

3 April 1992

(Supersedes LO 5-2420-222-12,  
dated 1 September 1987)

**TRACTOR, WHEELED, DED LOADER BACKHOE:  
WITH HYDRAULIC IMPACT TOOL  
AND WITH HYDRAULIC EARTH  
AUGER ATTACHMENT**

JOHN DEERE MODEL JD410(CCE)

**WITH BUCKET, IMPACTOR,  
AND EARTH DRILL  
NSN 2420-00-567-0135**

Reference: TM 6-2420-222-10, TM 5-2420-222-20, and C9100-IL.

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time you need to do all the services prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied unless changed by the Army Oil Analysis Program (AOAP) laboratory. Change the hard time interval if your lubricants are contaminated or if you are operating the equipment under adverse operating conditions, including longer-than-usual operating hours. The hard time interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals will be applied in the event AOAP laboratory support is not available.

**WARNING**

**Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles**

**and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.**

Clean fittings before lubricating. Clean parts with dry cleaning solvent P-D-680, Type II or equivalent. Dry before lubricating.

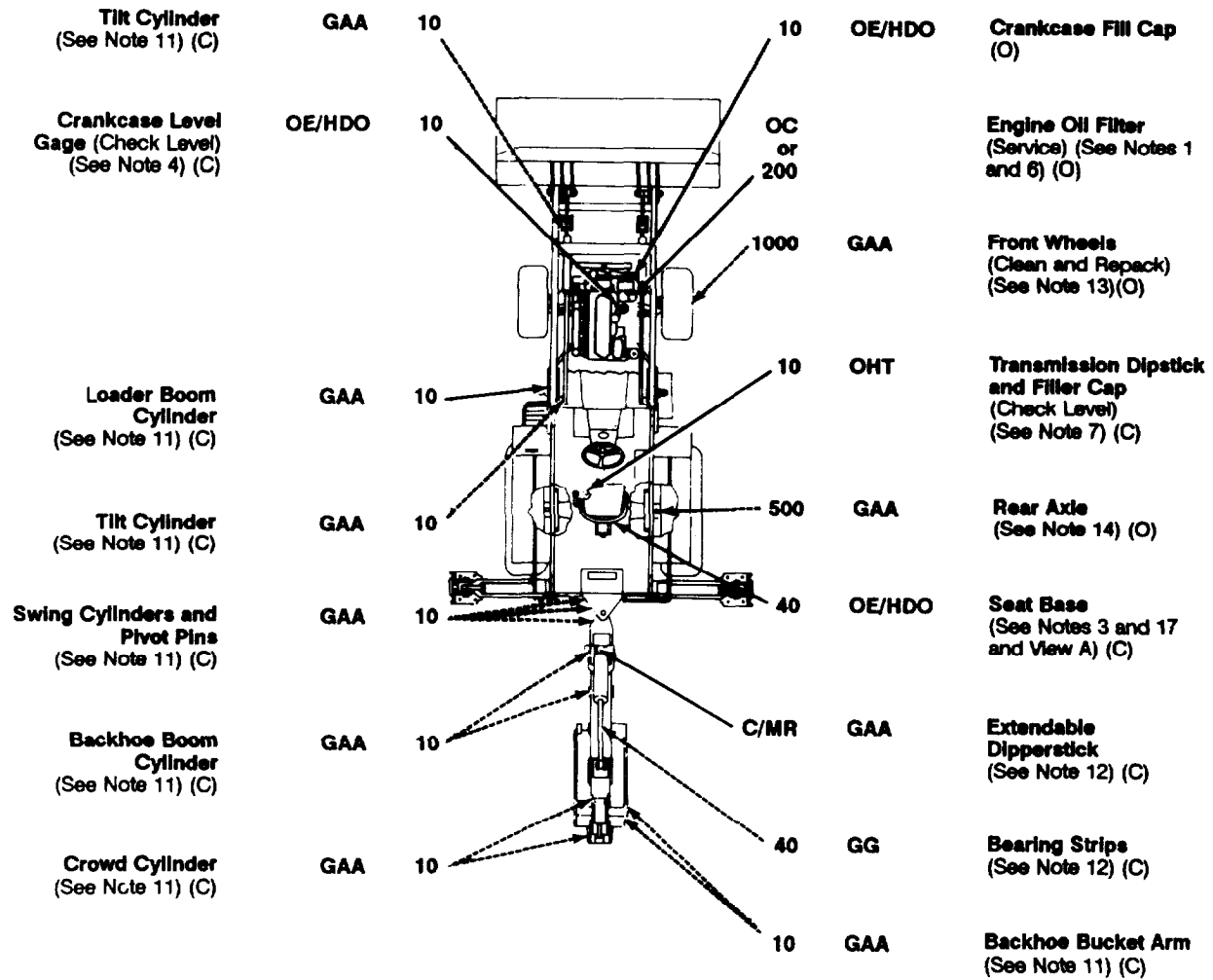
Broken arrow shafts (- - -) indicate lubrication points on both sides of the equipment.

The lowest level of maintenance authorized to lubricate a point is indicated by one of the following: (C) for Crew/Operator, or (O) for Organizational Maintenance.

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

Approved for public release; distribution is unlimited.



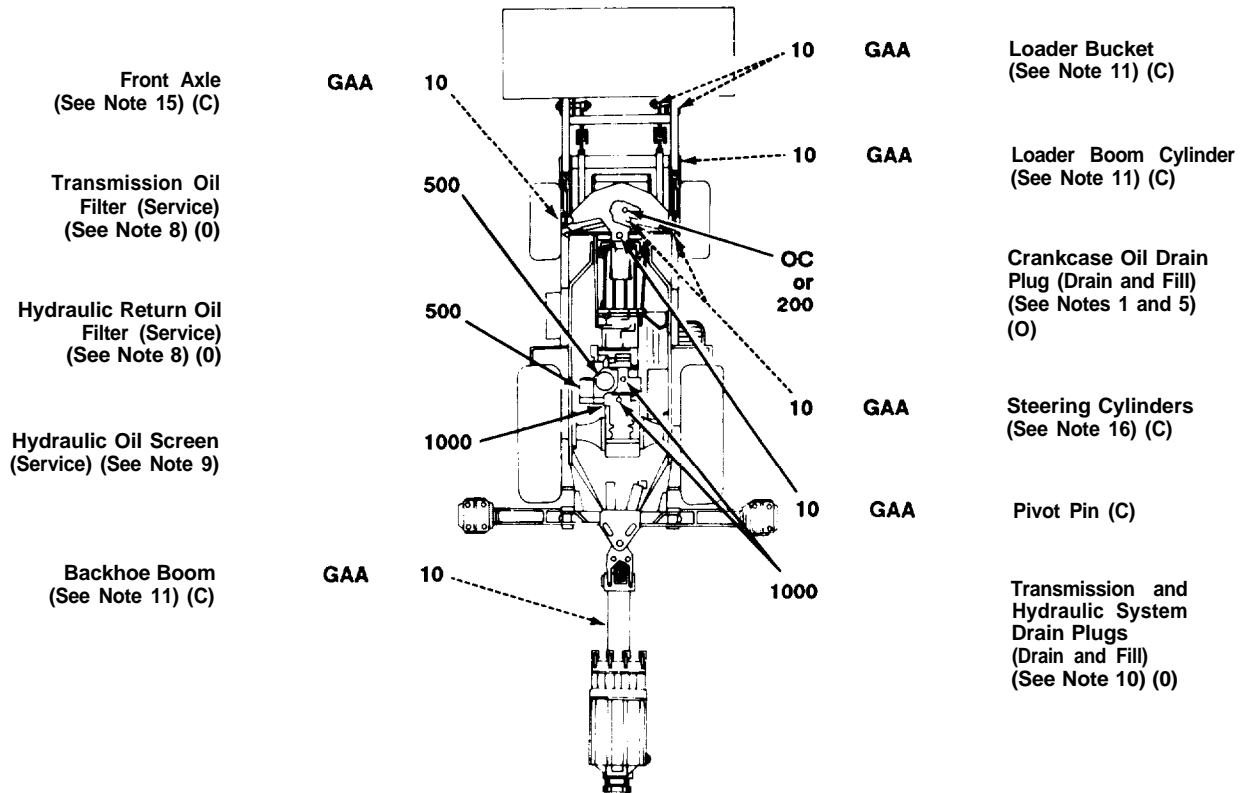
TOP VIEW

TOTAL MAN-HOURS*		TOTAL MAN-HOURS*	
INTERVAL	MAN-HOUR	INTERVAL	MAN-HOUR
10	1.0	500	0.5
40	0.5	1000	2.0
200	1.0		

\*The time specified is the time to required to perform all services at the particular interval (on-condition or hard time).

LUBRICANT • INTERVAL

INTERVAL • LUBRICANT



**BOTTOM VIEW**

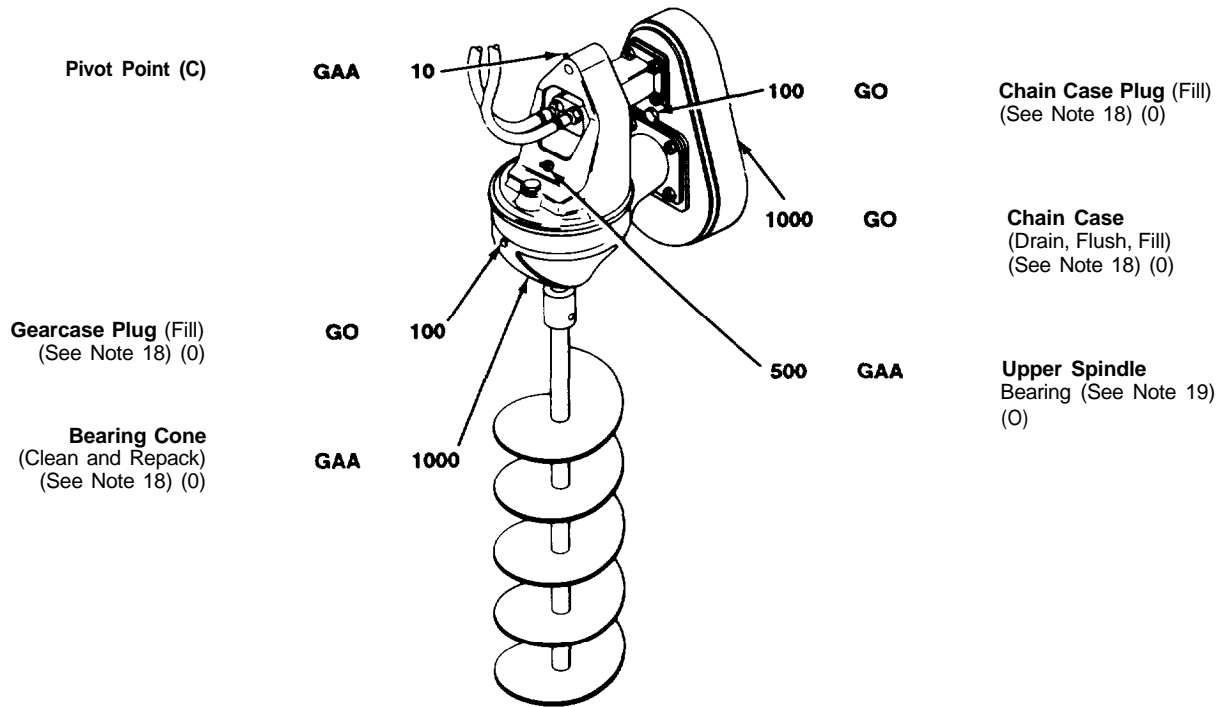
TOTAL MAN-HOURS+		TOTAL MAN-HOURS*	
INTERVAL	MAN-HOUR	INTERVAL	MAN-HOUR
10	1.0	500	0.5
200	1.0	1000	2.0

\* The time specified is the time required to perform all services at the particular interval (on-condition or hard time).

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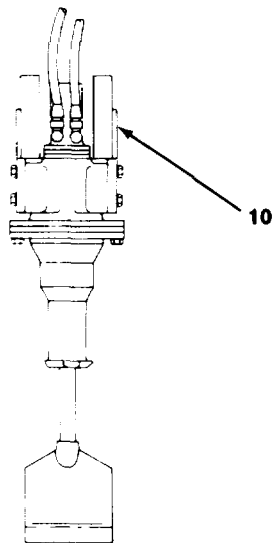
LUBRICANT • INTERVAL

INTERVAL • LUBRICANT



**EARTH DRILL**

INTERVAL • LUBRICANT



**Impactor**  
 (See Note 20) (0)

TOTAL MAN-HOURS*		TOTAL MAN-HOURS*	
INTERVAL	MAN-HOUR	INTERVAL	MAN-HOUR
10	1.0	500	0.5
100	1.0	1000	2.0

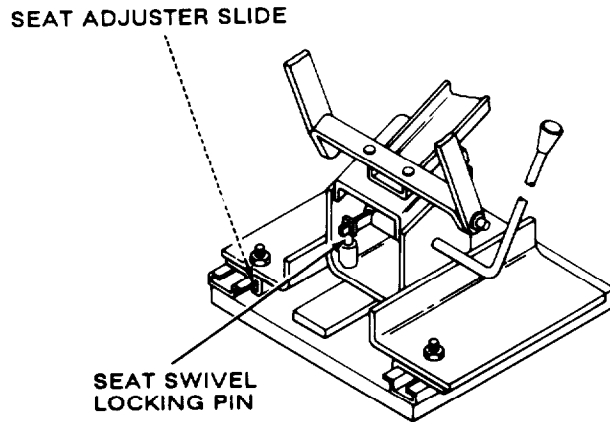
\* The time specified is the time required to perform all services at the particular interval (on-condition or hard time).

- KEY -

LUBRICANTS	CAPACITIES	EXPECTED TEMPERATURES			INTERVALS
		ABOVE +32°F (ABOVE +0°C)	+40°F to -10°F (+4°C to -23°C)	0°F to -65°F (-180°C to -54°C)	
OE/HDO (MIL-L-2104) Lubricating Oil, ICE, Tactical		OE/HDO 30	OE/HDO 10	-	C/MR: Condi- tion Monitor  Intervals given are in hours of normal opera- tion.
OEA (MIL-L-46167) Lubricating Oil, ICE, Arctic		-	-	OEA	
Engine Crankcase	9 qt (8.5 l)				
Oil Can Points (See Note 3)					
GO (MIL-L-2105) Lubricating Oil, Gear, Multipurpose		GO 80W/90	GO 80W/90	GO 75W	
GAA (MIL-G-10924) Grease, Automotive and Artillery		ALL TEMPERATURES			
HTC AE988 Impactor Lubricant		ALL TEMPERATURES			
GG (MIL-L-24131) Graphite		ALL TEMPERATURES			
OHT (MIL-H-6083) Hydraulic Fluid, Petroleum Base		ALL TEMPERATURES			
Transmission and Hydraulic System	82 qt (77.6 l)	ALL TEMPERATURES			

FOR ARCTIC OPERATION REFER TO FM 9-207

**A Seat Base**



**NOTES:**

1. **ARMY OIL ANALYSIS PROGRAM (AOAP).** For Active Army units, obtain samples from engine every 50 hours of operation or 60 days, whichever comes first. Reserve and National Guard activities will use 50 hours or 120 days as the prescribed sample intervals. Reserve and National Guard equipment in frequent use during active training period will adhere to the schedule for Active Army units. As a minimum, one sample from each unit's two week active training period will be submitted for each item of equipment. Send oil samples as soon as they have been taken to the nearest AOAP laboratory. Refer to TB 43-0210 for sampling instructions. When or if AOAP laboratory support is unavailable, hard time intervals will apply.
2. **FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -15°F (-26°C).** Remove lubricants prescribed in Key for temperatures above -15°F (-26°C). Relubricate with lubricants specified in Key for temperatures below -15°F (-26°C). If OEA lubricant is required to meet the temperature ranges prescribed in the Key, OEA lubricant is to be used in place of OE/HDO lubricant for all temperature ranges where OE/HDO is specified in the Key.
3. **OIL CAN POINTS.** Every 10 hours, lubricate linkage pins, throttle and governor linkage, clevises, all exposed adjusting threads, swivel locking pin of seat with OE/HDO or OEA as needed.
4. **CRANKCASE OIL LEVEL HOT OR COLD CHECK.** Oil level should be at H (High) mark on dipstick if engine is cold. If engine has been running, shut down engine and allow to sit five minutes before checking; oil level should be between H (High) and L (Low) marks on dipstick.

**NOTE**

**OE/HDO 15/40 may be used instead of OE/HDO 30 at +5°F (-15%) and above.**

5. **CRANKCASE.** Oil is to be changed each time an engine oil change is directed by AOAP laboratory. When AOAP laboratory support is not available, change oil every 100 hours. Drain when lubricant is warm.
6. **ENGINE OIL FILTER.** Replace filter element each time an engine oil change is directed by AOAP laboratory. Fill new oil filters with clean oil and install. Fill crankcase, operate engine five minutes, and check for leaks. Shut down engine, wait five minutes, check crankcase level and bring to H (High) mark. When AOAP laboratory support is not available, install new oil filters every 100 hours.
7. **TRANSMISSION DIPSTICK AND FILLER CAP.** Run engine two to three minutes. Check oil level when unit is on level ground, engine running at slow idle, loader bucket lowered, backhoe in transport position, range shift lever in (P) park, gearshift lever in neutral, and clutch engaged. If oil level is down to bottom mark on dipstick when dipstick is on filler tube, add oil.
8. **TRANSMISSION AND HYDRAULIC SYSTEM FILTERS.** Change filters after the first 50 hours; thereafter, every 500 hours. Add lubricant specified in Key.
9. **TRANSMISSION AND HYDRAULIC SYSTEM INTAKE SCREEN.** Each 1000 hours, remove and clean intake screen. Check hydraulic fluid level (see Note 7).

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**NOTES (CON'T):**

**10. TRANSMISSION AND HYDRAULIC SYSTEM DRAIN PLUGS.** Each 1000 hours remove drain plugs and drain fluid. Replace drain plugs and refill. Check fluid level (see Note 5).

**11. BACKHOE/LOADER BOOMS; BUCKET ARM; TILT, SWING, AND CROWD CYLINDER PIVOT POINTS.** When operating under adverse conditions (wet or muddy), lubricate every five hours (two strokes).

**12. EXTENDABLE DIPPERSTICK AND BEARING STRIPS.** Lubricate extendable dipperstick fitting as needed (two to four strokes). Clean bearing strips and lubricate once a week with Graphite (dry film) lube (MIL-L-24131).

**13. FRONT WHEELS.** Every 1000 hours, clean, repack, and adjust. Inspect grease seals for damaged or hardened lips. Install new seals if necessary. If backhoe loader is being operated in extremely wet and muddy conditions, grease front wheels daily (two to four strokes), until wheels can be removed and bearings cleaned and packed.

**14. REAR AXLE.** Each 500 hours, lubricate rear axle (eight strokes).

**15. FRONT AXLE.** Each 10 hours, lubricate grease points (two to four strokes).

**16. STEERING CYLINDERS.** Each 10 hours lubricate grease points (two to four strokes).

**17. SEAT.** Each 10 hours, lubricate locking pin slide and bearing contact area on both ends of adjuster.

**18. HYDRAULIC EARTH DRILL.** Each 100 hours, check gearcase and chain case oil level. Change gear lubricant if contaminated by water or other foreign material. Fill with spindle in vertical position. Operate for five minutes. Check for leaks and bring oil level to plug opening. Each 1000 hours, drain

chain case, and flush and fill with gear lubricant. Each 1000 hours, drain gearcase and remove cover. Clean bearing cone and repack. Replace cover and fill with gear lubricant.

**19. UPPER SPINDLE BEARING.** Each 500 hours, lubricate fitting (four strokes).

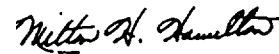
**20. IMPACTOR.** Every 10 hours, lubricate using only HTC-AE988; no other lubricants are authorized. when operating impactor under heavy usage, lubricate every five hours.

A copy of this Lubrication Order will remain with the equipment at all times. Instructions contained herein are mandatory.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN  
General, United States Army  
Chief of Staff

Official:



MILTON H. HAMILTON  
Administrative Assistant to the  
Secretary of the Army  
00763

Distribution:

To be distributed in accordance with DA Form 12-25-E, Block 4418, Unit maintenance requirements for LO 5-2490-222-12.

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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

## WEIGHT 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
ometers per Liter	Miles per Gallon	2.354
ometers per Hour	Miles per Hour	0.621



**PIN: 062486-000**