exit NOE environment.
2. **GEN 1** and **GEN 2** – Reset pilot **GEN RST** panel.

If condition persists:

3. LAND AS SOON POSSIBLE.

9.18.1.a. Single Generator/Single RTRU Failure.

1. Exit NOE environment.
2. Affected **GEN 1** or **GEN 2** – Reset pilot **GEN RST** panel.

If condition persists:

3. LAND AS SOON AS PRACTICABLE.

9.18.1.b. Multiple MPD Failure.

1. Exit NOE environment.
2. LAND AS SOON AS POSSIBLE.

g. The following urgent action changes will be made to TM 1-1520-251-CL, page E11/(E12 blank): Under the topic, "Electrical System Malfunction," replace subparagraph, "Both generator fail (GEN 1 Fail and GEN 2 FAIL)" with the following (the following procedures are underlined):

BOTH GENERATORS FAIL/COMPLETE LOSS OF ELECTRICAL POWER

1. Exit NOE environment.
2. **GEN 1** and **GEN 2** – Reset pilot **GEN RST** panel.

If condition persists:

3. LAND AS SOON AS POSSIBLE.

SINGLE GENERATOR/SINGLE RTRU FAILURE

1. Exit NOE environment.
2. Affected **GEN 1** or **GEN 2** – Reset pilot **GEN RST** panel.

If condition persists:

3. LAND AS SOON AS PRACTICABLE.

MULTIPLE MPD FAILURE

1. Exit NOE environment.
2. LAND AS SOON AS POSSIBLE.

h. The following urgent action changes will be made to TM 1-1520-251-MTF, page 2–2, under topic, "Prior to Maintenance Test Flight" (the following procedures are underlined):

BOTH GENERATORS FAIL/COMPLETE LOSS OF ELECTRICAL POWER

1. Exit NOE environment.
2. **GEN 1** and **GEN 2** – Reset pilot **GEN RST** panel.

If condition persists:

3. LAND AS SOON AS POSSIBLE.

SINGLE GENERATOR/SINGLE RTRU FAILURE

1. Exit NOE environment.
2. Affected **GEN 1** or **GEN 2** – Reset pilot **GEN RST** panel.

If condition persists:

3. LAND AS SOON AS PRACTICABLE.

MULTIPLE MPD FAILURE

1. Exit NOE environment.
2. LAND AS SOON AS POSSIBLE.

10. **Supply/Parts and Disposition.** N/A.

a. Parts Required. N/A.

b. Requisitioning Instructions. N/A.

c. Bulk and Consummable Materials. N/A.

d. Disposition. Hold any adapter, spline, P/N 1593588−9, NSN 3040−01−382−2814, Torlon, yellow−green in color found in retail repair parts stockage pending disposition instructions from logisical in paragraph 16.

11. **Special Tools and Fixtures Required.** N/A.

12. **Application.**

a. Category of Maintenance. AVUM.

b. Estimated Time Required.

(1) Total of 0.5 man−hours using 1 person.

(2) Total of 0.5 hours downtime for each end item.

c. Estimated Cost Impact To the Field. N/A.

d. TB/MWOs To Be Applied Prior To Or Concurrently With This Inspection. N/A.

e. Publications Which Require a Change As a Result of This TB. TM 1-1520-251-10, TM 1-1520-251-MTF, TM 1-1520-251-CL, and Longbow IETM with changes, shall be changed to reflect this TB. A copy of this TB shall be inserted in each of the appropriate TMs as authority to implement the change until the printed change or corrected IETM is received.

13. **References**.

a. DA PAM 738-751.

b. TM 1-1520-251-10, Operator's Manual for Helicopter, Attack, AH−64D Longbow Apache, dated 15 December 1998, with changes.

c. TM 1-1520-251-MTF, Maintenance Test Flight Manual, Helicopter, Attack, AH−64D Longbow Apache, dated 15 March 1998, with changes .

d. TM 1-1520-251-CL, Operator's Checklist for Helicopter, Attack, AH−64D Longbow Apache, dated 15 March 1998, with changes.

e. Interactive Electronic Technical Manual (IETM): TM 1-1520-LONGBOW/APACHE IETM, CD No. 1, Version 3.1.2, Data 19 November 1998, CD dated 1 December 1998 (or subsequent).

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 CDR, 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 (256) 313-2111. E-mail address is "safeadm@redstone.army.mil". This 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). No special report of the results of this TB is required.

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

d. Task/Inspection Reporting Suspense Date (Spares). Report compliance with this message to the wholesale materiel point of contact (Spares) listed in paragraph 16C within 7 days of the date of this TB on DD Form 1225. Provide the cost of compliance with this TB with an estimate of the cost reimbursable funding required to move serviceable items on hand listed in paragraph 7 to a work area, unpack the materiel, repack the materiel after inspection by AMCOM inspectors, and to return the materiel to storage, as appropriate. Report, by original serviceable condition code, the quantity of materiel placed in condition code //J//. Report by e–mail or datafax and provide local point of contact.

e. The following forms are applicable 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 (Generator).

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

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

(4) DA Form 2408-15, Historical Record for Aircraft.

15. **Weight and Balance.** N/A.

16. **Points of Contact**.

a. Technical point of contact for this TB is Matthew Benzek, AMSAM-RD-AE-I-P-A, DSN 897-4915 or commercial (256) 313–4915. Datafax is DSN 897–4923 or commercial (256) 313–4923; e-mail is "matthew.benzek@redstone.army.mil". The alternate point of contact is Dennis Hediger, DSN 897–4913 or commercial (256) 313–4913. E-mail is "dennis.hediger@redstone.army.mil".

b. Logistical point of contact for this TB is Jim Mason, SFAE–AV–AAH–L, 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". The alternate point of contact is Mike Sharp, DSN 897–4236 or commercial (256) 313–4236. E-mail is "sharpm@peoavn.redstone.army.mil".

c. Wholesale materiel point of contact is Perry Olten, DSCR–XBD, DSN 695–5120 or commercial (256) 279–5120. Datafax is DSN 695–6409. E–mail is "polten@dscr.dla.mil".

d. Safety point of contact for this TB is Frank Rosebery, AMSAM–SF–A (SAIC), DSN 788–8631 or commercial (256) 842–8631. Datafax is DSN 897–2111 or commercial (256) 313–2111. E–mail is "frank.rosebery@redstone.army.mil". The alternate point of contact is 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".

e. Foreign Military Sales (FMS) recipients requiring clarification of actions advised by this TB should contact one of the following (Huntsville, AL, time is GMT minus 6 hours):

(1) CW5 Joseph L. Wittstrom, Security Assistance Management, AMSAM-SA, DSN 897–0681 or commercial (256) 313–0681, e-mail "wittstromjl@redstone.army.mil".

(2) Ronnie W. Sammons, AMSAM-SA-CS-NF, DSN 897−0869 or commercial (256) 313−0869, e-mail “sammonsrw@redstone.army.mil”.

f. After hours, contact the AMCOM Command Operations Center (COC) 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 35898-5230. 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:

Official:

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

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0011530

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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: <mpmt%avma28@st-louis-emh7.army.mil>

Subject: DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19-OCT-93
8. ***Pub no:*** 55-2840-229-23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04-JUL-85
11. *Change Number:* 7
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

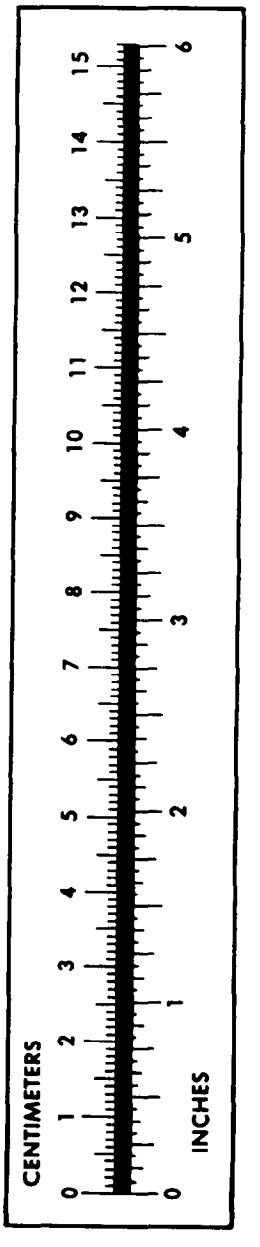
TEMPERATURE

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



PIN: 078044-000