

URGENT

*TB 1-1520-243-20-27

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

INSPECTION OF TAIL ROTOR DRIVESHAFT COUPLING FOR ALL UH-1 AND AH-1 SERIES AIRCRAFT

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

16 May 2000

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

NOTE

THIS PUBLICATION IS EFFECTIVE UNTIL RESCINDED OR SUPERSEDED.

1. Priority Classification. URGENT.

NOTE

IAW AR 95-1, paragraph 6-6.a., MACOM commanders may authorize temporary exception from ASAM message requirements. Exception may only occur when combat operations or matter of life or death in civil disasters or other emergencies are so urgent that they override the consequences of continued aircraft operation.

a. Aircraft in Use. Upon receipt of subject message/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 "Inspect Tail Rotor Driveshaft Coupling IAW UH-1-00-ASAM-04, AH-1-00-ASAM-08 (TB 1-1520-243-20-27) prior to or at next phase, but NLT 1 May 2001 ." The **RED HORIZONTAL DASH //--//** may be cleared when the inspection IAW paragraph 8, and the correction procedures IAW paragraph 9 are completed. Failure to comply with the requirements of subject message/TB within the time frame will cause the status symbol to be upgraded to a **RED //X//**.

b. Aircraft in Depot Maintenance. Same as paragraph 1.a.

c. Aircraft Undergoing Maintenance. Same as paragraph 1.a.

*This TB supersedes USAAMCOM Aviation Safety Action Message (ASAM) AH-1-00-ASAM-08 and UH-1-00-ASAM-04, 011223Z May 00.

d. Aircraft in Transit.

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

(2) **Ferry Status.**

(a) Inspect at final destination.

(b) Those aircraft that have a DD 250 and are at US Helicopters, same as paragraph

1.a.

e. Maintenance Trainers (Category A and B). Not applicable.

f. Component/Parts in Stock at All Levels (Depot and Others) Including War Reserves. Upon receipt of subject message/TB, the material condition tags of all items in all condition codes listed in paragraphs 6 and 7 shall be annotated to read "UH-1-00-ASAM-04, AH-1-00-ASAM-08, (TB 1-1520-243-20-27), Inspection of Tail Rotor Driveshaft Coupling, Not Complied With".

(1) **Wholesale Stock.** Upon receipt of subject message/TB, all serviceable items (condition codes A, B, C, D, and E) listed in paragraphs 6 and 7 located in wholesale depot storage shall be placed in condition code "J" and tagged with a suspended tag/label - Materiel, DD Form 1575/DD Form 1575-1. Do not remove original condition tags. Report compliance with subject message/TB IAW paragraph 14.d.(1).

(2) **Retail Stock.** Upon receipt of subject message/TB commanders and others maintaining retail stock at installation level and below shall contact the supported aviation unit to perform the inspection required by paragraph 8 and the correction procedures of paragraph 9 on discrepant materiel. Disposition of discrepant materiel will be IAW paragraph 10.

g. Components/Parts in Work. (Depot Level and Others). Items listed in paragraphs 6 and 7 in work will not be issued until compliance with subject message/TB.

2. Task/Inspection Suspense Date. Prior to or at the next phase inspection, but NLT 1 May 2001, and report IAW paragraph 14.b.

3. Reporting Compliance Suspense Date. Report compliance IAW paragraph 14.a. NLT 19 May 2001.

4. Summary of the Problem.

a. A tail rotor driveshaft coupling, P/N 204-040-604-5, manufactured by Vard Precision, has been found with cracks on the internal splines. These cracks have been determined to be a result of improper quenching during manufacturing. The quench cracks in the discrepant coupling did not propagate during the time the coupling was in operation. The cracks will most likely progress to chipped splines which would be found during the annual coupling inspection. Additional deficiencies found were the molybdenum and chromium content and core hardness were lower than is required by the material specification. It has been determined these additional deficiencies are not immediate concerns, but they may reduce the long term life of these components. Although these deficiencies have only been found in one coupling from a specified manufacturing lot, it is possible that the remaining couplings from that lot may also exhibit these deficiencies.

b. For Manpower/Downtime and Funding Impacts. See paragraph 12.

c. The Purpose of this TB is to:

(1) Require that all tail rotor driveshaft couplings be inspected at or before the next phase inspection IAW paragraph 8 of subject message/TB, and to remove all Vard Precision couplings with the manufacturing lot designator "L-60". Other Vard manufacturing lots are acceptable for continued use.

(2) Alert the field regarding an urgent change to TM 55-1520-210-23-1 and TM 55-1520-236-23-1, tail rotor driveshaft coupling inspection, to include a visual inspection of the internal splines for cracks using a 3-10X magnifying glass.

5. **End Items to be inspected.** All UH-1 and AH-1 series aircraft.

6. **Assembly Components to be Inspected.**

a. UH-1 Assemblies.

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
Driveshaft Hanger Assembly	204-040-600-11	1615-01-056-5365
42 Degree Gearbox	204-040-003-37	1615-00-918-2676
42 Degree Gearbox	204-040-003-13	1615-00-633-0864
42 Degree Gearbox	204-040-003-23	1615-00-776-1626
42 Degree Gearbox	204-040-003-29	1615-00-472-7306
42 Degree Gearbox	204-040-003-7	1615-00-624-5266
42 Degree Gearbox	204-040-003-19	1615-00-796-4218
42 Degree Gearbox Quill Assy.	204-040-003-33	1615-00-760-3314
42 Degree Gearbox Quill Assy.	204-040-003-35	1615-00-760-3313
90 Degree Gearbox	204-040-012-13	3040-00-918-2677
90 Degree Gearbox Quill Assy.	204-040-012-11	1615-00-760-3315
90 Degree Gearbox Quill Assy.	204-040-012-5	1615-00-893-2017
Tail Rotor Quill Assembly	204-040-207-13	1615-00-795-0661
Transmission	205-040-001-17	1615-00-919-1351

b. AH-1 Assemblies.

Driveshaft Hanger Assembly	212-040-600-7	1615-01-014-6008
Driveshaft Hanger Assembly	209-961-406-1	1615-01-008-7744
42 Degree Gearbox	212-040-003-23	1615-01-015-0584
42 Degree Gearbox Quill Assy.	212-040-003-15	1615-01-008-7746
42 Degree Gearbox Quill Assy.	212-040-003-17	1615-01-010-8799
90 Degree Gearbox	212-040-004-9	1615-01-008-7748
90 Degree Gearbox Quill Assy.	212-040-004-11	1615-01-008-7757
Tail Rotor Quill Assembly	212-040-365-25	1615-01-008-7743
Transmission	212-040-001-39	1615-01-014-6006
Transmission	212-040-001-51	N/A

7. **Parts to be Inspected.**

NOMENCLATURE	PART NUMBER	NATIONAL STOCK NUMBER
Driveshaft Coupling	204-040-604-5	1615-00-701-4142

8. Inspection Procedures.

NOTE

The inspection in paragraphs 8.a. through 8.e. does not require total disassembly of the driveshaft flexible couplings unless you are also performing the special 600 hour/annual coupling inspection.

a. Gain access to the driveshaft coupling, P/N 204-040-604-5.

(1) The coupling is installed in eight (8) locations on the UH-1.

(a) One at each driveshaft hanger assembly, P/N 204-040-600-11 (TM 55-1520-210-23P-1, figure 180, item 11).

(b) One on both 42 degree gearbox quill assemblies, P/N 2040040-003-33/35 (figure 182, item 12).

(c) One on the 90 degree gearbox quill assembly, P/N 204-040-012-11 (figure 183, item 32).

(d) One on the tail rotor quill assembly, P/N 204-040-207-13 (figure 171, item 12).

(2) The coupling is installed in seven (7) locations on the AH-1.

(a) One at each driveshaft hanger assembly, P/N 212-040-600-7 (TM 55-1520-236-23P-1, figure 87, items 16 and 44).

(b) One on both 42 degree gearbox quill assemblies, P/N 212-040-003-15/17 (figure 89, items 11 and 36).

(c) One on the 90 degree gearbox quill assembly, P/N 212-040-004-11 (figure 91, item 11).

(d) One on the tail rotor quill assembly, P/N 212-040-365-25 (figure 84, item 10).

NOTE

There are two possible locations for serial numbers on these couplings. Couplings made by Vard Precision are serialized on the flanged end of the coupling on the circular flat area adjacent to the curvic teeth. Couplings made by Bell Helicopter are probably marked on the outside cylindrical surface of the coupling, but may also be marked in the same area where the Vard couplings are marked.

NOTE

In order to easily identify the suspect couplings, some clean-up of the exterior surface of the coupling, or minimal paint removal, may be required. If paint is removed, re-apply IAW normal maintenance procedures.

b. Disconnect the driveshaft and inspect the flanged end of the coupling on the circular flat area adjacent to the curvic teeth for the presence of a vibro-etched serial number beginning with the prefix "VP-FS-".

(1) If the serial number prefix "VP-FS-" is found, proceed to paragraph 8.d.

(2) If a serial number prefix is found and it is not "VP-FS-", the couplings are serviceable and the **RED HORIZONTAL DASH //--//** will be cleared and compliance with subject message and TB 1-1520-243-20-27 will be noted. Proceed to paragraph 9.b. for notice of change to the technical manual inspection of the couplings.

c. If no serial number markings were found during the inspection IAW paragraph 8.b., inspect the outside cylindrical surface for cage code "97499" and /or a vibro-etched serial number.

(1) If no markings are found in this area, proceed to paragraph 9.a.

(2) If the serial number prefix found is not "VP-FS-", or if the cage code is "97499", the couplings are serviceable and the **RED HORIZONTAL DASH //--//** will be cleared and compliance with subject message and TB 1-1520-243-20-27 will be noted. Proceed to paragraph 9.b. for notice of change to the technical manual inspection of the couplings.

d. If the serial number prefix is "VP-FS-" and has a lot identification number of "L-60", proceed to paragraph 9.a.

e. If the serial number prefix is "VP-FS-", and lot identification number is other than "L-60", the couplings are serviceable and the **RED HORIZONTAL DASH //--//** will be cleared and compliance with subject message and TB 1-1520-243-20-27 will be noted. Proceed to paragraph 9.b. for notice of change to technical manual inspection of the couplings.

9. Corrective Procedures.

a. If no serial numbers are found, or if the part has the serial number prefix "VP-FS-" and the lot designator "L-60", the parts are unserviceable and shall be removed from service and demilitarized IAW paragraph 10.d.

b. An urgent manual change is currently being processed to add new inspection requirements for all driveshaft couplings (part number 204-040-604-5) to check for spline cracks during the existing 600 hour/annual inspection. Insert a copy of this message into the appropriate TM until the published change is available.

(1) For UH-1 users, add the following to TM 55-1520-210-23-1, paragraph 6-200.1 – Perform a visual inspection of all 204-040-604-5 couplings for spline cracks using a 3-10X magnifying glass. No cracks allowed.

(2) For AH-1 users, add the following to TM 55-1520-236-23-1, paragraph 6-128.1 – Perform a visual inspection of all 204-040-604-5 couplings for spline cracks using a 3-10X magnifying glass. No cracks allowed.

10. Supply/Parts and Disposition.

a. **Parts Required.** Items cited in paragraph 7 may be required to replace defective items.

b. **Requisitioning Instructions.** Requisition replacement parts using normal supply procedures. All requisitions shall use project code (CC 57-59) "XFM" (X-RAY-FOXTROT-MIKE).

NOTE

Project Code "XFM" is required to track and establish a data base of stock fund expenditures incurred by the field as a result of SOF actions.

c. **Bulk and Consumable Materials.** N/A.

d. **Disposition.** Demilitarize/mutilate IAW TM 1-1500-328-23 any part/component which does not meet inspection criteria.

e. **Disposition of Hazardous Material.** IAW Environmental Protection Agency directives as implemented by your servicing environmental coordinator (AR 200-1).

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

12. Application.

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

b. Estimated Time Required.

- (1) To conduct the initial visual inspection.
 - (a) Total of 1 man-hour using 1 person to conduct the initial inspection for each end item.
 - (b) Total of 1 hour downtime per end item.
- (2) To disassemble, inspect, and reassemble one coupling.
 - (a) Total of 3 man-hours using 1 person.
 - (b) Total of 3 hours downtime for each coupling disassembled.

c. Estimated Cost Impact to the Field.

NOMENCLATURE	P/N	NSN	QTY.	COST EA.	TOTAL COST
Driveshaft Coupling	204-040-604-5	1615-00-701-4142	1	\$441.06	\$441.06
Seal, driveshaft Coupling	204-040-611-1	5330-00-625-0132	1	\$1.64	\$1.64
NOTE Several alternate self-locking nuts are authorized for use (reference maintenance information message MIM-UH-1-87-XSOF-01).					
Nut, self-locking	52Z1835-048 524941	5310-00-688-2069	4	\$1.22	\$4.88
Nut, self-locking (Alternate)	FN1216-428 11502722-1 525-527-9002	5310-00-702-5020	4		
Nut, self-locking (Alternate)	MS21042L4	5310-00-807-1475	4		
Bolt, Machine	MS9089-24	5306-00-894-1067	4	\$0.42	\$1.68
Seal, Plain Encased	45185H60	5330-00-753-4432	4	\$16.09	\$64.36

Total cost per coupling = \$449.26.

Total cost per UH-1 (8 couplings & 4 encased seals) = \$3658.44

Total cost per AH-1 (7 couplings & 4 encased seals) = \$3209.18

d. TB/MWOs to be Applied Prior to or Concurrently with this Inspection. N/A

e. Publications which Require Change as a Result of this Inspection. TM 55-1520-210-23-1 and TM 55-1520-236-23-1 shall be changed to reflect this TB. A copy of this TB shall be inserted in the appropriate TM as authority to implement the change until the printed change is received.

13. References.

- a. TM 55-1520-210-23-1
- b. TM 55-1520-236-23-1.
- c. TM 55-1520-210-23P-1.
- d. TM 55-1520-236-23P-1.

- e. DA PAM 738-751.
- f. TB 1-1500-341-01.
- g. TM 1-1500-328-23.
- h. MIM-UH-1-87-XSOF-01.

14. Recording and Reporting Requirements.

a. Reporting Compliance Suspense Date (Aircraft). Upon entering requirements of subject message/TB on DA Form 2408-13-1 on all subject mission design series (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 IAW 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 UH-1-00-ASAM-04 and AH-1-00-ASAM-08 (TB 1-1520-243-20-27), date of entry on DA Form 2408-13-1, the aircraft MDS, and serial numbers of aircraft in numerical order.

b. Task/Inspection Reporting Suspense Date (Aircraft). No special report of the results of this inspection is required.

c. Reporting Message/TB Receipt (Spares).

- (1) **Materiel in Wholesale Depot Storage.** N/A.
- (2) **Materiel in Retail Storage.** N/A.

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

(1) **Materiel in Wholesale Depot Storage.** Report compliance with subject message/TB to the wholesale point of contact (spares) listed in paragraph 16.c. within 7 days of the date of subject message/TB on DD Form 1225. Provide the cost of compliance with subject message/TB to include an estimate of the reimbursable funding required to move serviceable items on hand listed in paragraphs 6 and 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 E-mail or datafax and provide local point of contact.

- (2) **Materiel in Retail Storage.** N/A.

e. The Following Forms are Applicable and are to be Completed in Accordance with DA Pamphlet 738-751, dated 15 March 1999:

NOTE

Unit Level Logistics System-Aviation (ULLS-A) users will use applicable electronic "E" forms.

- (1) DA Form 2408-5-1, Equipment Modification Record (UH-1/AH-1 90/42 degree gearbox and the AH-1 tail rotor quill assembly/transmission).
- (2) DA Form 2408-13, Aircraft Status Information Record.
- (3) DA Form 2408-13-1, Aircraft Inspection and Maintenance Record (only if the 90/42 degree gearbox, tail rotor quill assembly, and/or transmission assembly is removed/replaced).
- (4) DA Form 2408-15, Historical Record for Aircraft.
- (5) DA Form 2408-16, Aircraft Component Historical Record.
- (6) DA Form 2410, Component Removal and Repair/Overhaul Record (only if the 90/42 degree gearbox, tail rotor quill assembly, and/or transmission assembly is removed/replaced).

(7) DD Form 1574/DD Form 1574-1, Serviceable Tag/Label – Materiel (Color Yellow). Annotate Remarks Block with “Inspected Serviceable IAW UH-1-00-ASAM-04 and AH-1-00-ASAM-08 (TB 1-1520-243-20-27)”.

(8) DD Form 1575/DD Form 1575-1, Suspended Tag/Label – Materiel (Color Brown). Annotate Remarks Block with “Suspended IAW UH-1-00-ASAM-04 and AH-1-00-ASAM-08 (TB 1-1520-243-20-27)”.

(9) DD Form 1577/DD Form 1577-1, Unserviceable (Condemned) Tag/Label – Materiel (Color Red). Annotate remarks block with “Condemned IAW UH-1-00-ASAM-04 and AH-1-00-ASAM-08 (TB 1-1520-243-20-27) and Mutilated IAW TM 1-1500-328-23”.

(10) DD Form 1577-2/DD Form 1577-3, Unserviceable (Reparable) Tag/Label – Materiel (Color Green). Annotate remarks block with “Unserviceable IAW UH-1-00-ASAM-04 and AH-1-00-ASAM-08 (TB 1-1520-243-20-27)”.

15. Weight and Balance. N/A.

16. Points of Contact

a. Technical points of contact for this TB are:

(1) Primary – Mr. Steve Monaco, AMSAM-RD-AE-I-D-U, DSN 645-0078 or Commercial (256) 955-0078, Datafax is DSN 645-6590. E-mail is <steve.monaco@uh.redstone.army.mil>.

(2) Alternate – Mr. Gerald Johnson, AMSAM-RD-AE-I-D-O, DSN 645-9545 or Commercial (256) 955-9545. Datafax is DSN 645-9536. E-mail is <gerald.johnson@redstone.army.mil>.

b. Logistical points of contact for this TB are:

(1) For the UH-1 – Mike Haragan, AMSAM-DSA-UH-U, DSN 645-0211 or Commercial (256) 955-0211, Datafax is DSN 897-3770 or (256) 313-3770. E-mail is <mike.haragan@uh.redstone.army.mil>.

(2) For the AH-1

(a) Primary – Mr. Leonard Monk, AMSAM-DSA-CO, DSN 645-7605 or Commercial (256) 955-7605. Datafax is DSN 645-7125 or (256) 955-7125. E-mail is <leonard.monk@redstone.army.mil>.

(b) Alternate – Ms. Sue Lewis, AMSAM-DSA-CO, DSN 645-8249 or Commercial (256) 955-8249, Datafax is DSN 645-7125 or (256) 955-7125. E-mail is <susan.lewis@redstone.army.mil>.

c. Wholesale Materiel point of contact (Spares) is Ms. Sandra Walls, AMSAM-MMC-VS-UNA, DSN 897-1534 or Commercial (256) 313-1543, Datafax is DSN 897-1541. E-mail is <sandra.walls@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 (256) 876-4904. E-mail is <ann.waldeck@redstone.army.mil>.

e. Safety points of contact for this TB are:

(1) Primary – Mr. Harry Trumbull (SAIC), AMSAM-SF-A, DSN 897-2095 or Commercial (256) 313-2095, Datafax is DSN 895-2111 or (256) 313-2111. E-mail is <harry.trumbull@redstone.army.mil>.

(2) Alternate – Mr. Signey Hernandez, AMSAM-SF-A, DSN 897-2094 or Commercial (256) 313-2094, Datafax is DSN 897-2111. E-mail is <signey.hernandez@redstone.army.mil>.

f. Foreign Military Sales recipients requiring clarification of action advised by this TB should contact: CW5 Joseph L. Wittstrom, Security Assistance Management, AMSAM-SA, DSN 897-0410 or Commercial (256) 313-0410. E-mail is <wittstromjl@redstone.army.mil> or Mr. Ronnie W. Sammons, AMSAM-SA-CS-NF, DSN 897-0408 or Commercial (256) 313-0408. Datafax is DSN 897-0411 or Commercial (256) 313-0411. E-mail is <sammonsrw@redstone.army.mil>. Huntsville, AL, is GMT minus 5 hours.

g. After hours contact the AMCOM Command Operations Center (COC) DSN 897-2066/2067 or Commercial (256) 313-2066/2067.

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, Alabama 35898-5230. A reply will be furnished to you. You may also send in your comments electronically to our E-mail address at <ls-lp@redstone.army.mil>, or by datafax at DSN 788-6546 or commercial (256) 842-6546. Instructions for sending a DA Form 2028 by E-mail may be found at the back of most Technical Manuals.

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON
*Administrative Assistant to the
Secretary of the Army*
0013103

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

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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.

TEAR ALONG PERFORATED LINE

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

THE METRIC SYSTEM AND EQUIVALENTS

NEAR MEASURE

1 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

WEIGHTS

1 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

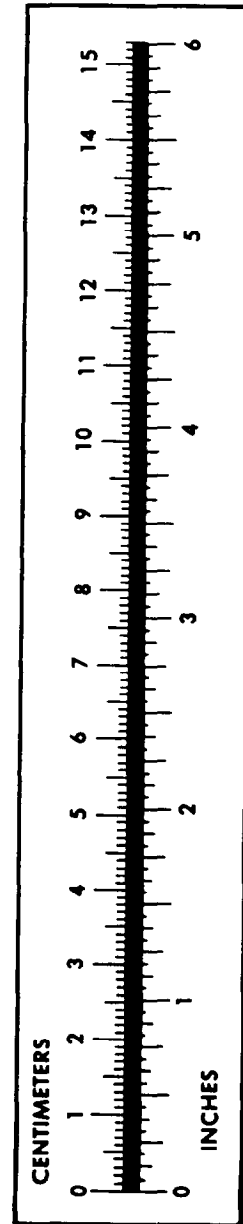
TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

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
its	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
meters per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



PIN: 078093-000