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Test 1394: John Deere 2240 Diesel 8-Speed TSS Transmission

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1394 — JOHN DEERE 2240 DIESEL 8 SPEED TSS TRANSMISSION (WITH MECHANICAL FRONT WHEEL DRIVE)

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—567 rpm)								
50.90 (37.96)	2500	3.404 (12.886)	0.469 (0.285)	14.96 (2.946)	190 (87.9)	64 (17.9)	76 (24.3)	28.863 (97.467)
Standard Power take-off Speed (540 rpm)—One Hour								
49.20 (36.69)	2383	3.211 (12.155)	0.457 (0.278)	15.32 (3.019)	191 (88.3)	65 (18.3)	77 (24.9)	28.855 (97.439)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
45.07 (33.61)	2604	3.095 (11.716)	0.481 (0.293)	14.56 (2.869)	186 (85.6)	65 (18.3)	77 (25.0)	..... .....
0.00 (0.00)	2651	1.336 (5.057)	..... .....	..... .....	173 (78.3)	65 (18.3)	78 (25.3)	..... .....
22.67 (16.91)	2622	2.025 (7.665)	0.626 (0.381)	11.20 (2.206)	177 (80.3)	66 (18.6)	78 (25.3)	..... .....
51.24 (38.21)	2499	3.408 (12.901)	0.466 (0.284)	15.04 (2.962)	191 (88.1)	66 (18.6)	78 (25.3)	..... .....
11.42 (8.52)	2640	1.618 (6.125)	0.993 (0.604)	7.06 (1.391)	175 (79.2)	66 (18.9)	78 (25.6)	..... .....
33.71 (25.14)	2596	2.487 (9.414)	0.517 (0.315)	13.55 (2.670)	181 (82.5)	67 (19.2)	80 (26.4)	..... .....
Av 27.35 Av (20.39)	2602	2.328 (8.812)	0.597 (0.363)	11.75 (2.314)	180 (82.3)	66 (18.7)	78 (25.4)	28.843 (97.397)

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			
					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	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 4th Gear											
40.16 (29.95)	2958 (13.16)	5.09 (8.19)	2502	4.88	3.353 (12.694)	0.585 (0.356)	11.98 (2.360)	194 (90.0)	66 (18.9)	78 (25.6)	28.75 (97.080)
75% of Pull at Maximum Power—Ten Hours 4th Gear											
33.46 (24.95)	2334 (10.38)	5.38 (8.65)	2604	3.53	2.922 (11.060)	0.612 (0.372)	11.45 (2.256)	186 (85.4)	67 (19.4)	75 (23.8)	28.715 (96.966)
50% of Pull at Maximum Power—Two Hours 4th Gear											
22.67 (16.91)	1547 (6.88)	5.50 (8.85)	2628	2.31	2.319 (8.778)	0.717 (0.436)	9.78 (1.926)	184 (84.4)	70 (20.8)	83 (28.3)	28.710 (96.950)
50% of Pull at Reduced Engine Speed—Two Hours 6th Gear											
22.76 (16.97)	1552 (6.90)	5.50 (8.85)	1491	2.51	1.766 (6.684)	0.544 (0.331)	12.89 (2.539)	182 (83.1)	64 (17.8)	77 (24.7)	28.805 (97.270)
MAXIMUM POWER IN SELECTED GEARS											
36.92 (27.53)	5777 (25.70)	2.40 (3.86)	2550	14.92	2nd Gear			182 (83.3)	59 (15.0)	64 (17.8)	28.840 (97.390)
41.22 (30.73)	4208 (18.72)	3.67 (5.91)	2500	7.43	3rd Gear			191 (88.1)	58 (14.4)	67 (19.4)	28.780 (97.190)
42.13 (31.42)	3107 (13.82)	5.08 (8.18)	2500	4.94	4th Gear			190 (87.5)	56 (13.3)	65 (18.3)	28.790 (97.220)
41.74 (31.13)	2373 (10.56)	6.60 (10.61)	2500	3.68	5th Gear			189 (87.2)	59 (15.0)	68 (20.0)	28.780 (97.190)
39.89 (29.75)	1620 (7.20)	9.24 (14.86)	2500	2.31	6th Gear			189 (87.2)	61 (16.1)	72 (22.2)	28.780 (97.190)

LUGGING ABILITY IN 4th GEAR

Crankshaft Speed rpm	2500	2247	1996	1741	1501	1254
Pull—lbs (kN)	3107 (13.82)	3319 (14.76)	3477 (15.47)	3623 (16.12)	3727 (16.58)	3600 (16.01)
Increase in Pull %	0	7	12	17	20	16
Power—Hp (kW)	42.13 (31.42)	40.20 (29.97)	37.29 (27.80)	33.78 (25.19)	29.86 (22.27)	24.17 (18.02)
Speed—Mph (km/h)	5.08 (8.18)	4.54 (7.31)	4.02 (6.47)	3.50 (5.63)	3.00 (4.83)	2.52 (4.05)
Slip %	4.94	5.56	5.80	6.05	6.53	6.05

Department of Agricultural Engineering

Dates of Test: May 26 to June 4, 1981

Manufacturer: JOHN DEERE WERKE

MANNHEIM, Mannheim, West Germany

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 46.3 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° (15°/15°)** 0.8417 **Fuel weight** 7.008 lbs/gal (0.840 kg/l) **Oil SAE 30 API service classification** CD/SD **To motor** 1.927 gal (7.294 l) **Drained from motor** 1.557 gal (5.894 l) **Transmission and final drive lubricant** John Deere Hy Gard Fluid **Front axle lubricant** EP SAE 90 transmission oil **Total time engine was operated** 40.0 hours.

ENGINE: Make John Deere Diesel **Type** three cylinder vertical **Serial No.** 3179DL01 480974CD **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 4.19" × 4.33" (106.5 mm × 110 mm) **Compression ratio** 16.8 to 1 **Displacement** 179 cu in (2934 ml) **Starting system** 12 volt **Lubrication pressure** **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** one paper element and one mesh strainer **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** 2240-400231L **Tread width** rear 55.1" (1400 mm) to 78.7" (2000 mm) front 53" (1350 mm) to 77" (1950 mm) **Wheel base** 81" (2060 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 32.6" (827 mm) Vertical distance above roadway 29.8" (757 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 **Advised speeds mph (km/h)** first 1.9 (3.1) second 2.6 (4.2) third 3.8 (6.1) fourth 5.1 (8.2) fifth 6.5 (10.5) sixth 9.0 (14.5) seventh 13.0 (20.9) eighth 17.5 (28.2) reverse 2.9 (4.7), 4.0 (6.5), 5.8 (9.4), 7.8 (12.6) **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 142" (3.60 m) left 142" (3.60 m) (on concrete surface without brake) right 177" (4.50 m) left 177" (4.50 m) **Turning space diameter** (on concrete surface with brake applied) right 308" (7.82 m) left 308" (7.82 m) (on concrete surface without brake) right 378" (9.60 m) left 378" (9.60 m) **Power take-off** 540 rpm at 2383 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 150°F (65.7°C). Five gears were chosen between 15% slip and 10 mph (16.1 km/h).

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Engaged dB (A)
Maximum Available Power—Two Hours	96.0	95.5
75% of Pull at Maximum Power—Ten Hours		95.5
50% of Pull at Maximum Power—Two Hours		94.0
50% of Pull at Reduced Engine Speed—Two Hours		89.0
Bystander in 7th gear	86.0	

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

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)	Temp. °F (°C) Cool- ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 4th Gear											
39.78 (29.66)	3009 (13.38)	4.96 (7.98)	2500	7.04	3.353 (12.694)	0.591 (0.359)	11.86 (2.337)	189 (87.2)	61 (16.1)	72 (21.9)	28.835 (97.370)

MAXIMUM POWER IN SELECTED GEARS

29.26 (21.82)	4494 (19.99)	2.44 (3.93)	2605	14.90	2nd Gear	178 (81.1)	58 (14.4)	62 (16.7)	28.840 (97.390)
41.05 (30.61)	3100 (13.79)	4.97 (7.99)	2500	6.83	4th Gear	190 (87.8)	57 (13.9)	66 (18.9)	28.790 (97.220)

TIRES, BALLAST AND WEIGHT

		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Two 16.9-28; 6; 16 (110)	Two 16.9-28; 6; 16 (110)
Ballast	—Liquid (each)	None	None
	—Test Equip. (each)	68 lb (31 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 9.5-24; 6; 16 (110)	Two 9.5-24; 6; 16 (110)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	88 lb (40 kg)	None
Height of Drawbar		16.5 in (420 mm)	16.5 in (420 mm)
Static Weight with Operator—Rear		3730 lb (1692 kg)	3595 lb (1631 kg)
Front		2475 lb (1123 kg)	2300 lb (1043 kg)
Total		6205 lb (2815 kg)	5895 lb (2674 kg)



John Deere 2240 Diesel

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1394.

LOUIS I. LEVITICUS
Engineer-in-Charge

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Board of Tractor Test Engineers