ROUTINE

***TB 1-1520-238-30-15**

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

TAIL ROTOR (T/R) HEAD ASSEMBLY INSTALLATION AND INSPECTION, AH-64 HELICOPTER

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

30 June 1999

NOTE

THIS PUBLICATION IS EFFECTIVE UNTIL RESCINDED OR SUPERSEDED.

1. Priority Classification.

a. Aircraft in Use. Upon receipt of this technical bulletin the condition status symbol of the cited aircraft will be changed to a Red Horizontal Dash //-//. The Red Horizontal Dash //-// may be cleared when the inspection of paragraphs 8.a. through 8.c. are completed. The affected aircraft shall be inspected as soon as practical but no later than the Task/Inspection suspense date. Failure to comply with the requirements of this message within the time frame will cause the status symbol to be upgraded to a red //x//.

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 – Same as paragraph 1 .a. (May return to nearest AH-64 maintenance facility.)

*This TB supersedes TB 1-1520-238-30-I 5, 7 December 1998, and USAAMCOM Aviation Safety Action Message 0118487 JUN 99 (AH-84-SS-ASAM-07).

(3) Aircraft that have a DD Form 250 and are still at Boeing will be inspected prior to ferry to final destination.

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

f. Components/Parts in Stock including War Reserves at All **Levels (Depot and others). N/A.**

2. **Task/Inspection Suspense Date.**

a. One-time torque check (paragraph 8.a.) of all AH-64 Tail Rotor Gearbox Output Shaft Stud Nuts no later than next 10 hour/l 4 day inspection.

b. If any nuts fail the torque check, all three studs must be replaced in accordance with paragraph 9, prior to next flight.

c. If nuts have not lost torque, perform the paragraph 8.d. through 8.p. inspection procedures no later than next 250 hour phase inspection.

3. Reporting Compliance Suspense Date. N/A.

4. Summary of Problem.

a. A past AH-64A mishap investigation determined the presence of an improperly installed (incorrectly indexed) Tail Rotor (T/R) Fork Assembly. The interface between the T/R Fork and the Gearbox Output Shaft (Curvic Coupling) was designed so that installation could be accomplished in only one way. The studs are in a triangular pattern but are not equally spaced (i.e., 115 degrees, 120 degrees, and 125 degrees of separation). An anomaly was discovered in this design, which may allow the curvic coupling and fork assembly to be incorrectly indexed during installation. If the fork is incorrectly indexed, binding of the studs occurs, stress levels increase, and fatigue life of the studs is greatly reduced. Improper installation of the fork could lead to failure of the Tail Rotor. Recently, more occurrences of misindexed T/R Fork Assemblies have been discovered.

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

c. The purpose of this message is to:

(1) Direct a one-time and recurring inspection of three T/R Gearbox Output Shaft Stud Nuts for torque. (If any of the nuts fail the torque check, all three studs must be replaced in accordance with paragraph 9 prior to the next flight.)

(2) Direct a one-time inspection of T/R Fork alignment to ensure proper indexing and that improper indexing has not occurred in past installations.

(3) Determine the condition of the T/R Gearbox Output Shaft Studs.

(4) Require positive verification of alignment prior to each installation of the Tail Rotor Head.

5. **End Items to be Inspected. All AH-64 aircraft.**

6. Assembly Components to be inspected.

Nomenclature	Part No.	NSN
Head, Rotary Wing	7-311421036	1615-01-l 54-7080
Head, Rotary Wing	7-311421036-7	1615-01-224-6951
Head, Rotary Wing	7-311421036-9/-1 l/-l 3	1615-01-307-0156
T/R Gearbox	7-311340001-3	1615-01-l 55-6583
T/R Gearbox	7-311340001-5/-7	1615-01-254-7793
T/R Output Shouldered Shaft	7-311340092	3040-01-l 72-8192

7. **Parts to be Inspected.**

Nomenclature	Part No.	NSN
Fork Assembly	7-211421008-9/-11	1615-01-221-2932
Fork Assembly	7-511421008	1615-01-461-5084
Stud, Locking	HS5155-0377	5307-01-l 77-5805
Nut, Self-Locking	HS4143-5	5310-01-184-0357
Nut, Self-Locking	NAS1726-7	531 O-01 -440-4438

8. **Inspection Procedures.**

NOTE

Inspection 8.a. is performed on the aircraft with nothing disassembled. The following 600 inch-pound torque check is only used to determine if the studs are in a loose condition.

a. No later than next 10 hour/l4 day inspection, perform torque check of three nuts, P/N HS4143-5, securing the T/R Fork to the T/R Gearbox Output Shaft (item 5, paragraph 5.61.3.a. of reference 13). Using a torque wrench set to 600 inch-pounds, attempt to turn each nut in a clockwise direction. Any rotation of the nut before 600 inch-pounds is unacceptable.

b. If nut rotation does not occur before 600 inch-pounds, verify proper indexing of tail rotor fork using paragraphs 8.d. through 8.p. no later than next 250 hour phase inspection.

c. If rotation of any of the nuts occurs before 600 inch-pounds, verify proper indexing of tail rotor fork using paragraphs 8.d. through 8.p. prior to the next flight.

NOTE

Task 5.61 of reference 13 refers to a single stud marked with an "X" on the end. An "X" on the stud may be unreliable and should be ignored. Positive verification of alignment shall be accomplished prior to each T/R Head installation.

d. Locate the number 1 hole in the T/R Fork. The number 1 hole is the hole adjacent to the Teeter Stop Arm. For clarification, refer to item 3 in paragraph 5.61.3(a) of reference 13. Apply torque stripe paint around this hole (not the stud).

NOTE

The following inspections are performed on the aircraft with T/R Blades installed.

e. Remove the three nuts securing the fork to the T/R Output Shaft. If any threads on the studs are crossed, stripped, or flattened, or if obvious necking of the threads is evident on the stud, replace the bad stud in accordance with paragraph 9.

CAUTION

Do not allow the T/R Head Assembly to rest on the studs while the T/R Head Assembly is slid out. Excessive bending loads may damage the studs.

f. Using two persons or an overhead hoist/crane to support the hub (while a third person performs the inspection below) slide the T/R Head Assembly out approximately 2-1/2 inches. (Do not completely remove the fork from the studs.)

g. Identify and number the studs using figures 1 through 3. The number 2 stud is the only stud centered on a spline tooth. Mark the end of the number 1 stud, located counterclockwise from the number 2 stud, using torque stripe paint.

h. If the number 1 stud marked above does not correspond with the number 1 fork hole marked in paragraph 8.d., the fork was incorrectly indexed during installation. Replace all three studs per paragraph 9.

NOTE

Axial wear of only the cadmium plating itself is not cause for rejection.

i. Inspect studs for axial scoring/gouging into the parent material. If scoring is detected, the Head Assembly was previously incorrectly indexed, and all three studs must be replaced per paragraph 9.

j. Check for radial wear marks (smiles) between l-112 and 2 inches outboard of the lockring, as shown in figure 4. If these marks exist or corrosion prevents inspection in the area between l-112 and 2 inches outboard of the lockring, replace all three studs using paragraph 9.

CAUTION

MIL-A-9962 abrasive mat or equivalent is aluminum oxide impregnated nylon webbing. Its use must be limited to the corroded areas in order to minimize the cadmium plating removal.

k. Check the remaining area on the studs for corrosion. (The remaining area is the area not between 1-1/2 and 2 inches outboard of the lockring.) General dulling of the surface is the first stage of corrosion. Darkening of the cadmium plate finish is not cause for rejection. Corrosion will appear brown or red in color. This corrosion is acceptable provided that deposits are easily removable with Scotchbrite, abrasive mat (MIL-A-9962, very fine, NSN 5350-00-967-5089) or equivalent. To remove corrosion, the Scotchbrite must be cut into a strip just wide enough to cover the corrosion products. The use of wider strips will remove cadmium plating, which will degrade the corrosion protection available. Apply Corrosion Preventive Compound, MIL-C-16173, Grade IV or equivalent to studs prior to reassembly. If corrosion cannot be easily removed, replace corroded studs in accordance with paragraph 9.

I. Check studs for looseness per TM l-1 520-238-23/Longbow IETM. Replace studs if free play exceeds 0.022 inch.

m. Check spline teeth on both the tail rotor fork and drive shaft for sealant. Remove sealant if present. Do not reapply sealant.

n. If none of the conditions identified in paragraph 8.h. through 8.m. exists, apply CPC MIL-C-16173 to studs and reinstall the T/R Head. Make sure that the number 1 stud and hole defined in paragraphs 8.d. and 8.g. are aligned.

o. Recheck torque in accordance with paragraph 9.f.

9. Correction Procedures.

a. Remove T/R Gearbox from the aircraft in accordance with task 6.145 of reference 13.

b. Contact local OLR site to replace all three T/R gearbox output shaft studs.

c. After the T/R Gearbox is returned from the OLR site, reinstall the Gearbox per task 6.145 of reference 13.

NOTE

The task in paragraph 9.c. will require three persons and an overhead crane/hoist. Do not endload the studs.

d. Apply Corrosion Preventive Compound, MIL-C-116173, Grade IV to studs.

e. Install the T/R Head, ensuring that the number 1 fork hole and stud established in paragraph 8.d. and 8.g. are aligned.

f. Recheck torque on the three (3) T/R Fork Nuts in accordance with paragraph 8.a. after next flight but not to exceed 10 flight hours.

(1) If no rotation is found (no loss of torque), inspection is complete. If any nut rotates, retorque the tail rotor fork nuts in accordance with paragraph 5.61 of reference 13.

(2) Recheck torque in accordance with paragraph 8.a. after next flight but not to exceed 10 flight hours. If any nut rotates after the second torque check, replace all three studs. If no loss of torque is detected, inspection is complete.

(3) Repeat torque check at each 250 hour phase inspection.

10. Supply/Parts and Disposition.

a. Parts Required. Items cited in paragraphs 6 and 7 may be required to replace defective items.

b. Requisitioning Instructions. Requisition replacement parts through normal supply channels using normal supply procedures.

c. Bulk and Consumable Materials.

NOTE

The following items are mandatory consumables to perform the inspection/correction. Other items may need to be replaced depending upon their condition.

(1) The following consumables are required to perform the inspection in paragraph 8.

Nomenclature	Part No.	NSN
Pin, Cotter	293-1014P19	5315-00-241-7330
Nut, Self-locking	MS21 224-8	5310-00-004-5119
Nut, Self-locking	MS21 224-6	531 O-00-004-51 18
Pin, Cotter	MS24665-153	5315-00-l 850037
Nut, Self-locking	MS1 7825-4	531 o-00-961 -8390
Nut, Self-locking	HS4143-5	531 O-01 -184-0357
Nut, Self-locking	HS5158-0389	5365-01-l 79-4301

(2) The following consumables are required to perform the correction in paragraph 9, if required.

Nomenclature	Part No.	NSN
Nut, Self-locking	HS4133-9	531 O-01 -176-7064
Nut, Self-locking	MS21 083N8	531 o-00-902-9369
Packing and Retainer	NAS1523AA6E	5330-01-040-7983
PLI Washer	HS4742-9D287	531 O-01 -176-7025

d. Disposition. Contact the Logistical Point of Contact for disposition instructions for the T/R Gearbox to the local OLR site.

e. Disposition of Hazardous Materials. N/A.

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

12. Application.

a. Category of Maintenance.

(1) AVUM shall perform the following:

(a) One-time torque check.

(b) Partial removal, inspection, and replacement of T/R Head with blades attached.

(c) Removal and Replacement of T/R Gearbox.

(2) OLR site shall perform stud replacement.

b. Time Required.

(1) Total of 0.5 man-hour using one person to check torque.

(2) Total of three (3) man-hours using three persons to partially remove, inspect, and replace the Tail Rotor Heads with blades attached.

(3) Total of nine (9) man-hours using two persons to remove and replace the T/R Gearbox.

c. Estimated Cost Impact of Stock Fund Items to the Field (if required). N/A.

d. Publications Requiring Change as a Result of this Inspection. TM I-l 520-238-23, TM I-l 520-238-PM, Longbow IETM shall be changed to reflect this TB. A copy of this TB shall be inserted in the appropriate manual as authority to implement the change until the printed change is received.

13. **References.** Refer to TM I-l 520-238-23, Aviation Unit and Intermediate Maintenance Manual, 16 May 1994.

14. Recording and Reporting Requirements.

a. Repotting compliance suspense date (aircraft) N/A.

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

c. Reporting Compliance Suspense Date (Spares). N/A.

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

e. The following forms are applicable and are to be completed in accordance with DA PAM 738-751, 15 June 1992.

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

(1) DA Form 2408-5-l) Equipment Modification Record (Tail Rotor Head Assembly)

(2) DA Form 2408-l 3, Aircraft Status Information Record.

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

(4) **DA** Form 2408-l 3-2, Related Maintenance Action Record.

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

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

(7) DA Form 2410, Component Removal and Repair/Overhaul Record (If the T/R head, T/R gearbox, T/R fork assembly, and/or locking stud (Local 2410) is removed, repaired and/or replaced).

15. Weight and Balance. N/A.

16. Points of Contact.

a. Technical – Mr. Kenneth Muzzo, AMSAM-AR-EI-P-A, DSN 897-4812 or Commercial (256) 313-4812. E-mail is kenneth.muzzo@avrdecr.redstone.army.mil. Datafax is DSN 897-4923 or Commercial (256) 313-4923.

b. Logistical – Mr. John Patton, SFAE-AV-AAH, DSN 897-4244 or Commercial (256) 313-4244. E-mail is pattonj@peoavn.redstone.army.mil. Datafax is DSN 897-4343 or Commercial (256) 313-4343.

c. Forms and Records – Ms. Ann Waldeck, AMSAM-MMC-RE-F, DSN 746-5564 or Commercial (256) 876-5564. Datafax is DSN 746-4904 or Commercial (256) 876-9404. E-mail is waldeck-ab@redstone.army.mil.

d. Safety – Mr. Howard Chilton, AMSAM-SF-A, DSN 897-2068 or Commercial (256) 313-2068. Datafax is Commercial (256) 313-2111. E-mail is chilton-hl@redstone.army.mil.

e. Foreign Military Sales recipients requiring clarification of action advised by this message should contact one of the following persons (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 is wittstrom-jl@redstone.army.mil.

(2) Mr. Ronnie W. Sammons, AMSAM-SA-CS-NF, DSN 897-0869 or Commercial (256) 313-0869. Datafax is DSN 897-0411 or Commercial (205) 313-0411. E-mail is sammons-rw@redstone.army.mil.

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

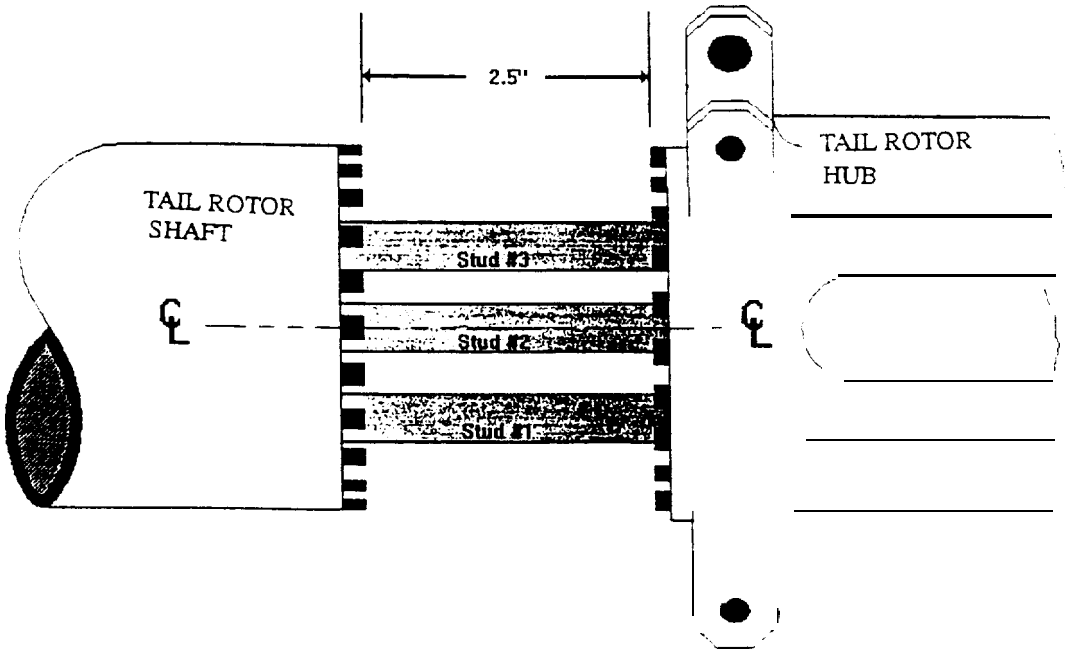


Figure 1. Tail Rotor Shaft. Hub, and Stubs.

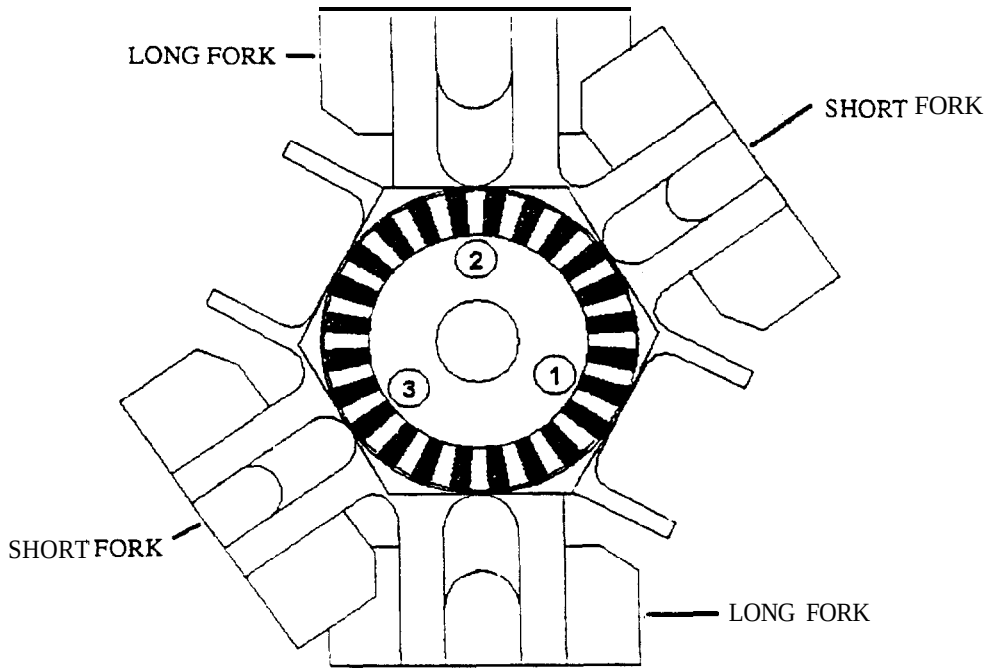


Figure 2. Base of T/R Fork.

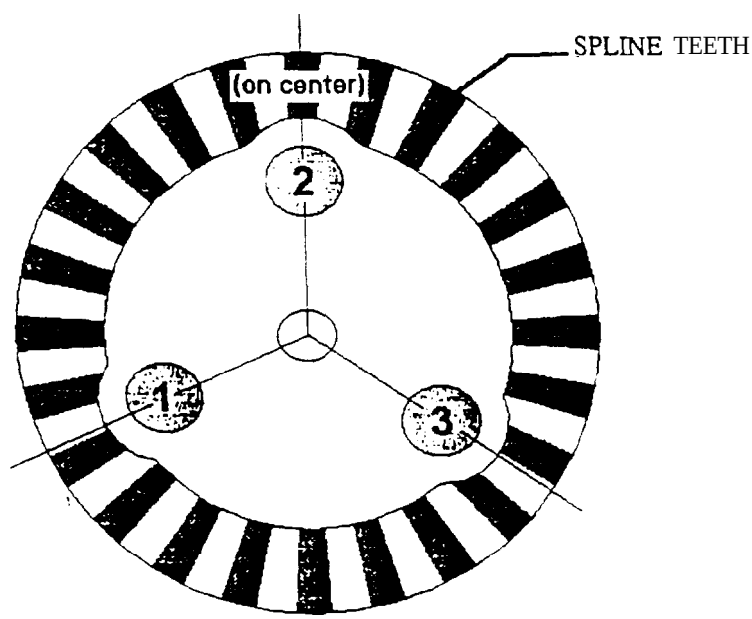


Figure 3. T/R Drive Shaft.

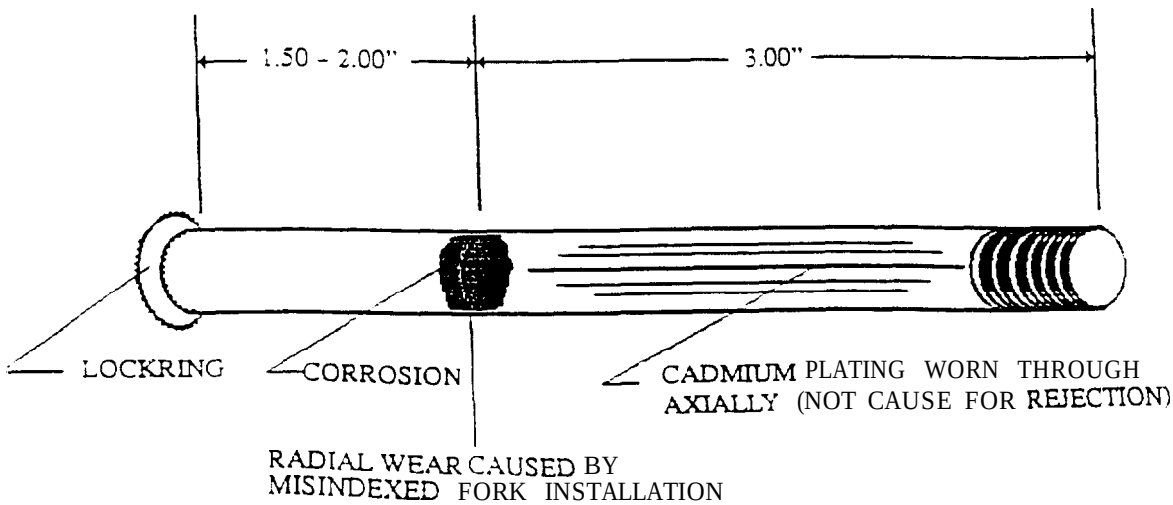
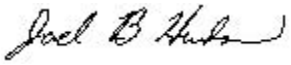


Figure 4. Stud Inspection Area.

By Order of the Secretary of the Army:

Official:



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

9918001

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General, United States Army
Chief of Staff

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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

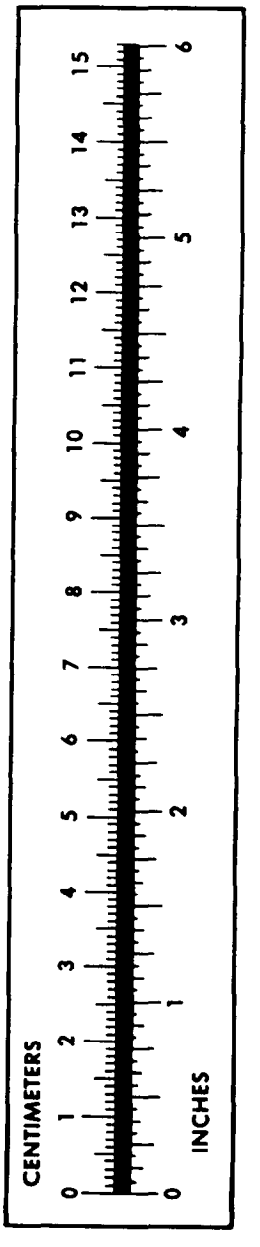
TEMPERATURE

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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