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Test 1477: John Deere 4650 Quadrange Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1477

JOHN DEERE 4650 QUADRANGE 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—998 rpm)									
165.70 (123.56)	2200	9.750 (36.908)	0.412 (0.251)	16.99 (3.348)	188 (86.9)	63 (17.3)	75 (24.0)	28.903 (97.602)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
143.45 (106.97)	2240	8.823 (33.399)	0.431 (0.262)	16.26 (3.203)	184 (84.2)	64 (18.1)	76 (24.4)	..... .....
0.00 (0.00)	2331	2.509 (9.498)	..... .....	..... .....	172 (77.5)	63 (17.2)	74 (23.1)	..... .....
73.12 (54.53)	2287	5.638 (21.342)	0.540 (0.329)	12.97 (2.555)	180 (82.5)	64 (17.8)	76 (24.4)	..... .....
164.75 (122.85)	2200	9.722 (36.802)	0.414 (0.252)	16.95 (3.338)	190 (87.8)	66 (18.6)	76 (24.7)	..... .....
36.96 (27.56)	2312	4.041 (15.297)	0.766 (0.466)	9.15 (1.802)	174 (78.9)	66 (18.9)	78 (25.6)	..... .....
108.52 (80.92)	2262	7.162 (27.111)	0.463 (0.281)	15.15 (2.985)	182 (83.6)	66 (18.6)	78 (25.3)	..... .....
Av Av	87.80 (65.47)	2272	6.316 (23.909)	0.504 (0.307)	13.90 (2.738)	180 (82.4)	65 (18.2)	76 (24.6)	28.893 (97.566)

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

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 7th (B2) Gear											
142.31 (106.12)	9807 (43.62)	5.44 (8.76)	2200	5.00	9.614 (36.393)	0.473 (0.288)	14.80 (2.916)	190 (87.8)	53 (11.4)	60 (15.6)	28.750 (97.084)
75% of Pull at Maximum Power—Ten Hours 7th (B2) Gear											
113.49 (84.63)	7495 (33.34)	5.68 (9.14)	2261	3.55	8.219 (31.113)	0.508 (0.309)	13.81 (2.720)	187 (86.1)	54 (11.9)	60 (15.5)	28.785 (97.203)
50% of Pull at Maximum Power—Two Hours 7th (B2) Gear											
77.34 (57.68)	4997 (22.23)	5.80 (9.34)	2285	2.43	6.386 (24.172)	0.579 (0.352)	12.11 (2.386)	182 (83.1)	52 (10.8)	56 (13.3)	28.755 (97.101)
50% of Pull at Reduced Engine Speed—Two Hours 11th (C3) Gear											
77.36 (57.69)	4997 (22.23)	5.81 (9.34)	1367	2.39	5.244 (19.851)	0.475 (0.289)	14.75 (2.906)	185 (84.7)	51 (10.3)	54 (12.2)	28.755 (97.101)
MAXIMUM POWER IN SELECTED GEARS											
100.48 (74.92)	16814 (74.79)	2.24 (3.61)	2262	14.92	2nd (A2) Gear			185 (84.7)	48 (8.9)	52 (11.1)	28.790 (97.220)
135.22 (100.84)	15548 (69.16)	3.26 (5.25)	2202	10.57	3rd (A3) Gear			189 (87.2)	48 (8.9)	53 (11.7)	28.790 (97.220)
140.97 (105.12)	12591 (56.01)	4.20 (6.76)	2201	6.91	4th (B1) Gear			190 (87.5)	49 (9.4)	54 (12.2)	28.800 (97.253)
142.42 (106.20)	12365 (55.00)	4.32 (6.95)	2200	6.75	5th (A4) Gear			190 (87.8)	49 (9.4)	55 (12.8)	28.800 (97.253)
142.31 (106.12)	10662 (47.42)	5.01 (8.06)	2200	5.51	6th (C1) Gear			190 (87.8)	50 (10.0)	56 (13.3)	28.810 (97.287)
144.92 (108.07)	9993 (44.45)	5.44 (8.75)	2201	4.96	7th (B2) Gear			190 (87.5)	50 (10.0)	57 (13.9)	28.800 (97.253)
145.58 (108.56)	8464 (37.65)	6.45 (10.38)	2202	4.08	8th (C2) Gear			190 (87.8)	51 (10.6)	57 (13.9)	28.790 (97.220)
142.54 (106.29)	6780 (30.16)	7.88 (12.69)	2201	3.18	9th (B3) Gear			190 (87.5)	52 (11.1)	58 (14.4)	28.780 (97.186)
140.85 (105.03)	6346 (28.23)	8.32 (13.40)	2201	3.10	10th (D1) Gear			190 (87.8)	52 (11.1)	59 (15.0)	28.770 (97.152)

Department of Agricultural Engineering

Dates of Test: April 7-26, 1983

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 47.0 (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 15W-40 **API service classification** CD, CC, SD **To motor** 4.761 gal (18.022 l) **Drained from motor** 4.577 gal (17.324 l) **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 43.0 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *RG6466A242531* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" × 4.75" (116.0 mm × 120.6 mm) **Compression ratio** 15.8 to 1 **Displacement** 466 cu in (7636 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements and prestrainer **Muffler** vertical **Cooling medium temperature control** three thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *RW4650H002529* **Tread width** rear 63" (1600 mm) to 130" (3300 mm) front 60.2" (1530 mm) to 86.3" (2192 mm) **Wheel base** 118.5" (3010 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 31.5" (800 mm) Vertical distance above roadway 45.3" (1151 mm) Horizontal distance from center of rear wheel tread 0.3" (8 mm) to the right **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 2.0 (3.2) second 2.6 (4.1) third 3.7 (5.9) fourth 4.5 (7.2) fifth 4.6 (7.4) sixth 5.3 (8.5) seventh 5.7 (9.2) eighth 6.7 (10.8) ninth 8.2 (13.1) tenth 8.6 (13.8) eleventh 9.6 (15.4) twelfth 10.4 (16.7) thirteenth 10.9 (17.5) fourteenth 12.2 (19.6) fifteenth 15.5 (25.0) sixteenth 19.7 (31.7) reverse 3.8 (6.1), 4.8 (7.8), 8.5 (13.7), 10.0 (16.1) 10.8 (17.4) 12.7 (20.4) **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 165" (4.2 m) left 165" (4.2 m) (on concrete surface without brake) right 181" (4.6 m) left 181" (4.6 m) **Turning space diameter** (on concrete surface with brake applied) right 346" (8.79 m) left

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2201	1980	1761	1540	1320	1090
Pull—lbs (kN)	9993 (44.45)	11346 (50.47)	12282 (54.63)	13091 (58.23)	13200 (58.72)	11542 (51.34)
Increase in Pull %	0	14	23	31	32	16
Power—Hp (kW)	144.92 (108.07)	146.68 (109.38)	140.21 (104.56)	129.78 (96.77)	112.14 (83.62)	81.91 (61.08)
Speed—Mph (km/h)	5.44 (8.75)	4.85 (7.80)	4.28 (6.89)	3.72 (5.98)	3.19 (5.13)	2.66 (4.28)
Slip %	4.96	5.90	6.68	7.13	7.13	6.21

TRACTOR SOUND LEVEL WITH CAB	Radial Ply		Bias Ply
	2000 RPM dB(A)	2200 RPM dB(A)	2200 RPM dB(A)
Maximum Available Power—Two Hours	73.0	74.0	73.0
75% of Pull at Maximum Power—Ten Hours			73.5
50% of Pull at Maximum Power—Two Hours			73.5
50% of Pull at Reduced Engine Speed—Two Hours			72.0
Bystander in 16th (D4) gear			87.5

SUPPLEMENTARY TESTS

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES POWER AND FUEL CONSUMPTION AT 2200 RPM

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 7th (B2) Gear												
143.28 (106.85)	9371 (41.68)	5.73 (9.23)	2201	2.09	9.596 (36.325)	0.469 (0.285)	14.93 (2.941)	190 (87.8)	52 (10.8)	67 (19.2)		28.620 (96.645)

MAXIMUM POWER IN SELECTED GEARS

117.15 (87.36)	18931 (84.21)	2.32 (3.73)	2246	13.21	2nd (A2) Gear			187 (85.8)	47 (8.3)	56 (13.3)		28.680 (96.848)
147.71 (110.15)	9673 (43.03)	5.73 (9.22)	2201	2.22	7th (B2) Gear			190 (87.8)	49 (9.4)	59 (15.0)		28.670 (96.814)

POWER AND FUEL CONSUMPTION AT 2000 RPM 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—One Hour (PTO Speed—908 rpm)								
167.22 (124.70)	2000	9.374 (35.484)	0.393 (0.239)	17.84 (3.514)	187 (85.9)	63 (17.4)	75 (23.9)	28.900 (97.591)

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

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 7th (B2) Gear												
148.33 (110.61)	10712 (47.65)	5.19 (8.36)	2001	2.39	9.507 (35.988)	0.449 (0.273)	15.60 (3.074)	193 (89.2)	56 (13.1)	73 (22.8)		28.535 (96.358)

MAXIMUM POWER IN SELECTED GEAR

150.79 (112.44)	10906 (48.51)	5.18 (8.34)	1999	2.48	7th (B2) Gear			192 (88.6)	50 (10.0)	62 (16.7)		28.650 (96.747)
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Bias Ply Tires

TIRES, BALLAST AND WEIGHT

Rear Tires

—No., size, ply & psi (kPa)
—Liquid (each inner)
—Cast Iron (each)

With Ballast

Four 20.8R38; 10; 14 (95)
752 lb (341 kg)
None

Without Ballast

Four 20.8R38; 10; 14 (95)
None
None

Front Tires

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

Two 14L-16.1; 10; 44 (305)
None
55 lb (25 kg)

Two 14L-16.1; 10; 44 (305)
None
None

Height of Drawbar

24.5 in (620 mm)

24.5 in (620 mm)

Static Weight with Operator—Rear

—Front
—Total

14705 lb (6670 kg)
4910 lb (2227 kg)
19615 lb (8897 kg)

13200 lb (5988 kg)
4800 lb (2177 kg)
18000 lb (8165 kg)

Radial Ply Tires

With Ballast

Four 20.8R38; 10; 12 (85)
520 lb (236 kg)
None

Without Ballast

Four 20.8R38; 10; 12 (85)
None
None

Two 14L-16.1; 10; 44 (305)
None
55 lb (25 kg)

Two 14L-16.1; 10; 44 (305)
None
None

24 in (610 mm)

24 in (610 mm)

14680 lb (6659 kg)
4910 lb (2227 kg)
19590 lb (8886 kg)

13640 lb (6187 kg)
4800 lb (2177 kg)
18440 lb (8364 kg)



John Deere 4650 Quadrange Diesel

346" (8.79 m) (on concrete surface without brake)
right 380" (9.65 m) left 380" (9.65 m) **Power take-off** 998 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: During preliminary PTO tests, it was determined that there was a misaligned gasket on the intake manifold. This gasket was replaced and test continued.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 127°F (52.8°C). Nine gears were chosen between 15% slip and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1477.

LOUIS I. LEVITICUS

Engineer-in-Charge

K. VON BARGEN

W. E. SPLINTER

L. L. BASHFORD

Board of Tractor Test Engineers