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Test 1348: Kubota M4500DT and M4500 Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1348 — KUBOTA M4500DT DIESEL ALSO KUBOTA M4500 DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °F (°C)			Barometer inch Hg (kPa)	
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—640 rpm)									
49.72 (37.07)	2600	3.460 (13.098)	0.491 (0.299)	14.37 (2.831)	222 (105.8)	55 (12.9)	75 (23.8)	28.943 (97.737)	
Standard Power Take-Off Speed (540 rpm)—One Hour									
44.49 (33.17)	2192	2.928 (11.085)	0.465 (0.283)	15.19 (2.993)	223 (106.3)	54 (12.2)	75 (23.9)	28.930 (97.692)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
42.87 (31.97)	2638	2.935 (11.112)	0.484 (0.294)	14.60 (2.877)	206 (96.7)	54 (12.2)	75 (23.9)	.....
0.00 (0.00)	2787	0.981 (3.715)	.....	.....	184 (84.4)	54 (12.2)	75 (23.9)	.....
22.08 (16.46)	2716	1.856 (7.027)	0.594 (0.361)	11.89 (2.343)	188 (86.7)	54 (12.2)	75 (23.9)	.....
50.59 (37.73)	2600	3.522 (13.331)	0.492 (0.299)	14.37 (2.830)	217 (102.8)	56 (13.1)	75 (23.9)	.....
11.13 (8.30)	2740	1.376 (5.210)	0.873 (0.531)	8.09 (1.593)	184 (84.4)	56 (13.6)	75 (23.9)	.....
32.74 (24.42)	2685	2.370 (8.973)	0.511 (0.311)	13.81 (2.721)	192 (88.6)	56 (13.6)	75 (23.9)	.....
Av Av	26.57 (19.81)	2694	2.174 (8.228)	0.578 (0.351)	12.22 (2.408)	195 (90.6)	55 (12.8)	75 (23.9)	28.917 (97.649)

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 13th (HH-1) Gear											
40.85 (30.46)	3102 (13.80)	4.94 (7.95)	2600	9.96	3.434 (12.999)	0.594 (0.361)	11.90 (2.343)	210 (98.9)	59 (15.0)	68 (20.0)	28.935 (97.709)
75% of Pull at Maximum Power—Ten Hours 13th (HH-1) Gear											
33.24 (24.79)	2389 (10.63)	5.22 (8.40)	2660	6.96	2.765 (10.466)	0.587 (0.357)	12.02 (2.369)	191 (88.3)	59 (15.0)	69 (20.6)	28.877 (97.513)
50% of Pull at Maximum Power—Two Hours 13th (HH-1) Gear											
23.06 (17.20)	1601 (7.12)	5.40 (8.69)	2691	4.77	2.142 (8.107)	0.656 (0.399)	10.77 (2.121)	187 (85.8)	60 (15.3)	66 (18.6)	28.990 (97.895)
50% of Pull at Reduced Engine Speed—Two Hours 14th (HH-2) Gear											
23.10 (17.23)	1599 (7.11)	5.42 (8.72)	2211	4.53	1.876 (7.102)	0.574 (0.349)	12.31 (2.425)	188 (86.4)	62 (16.7)	73 (22.5)	28.990 (97.895)

MAXIMUM POWER IN SELECTED GEARS

33.75 (25.17)	4812 (21.40)	2.63 (4.23)	2679	14.99	11th (HL-3) Gear			186 (85.6)	54 (12.2)	56 (13.3)	29.010 (97.962)
41.17 (30.70)	4335 (19.28)	3.56 (5.73)	2600	13.21	12th (HL-4) Gear			194 (90.0)	55 (12.8)	57 (13.9)	28.990 (97.895)
41.96 (31.29)	3187 (14.18)	4.94 (7.95)	2600	9.90	13th (HH-1) Gear			199 (92.8)	55 (12.8)	58 (14.4)	28.940 (97.726)
42.50 (31.69)	2588 (11.51)	6.16 (9.91)	2600	7.63	14th (HH-2) Gear			204 (95.6)	57 (13.9)	65 (18.3)	28.940 (97.726)

LUGGING ABILITY IN 13th (HH-1) GEAR

Crankshaft Speed rpm		2600	2343	2080	1824	1558	1298	1027
Pull—lbs (kN)		3187 (14.18)	3319 (14.76)	3409 (15.16)	3549 (15.79)	3675 (16.35)	3795 (16.88)	3625 (16.12)
Increase in Pull %		0	4	7	11	15	19	14
Power—Hp (kW)		41.96 (31.29)	39.21 (29.24)	35.60 (26.55)	32.36 (24.13)	28.42 (21.19)	24.25 (18.08)	18.46 (13.77)
Speed—Mph (km/h)		4.94 (7.95)	4.43 (7.13)	3.92 (6.30)	3.42 (5.50)	2.90 (4.67)	2.40 (3.86)	1.91 (3.07)
Slip %		9.90	10.22	10.64	11.05	11.77	12.37	11.77

Department of Agricultural Engineering

Dates of Test: May 12—22, 1980

Manufacturer: KUBOTA LTD, 22 Funade-cho, 2-chome, Naniwa-ku, Osaka, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 47.9 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° (15°/15°)** 0.8482 **Fuel weight** 7.062 lbs/gal (0.846 kg/l) **Oil SAE 20-20W API service classification** SB/SE-CA/CD **To motor** 2.682 gal (10.151 l) **Drained from motor** 2.586 gal (9.788 l) **Transmission and final drive lubricant** SAE 80 **Total time engine was operated** 38.5 hours.

ENGINE Make Kubota Dsl **Type** six cylinder vertical **Serial No.** S2600-A-1622 **Crankshaft** lengthwise **Rated rpm** 2600 **Bore and stroke** 3.23" × 3.23" (82 mm × 82 mm) **Compression ratio** 21 to 1 **Displacement** 158.5 cu in (2598 ml) **Starting system** 12 volt **Lubrication pressure** **Air cleaner** one paper element **Oil filter** one full flow paper cartridge **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** one thermostat

CHASSIS: Type front wheel assist **Serial No.** M4500DT-10788 **Tread width** rear 51.2" (1300 mm) to 74.8" (1900 mm) front 55.9" (1420 mm) **Wheel base** 79.5" (2020 mm) **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 35.2" (895 mm) Vertical distance above roadway 39.3" (999 mm) Horizontal distance from center of rear wheel tread 0" (0 mm) to the right/left **Hydraulic control system** direct engine drive **Transmission** Selective gear fixed ratio **Advertised speeds mph (km/h)** first 0.3 (0.4) second 0.3 (0.5) third 0.5 (0.9) fourth 0.7 (1.2) fifth 1.0 (1.6) sixth 1.2 (1.9) seventh 1.5 (2.4) eighth 1.8 (3.0) ninth 2.0 (3.2) tenth 2.8 (4.4) eleventh 3.1 (5.0) twelfth 4.2 (6.8) thirteenth 5.6 (9.1) fourteenth 6.9 (11.0) fifteenth 11.6 (18.6) sixteenth 15.8 (25.4) reverse 0.3 (0.5), 1.3 (2.0), 2.0 (3.2), 7.4 (11.9) **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together and hand lever **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 122" (3.10 m) left 122" (3.10 m) (on concrete surface without brake) right 153.5" (3.90 m) left 153.5" (3.90 m) **Turning space diameter** (on concrete surface with brake applied) right 252" (6.40 m) left 252" (6.40 m) (on concrete surface without brake) right 315" (8.00 m) left 315" (8.00 m) **Power take-off** 540 rpm at 2192 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Temperature at injection pump was 165°F (73.8°C). Four gears were chosen between 15% slip and 10 mph (16.1 km/h).

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	91.5	90.5
75% of Pull at Maximum Power—Ten Hours	—	90.0
50% of Pull at Maximum Power—Two Hours	—	90.0
50% of Pull at Reduced Engine Speed—Two Hours	—	88.0
Bystander in 16th (HH-4) gear	—	79.5

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Temp. °F (°C) Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 13th (HH-1) Gear											
41.09 (30.64)	2966 (13.19)	5.20 (8.36)	2601	6.93	3.345 (12.664)	0.575 (0.350)	12.28 (2.419)	213 (100.3)	60 (15.6)	71 (21.4)	28.915 (97.642)

MAXIMUM POWER IN SELECTED GEARS

36.68 (27.35)	5932 (26.39)	2.32 (3.73)	2638	14.96	10th (LH-4) Gear			191 (88.1)	54 (12.2)	56 (13.3)	29.010 (97.962)
42.53 (31.71)	3077 (13.69)	5.18 (8.34)	2598	7.05	13th (HH-1) Gear			203 (94.7)	56 (13.3)	61 (16.1)	28.940 (97.726)
42.00 (31.32)	2452 (10.91)	6.42 (10.34)	2601	5.59	14th (HH-2) Gear			204 (95.3)	56 (13.3)	63 (17.2)	28.940 (97.726)

TIRES, BALLAST AND WEIGHT

Rear Tires
—No., size, ply & psi (kPa)
Ballast —Liquid (each)
—Cast Iron (each)

Front Tires
—No., size, ply & psi (kPa)
Ballast —Liquid (each)
—Cast Iron (each)

Height of Drawbar

Static Weight with Operator—Rear
—Front
—Total

With Ballast

Two 14.9-28; 6; 16 (110)
520 lb (236 kg)
475 lb (215 kg)

Two 9.5-24; 6; 18 (125)
None
323 lb (146 kg)

18 in (455 mm)

5020 lb (2277 kg)
2780 lb (1261 kg)
7800 lb (3538 kg)

Without Ballast

Two 14.9-28; 6; 16 (110)
None
None

Two 9.5-24; 6; 18 (125)
None
None

18 in (455 mm)

3030 lb (1375 kg)
2135 lb (968 kg)
5165 lb (2343 kg)

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1348.

LOUIS I. LEVITICUS

Engineer-in Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

K. VON BARGEN

Board of Tractor Test Engineers



Kubota M4500DT Diesel

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