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Test 1459: John Deere 4450 Powershift Diesel 15-Speed

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NEBRASKA TRACTOR TEST 1459

JOHN DEERE 4450 POWERSHIFT DIESEL

15 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—1002 rpm)								
140.43 (104.72)	2200	8.694 (32.910)	0.432 (0.263)	16.15 (3.182)	188 (86.9)	62 (16.8)	75 (23.8)	28.837 (97.377)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
122.44 (91.30)	2256	7.945 (30.075)	0.453 (0.275)	15.41 (3.036)	184 (84.2)	60 (15.6)	74 (23.3)	.....
0.00 (0.00)	2334	2.562 (9.698)	.....	.....	170 (76.7)	59 (15.0)	74 (23.1)	.....
62.38 (46.52)	2300	5.181 (19.612)	0.580 (0.353)	12.04 (2.372)	180 (82.2)	59 (15.0)	74 (23.3)	.....
141.95 (105.85)	2200	8.736 (33.069)	0.429 (0.261)	16.25 (3.201)	188 (86.9)	60 (15.6)	74 (23.3)	.....
31.37 (23.39)	2314	3.844 (14.551)	0.855 (0.520)	8.16 (1.607)	173 (78.3)	59 (15.0)	74 (23.3)	.....
92.50 (68.98)	2274	6.561 (24.836)	0.495 (0.301)	14.10 (2.777)	183 (83.9)	59 (15.0)	74 (23.3)	.....
Av 75.11 <i>(56.01)</i>	2280	5.805 <i>(21.974)</i>	0.539 <i>(0.328)</i>	12.94 <i>(2.549)</i>	180 <i>(82.1)</i>	59 <i>(15.2)</i>	74 <i>(23.3)</i>	28.880 <i>(97.523)</i>

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 10th Gear											
117.46 (87.59)	7134 (31.73)	6.17 (9.94)	2200	4.10	8.616 (32.616)	0.512 (0.311)	13.63 (2.686)	184 (84.4)	55 (12.5)	61 (15.8)	28.675 (96.831)
75% of Pull at Maximum Power—Ten Hours 10th Gear											
94.34 (70.35)	5457 (24.27)	6.48 (10.43)	2287	3.16	7.499 (28.385)	0.555 (0.337)	12.58 (2.478)	179 (81.5)	33 (0.5)	38 (3.4)	29.150 (98.435)
50% of Pull at Maximum Power—Two Hours 10th Gear											
64.00 (47.73)	3638 (16.18)	6.60 (10.62)	2300	2.12	6.037 (22.852)	0.658 (0.400)	10.60 (2.088)	178 (80.8)	47 (8.1)	54 (11.9)	28.945 (97.743)
50% of Pull at Reduced Engine Speed—Two Hours 13th Gear											
63.86 (47.62)	3638 (16.18)	6.58 (10.59)	1442	2.20	4.586 (17.359)	0.501 (0.305)	13.92 (2.743)	177 (80.3)	43 (5.8)	48 (8.9)	28.980 (97.861)

MAXIMUM POWER IN SELECTED GEARS

100.25 (74.76)	15014 (66.79)	2.50 (4.03)	2251	14.13	4th Gear			179 (81.7)	50 (10.0)	52 (11.1)	28.730 (97.017)
111.19 (82.91)	14361 (63.88)	2.90 (4.67)	2199	11.48	5th Gear			182 (83.1)	52 (11.1)	56 (13.3)	28.710 (96.949)
117.53 (87.64)	13005 (57.85)	3.39 (5.45)	2200	9.02	6th Gear			183 (83.6)	54 (12.2)	59 (15.0)	28.700 (96.916)
118.97 (88.72)	11156 (49.62)	4.00 (6.44)	2201	6.77	7th Gear			185 (84.7)	54 (12.2)	58 (14.4)	28.690 (96.882)
117.28 (87.45)	9449 (42.03)	4.65 (7.49)	2200	5.53	8th Gear			185 (85.0)	54 (12.2)	60 (15.6)	28.690 (96.882)
117.58 (87.68)	8151 (36.26)	5.41 (8.71)	2200	4.56	9th Gear			184 (84.4)	54 (12.2)	60 (15.6)	28.680 (96.848)
119.78 (89.32)	7276 (32.36)	6.17 (9.94)	2201	4.10	10th Gear			184 (84.4)	54 (12.2)	60 (15.6)	28.670 (96.814)
117.04 (87.28)	6132 (27.28)	7.16 (11.52)	2201	3.49	11th Gear			181 (82.8)	44 (6.7)	46 (7.8)	28.900 (97.591)
121.94 (90.93)	5695 (25.33)	8.03 (12.92)	2200	3.18	12th Gear			181 (82.8)	45 (7.2)	48 (8.9)	28.910 (97.625)

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2201	1982	1765	1540	1323	1099
Pull—lbs (kN)	7276 (32.36)	8374 (37.25)	9125 (40.59)	9401 (41.82)	9130 (40.61)	8594 (38.23)
Increase in Pull %	0	15	25	29	25	18
Power—Hp (kW)	119.78 (89.32)	123.44 (92.05)	119.11 (88.82)	106.85 (79.68)	89.09 (66.43)	70.05 (52.23)
Speed—Mph (km/h)	6.17 (9.94)	5.53 (8.90)	4.89 (7.88)	4.26 (6.86)	3.66 (5.89)	3.06 (4.92)
Slip %	4.10	4.63	5.23	5.38	5.38	4.93

	Radial Ply		Bias Ply
	2000 RPM	2200 RPM	2200 RPM
TRACTOR SOUND LEVEL WITH CAB	dB(A)	dB(A)	dB(A)

Maximum Available Power—Two Hours	74.5	74.5	74.0
75% of Pull at Maximum Power—Ten Hours			74.0
50% of Pull at Maximum Power—Two Hours			74.0
50% of Pull at Reduced Engine Speed—Two Hours			72.0
Bystander in 15th gear			86.0

Department of Agricultural Engineering

Dates of Test: October 13 to November 4, 1982

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

FUEL, OIL AND TIME: Fuel No. 2 Diesel Cetane No. 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° (15°/15°) 0.8381 Fuel weight 6.978 lbs/gal (0.836 kg/l) Oil SAE 15W-40 API service classification CD, CC, SD To motor 3.664 gal (13.870 l) Drained from motor 3.468 gal (13.129 l) Transmission and hydraulic lubricant John Deere Hy-Gard transmission and hydraulic fluid Total time engine was operated 70.0 hours.**

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger Serial No. *RG6466T230932* **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 with prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals Serial No. *RW4450P001406* **Tread width** rear 60.0" (1524 mm) to 130" (3300 mm) front 58" (1470 mm) to 82.6" (2099 mm) **Wheel base** 106.7" (2710 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 28.0" (711 mm) Vertical distance above roadway 41.9" (1064 mm) Horizontal distance from center of rear wheel tread 0.5" (13 mm) to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 1.4 (2.2) second 2.0 (3.2) third 2.3 (3.7) fourth 3.0 (4.8) fifth 3.4 (5.5) sixth 3.9 (6.3) seventh 4.5 (7.2) eighth 5.0 (8.1) ninth 5.8 (9.3) tenth 6.6 (10.6) eleventh 7.6 (12.2) twelfth 8.7 (14.0) thirteenth 10.8 (17.3) fourteenth 14.7 (23.6) fifteenth 18.2 (29.3) reverse 1.7 (2.7), 2.4 (3.9), 3.6 (5.9), 5.5 (8.8) **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 146" (3.7 m) left 146" (3.7 m) (on concrete surface without brake) right 157" (4.0 m) left 157" (4.0 m) **Turning space diameter** (on concrete surface with brake applied) right 302" (7.67 m) left 302" (7.67 m) (on concrete surface without brake) right 338" (8.58 m) left 338" (8.58 m) **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

**SUPPLEMENTAL 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 10th Gear											
118.71 (88.52)	6737 (29.97)	6.61 (10.63)	2200	2.33	8.688 (32.888)	0.511 (0.311)	13.66 (2.692)	189 (87.2)	53 (11.7)	66 (18.9)	28.900 (97.591)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Gear	Fuel Consumption 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)
94.39 (70.39)	16154 (71.85)	2.19 (3.53)	2267	10.59	3rd Gear				182 (83.1)	49 (9.4)	57 (13.9)	28.630 (96.679)
115.13 (85.85)	15916 (70.80)	2.71 (4.37)	2201	9.33	4th Gear				184 (84.2)	49 (9.4)	57 (13.9)	28.640 (96.713)
118.62 (88.45)	13760 (61.21)	3.23 (5.20)	2201	6.07	5th Gear				185 (84.7)	50 (10.0)	58 (14.4)	28.620 (96.645)
121.14 (90.33)	12210 (54.31)	3.72 (5.99)	2199	4.99	6th Gear				189 (87.2)	60 (15.6)	71 (21.7)	28.530 (96.342)
122.09 (91.05)	10578 (47.05)	4.33 (6.97)	2199	4.04	7th Gear				189 (87.2)	59 (15.0)	69 (20.6)	28.540 (96.375)
119.75 (89.29)	8956 (39.84)	5.01 (8.07)	2200	3.07	8th Gear				190 (87.5)	57 (13.9)	67 (19.4)	28.560 (96.443)
119.40 (89.03)	7704 (34.27)	5.81 (9.35)	2200	2.74	9th Gear				190 (87.8)	56 (13.3)	67 (19.4)	28.570 (96.477)
120.27 (89.68)	6837 (30.41)	6.60 (10.62)	2199	2.41	10th Gear				189 (87.2)	56 (13.3)	67 (19.4)	28.580 (96.510)
118.67 (88.49)	5826 (25.91)	7.64 (12.29)	2199	2.08	11th Gear				191 (88.1)	60 (15.6)	71 (21.7)	28.530 (96.342)
122.51 (91.36)	5355 (23.82)	8.58 (13.81)	2200	1.91	12th Gear				191 (88.3)	60 (15.6)	71 (21.7)	28.520 (96.308)

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2199	1980	1761	1537	1321	1110
Pull—lbs (kN)	6837 (30.41)	7892 (35.11)	8500 (37.81)	8884 (39.52)	9007 (40.07)	8070 (35.90)
Increase in Pull %	0	15	24	30	32	18
Power—Hp (kW)	120.27 (89.68)	124.40 (92.77)	118.91 (88.67)	108.25 (80.72)	94.28 (70.30)	71.22 (53.11)
Speed—Mph (km/h)	6.60 (10.62)	5.91 (9.51)	5.25 (8.44)	4.57 (7.35)	3.93 (6.32)	3.31 (5.33)
Slip %	2.41	2.91	3.07	3.23	3.39	3.07

**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—911 rpm)								
144.35 (107.64)	2000	8.497 (32.165)	0.411 (0.250)	16.99 (3.346)	189 (87.2)	61 (16.3)	75 (23.7)	28.855 (97.439)

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 10th Gear											
124.03 (92.49)	7774 (34.58)	5.98 (9.63)	2001	2.86	8.527 (32.277)	0.480 (0.292)	14.55 (2.865)	190 (87.5)	53 (11.7)	62 (16.4)	29.105 (98.283)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Gear	Fuel Consumption 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)
125.59 (93.65)	12047 (53.59)	3.91 (6.29)	2003	4.75	7th Gear				192 (88.6)	59 (15.0)	70 (21.1)	28.540 (96.375)
125.42 (93.52)	7852 (34.93)	5.99 (9.64)	2001	2.74	10th Gear				190 (87.8)	56 (13.3)	67 (19.4)	28.570 (96.477)
128.10 (95.52)	6173 (27.46)	7.78 (12.52)	1999	2.08	12th Gear				192 (88.6)	60 (15.6)	71 (21.7)	28.520 (96.308)

Bias Ply Tires

TIRES, BALLAST AND WEIGHT	With Ballast		Without Ballast	
	Rear Tires	—No., size, ply & psi (kPa)	Four 18.4-38; 6; 14 (95)	Four 18.4-38; 6; 14 (95)
Ballast	—Liquid (each inner)	858 lb (389 kg)	None	
	—Cast Iron (each)	None	None	
Front Tires	—No., size, ply & psi (kPa)	Two 11.00-16; 8; 40 (275)	Two 11.00-16; 8; 40 (275)	
Ballast	—Liquid (each)	40 lb (18 kg)	None	
	—Test Equip. (each)	None	None	
Height of Drawbar		22 in (560 mm)	22 in (560 mm)	
Static Weight with Operator—Rear		12875 lb (5840 kg)	11160 lb (5062 kg)	
Front		3870 lb (1755 kg)	3790 lb (1719 kg)	
Total		16745 lb (7595 kg)	14950 lb (6781 kg)	

Radial Ply Tires

With Ballast		Without Ballast	
Inner Two 18.4R38; 8; 12 (85)	Outer Two 18.4R38; 6; 12 (85)	Inner Two 18.4R38; 8; 12 (85)	Outer Two 18.4R38; 6; 12 (85)
572 lb (260 kg)	None	None	None
None	None	None	None
Two 11.00-16; 8; 40 (275)	None	Two 11.00-16; 8; 40 (275)	None
40 lb (18 kg)	None	40 lb (18 kg)	None
20.5 in (520 mm)	None	20.5 in (520 mm)	None
12745 lb (5781 kg)	3880 lb (1760 kg)	11600 lb (5262 kg)	3800 lb (1724 kg)
16625 lb (7541 kg)	None	15400 lb (6985 kg)	None



John Deere 4450 Powershift Diesel

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 122°F (50.0°C). Nine gears were chosen between stability limit and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1459.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers