

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

1-1-1983

Test 1476: John Deere 4450 Quadrange Diesel 16-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Nebraska Tractor Test Lab, "Test 1476: John Deere 4450 Quadrange Diesel 16-Speed" (1983). *Nebraska Tractor Tests*. 1787.

<https://digitalcommons.unl.edu/tractormuseumlit/1787>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA TRACTOR TEST 1476

JOHN DEERE 4450 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—1002 rpm)								
140.33 (104.64)	2200	8.580 (32.479)	0.428 (0.261)	16.36 (3.222)	202 (94.5)	67 (19.7)	74 (23.6)	28.923 (97.670)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
121.61 (90.68)	2242	7.762 (29.382)	0.447 (0.272)	15.67 (3.086)	197 (91.7)	67 (19.4)	74 (23.6)	..... .....
0.00 (0.00)	2329	2.466 (9.335)	..... .....	..... .....	176 (79.7)	68 (19.7)	74 (23.1)	..... .....
61.96 (46.20)	2284	5.065 (19.173)	0.573 (0.348)	12.23 (2.410)	186 (85.8)	70 (20.8)	76 (24.4)	..... .....
139.75 (104.21)	2200	8.559 (32.399)	0.429 (0.261)	16.33 (3.216)	201 (93.9)	70 (20.8)	78 (25.3)	..... .....
31.22 (23.28)	2302	3.840 (14.536)	0.862 (0.524)	8.13 (1.602)	180 (82.2)	68 (20.0)	76 (24.2)	..... .....
92.10 (68.68)	2264	6.452 (24.423)	0.491 (0.299)	14.27 (2.812)	192 (88.9)	69 (20.6)	76 (24.4)	..... .....
Av Av	74.44 (55.51)	2270 (21.543)	5.691 (0.326)	13.08 (2.577)	189 (87.1)	68 (20.2)	76 (24.2)	28.937 (97.715)

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 6th (C1) Gear											
120.11 (89.56)	8954 (39.83)	5.03 (8.10)	2201	5.02	8.331 (31.536)	0.486 (0.296)	14.42 (2.840)	201 (93.6)	48 (8.6)	59 (15.0)	28.710 (96.949)
75% of Pull at Maximum Power—Ten Hours 6th (C1) Gear											
97.87 (72.98)	7022 (31.24)	5.23 (8.41)	2260	4.00	7.278 (27.552)	0.521 (0.317)	13.45 (2.649)	193 (89.7)	51 (10.3)	54 (12.0)	28.264 (95.443)
50% of Pull at Maximum Power—Two Hours 6th (C1) Gear											
67.12 (50.05)	4682 (20.83)	5.38 (8.65)	2292	2.65	5.780 (21.879)	0.603 (0.367)	11.61 (2.288)	187 (86.1)	36 (2.2)	38 (3.3)	28.550 (96.409)
50% of Pull at Reduced Engine Speed—Two Hours 11th (C3) Gear											
67.16 (50.08)	4682 (20.83)	5.38 (8.66)	1388	2.58	4.620 (17.490)	0.482 (0.293)	14.54 (2.863)	179 (81.4)	36 (2.2)	39 (3.6)	28.550 (96.409)
MAXIMUM POWER IN SELECTED GEARS											
111.39 (83.07)	15069 (67.03)	2.77 (4.46)	2225	14.74	3rd (A3) Gear			196 (91.1)	43 (6.1)	50 (10.0)	28.830 (97.355)
121.23 (90.40)	12134 (53.97)	3.75 (6.03)	2202	7.64	4th (A4) Gear			198 (92.2)	43 (6.1)	52 (11.1)	28.820 (97.321)
124.01 (92.47)	11152 (49.60)	4.17 (6.71)	2202	6.64	5th (B1) Gear			201 (93.9)	44 (6.7)	53 (11.7)	28.820 (97.321)
125.18 (93.35)	9363 (41.65)	5.01 (8.07)	2200	5.25	6th (C1) Gear			203 (94.7)	45 (7.2)	54 (12.2)	28.810 (97.287)
123.61 (92.18)	8624 (38.36)	5.38 (8.65)	2200	4.95	7th (B2) Gear			202 (94.4)	45 (7.2)	54 (12.2)	28.800 (97.253)
123.36 (91.99)	7201 (32.03)	6.42 (10.34)	2199	3.97	8th (C2) Gear			202 (94.2)	45 (7.2)	55 (12.8)	28.790 (97.220)
124.38 (92.75)	6549 (29.13)	7.12 (11.46)	2201	3.59	9th (B3) Gear			202 (94.2)	45 (7.2)	55 (12.8)	28.780 (97.186)
122.93 (91.67)	5863 (26.08)	7.86 (12.65)	2201	3.12	10th (D1) Gear			200 (93.3)	46 (7.8)	55 (12.8)	28.770 (97.152)
123.35 (91.98)	5458 (24.28)	8.48 (13.64)	2200	2.97	11th (C3) Gear			202 (94.2)	46 (7.8)	55 (12.8)	28.760 (97.118)

Department of Agricultural Engineering

Dates of Test: April 4-25, 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°) 0.8416 Fuel weight 7.007 lbs/gal (0.840 kg/l) Oil SAE 15W-40 API service classification CD, CC, SD To motor 3.988 gal (15.097 l) Drained from motor 3.670 gal (13.894 l) Transmission and final drive lubricant John Deere Hy-Gard transmission and hydraulic fluid Total time engine was operated 45.5 hours.

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger Serial No. *RG6466T242728* Crankshaft lengthwise Rated rpm 2000 to 2200 Bore and stroke 4.57" x 4.75" (116.0 mm x 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 two thermostats and variable speed fan.

CHASSIS: Type standard with duals Serial No. *RW4450H004234* 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 partial (2) range operator controlled powershift Advertised speeds mph (km/h) first 2.0 (3.2) second 2.5 (4.0) third 3.3 (5.3) fourth 4.1 (6.7) fifth 4.6 (7.3) sixth 5.4 (8.7) seventh 5.8 (9.3) eighth 6.8 (11.0) ninth 7.5 (12.1) tenth 8.3 (13.4) eleventh 8.9 (14.4) twelfth 9.5 (15.3) thirteenth 10.5 (16.9) fourteenth 11.3 (18.2) fifteenth 13.7 (22.1) sixteenth 17.3 (27.9) reverse 3.2 (5.1), 4.0 (6.5), 7.3 (11.8), 8.7 (13.9), 9.2 (14.8), 10.9 (17.6) 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)

LUGGING ABILITY IN 6th (C1) GEAR

Crankshaft Speed rpm	2200	1984	1763	1538	1323	1098
Pull—lbs (kN)	9363 (41.65)	10696 (47.58)	11602 (51.61)	12045 (53.58)	11922 (53.03)	10948 (48.70)
Increase in Pull %	0	14	24	29	27	17
Power—Hp (kW)	125.18 (93.35)	127.53 (95.10)	122.05 (91.02)	110.03 (82.05)	93.85 (69.99)	72.06 (53.74)
Speed—Mph (km/h)	5.01 (8.07)	4.47 (7.20)	3.95 (6.35)	3.43 (5.51)	2.95 (4.75)	2.47 (3.97)
Slip %	5.25	6.28	7.14	7.57	7.28	6.57

TRACTOR SOUND LEVEL WITH CAB	Radial Ply		Bias Ply	
	2000 RPM	2200 RPM	2200 RPM	2200 RPM
	dB(A)	dB(A)	dB(A)	dB(A)
Maximum Available Power—Two Hours	73.0	74.0	73.5	
75% of Pull at Maximum Power—Ten Hours			73.5	
50% of Pull at Maximum Power—Two Hours			73.0	
50% of Pull at Reduced Engine Speed—Two Hours			71.5	
Bystander in 16th (D4) gear			86.5	

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 6th (C1) Gear											
124.15 (92.58)	8660 (38.52)	5.38 (8.65)	2199	3.20	8.456 (32.009)	0.477 (0.290)	14.68 (2.892)	204 (95.6)	48 (8.9)	60 (15.6)	28.945 (97.743)

MAXIMUM POWER IN SELECTED GEARS

99.94 (74.53)	16278 (72.41)	2.30 (3.71)	2249	12.52	2nd (A2) Gear			192 (88.9)	44 (6.7)	51 (10.6)	28.940 (97.726)
126.34 (94.21)	8823 (39.25)	5.37 (8.64)	2201	3.28	6th (C1) Gear			201 (93.9)	46 (7.8)	55 (12.8)	28.960 (97.794)

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)								
142.27 (106.09)	2000	8.327 (31.521)	0.410 (0.250)	17.08 (3.366)	201 (93.7)	68 (19.8)	75 (23.7)	28.925 (97.675)

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 6th (C1) Gear											
127.24 (94.88)	9822 (43.69)	4.86 (7.82)	1999	3.80	8.349 (31.604)	0.460 (0.280)	15.24 (3.002)	206 (96.4)	48 (8.9)	63 (16.9)	28.920 (97.659)

MAXIMUM POWER IN SELECTED GEAR

128.68 (95.95)	9930 (44.17)	4.86 (7.82)	2000	3.68	6th (C1) Gear			201 (93.9)	47 (8.3)	57 (13.9)	28.960 (97.794)
-------------------	-----------------	----------------	------	------	---------------	--	--	---------------	-------------	--------------	--------------------

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)	1140 lb (517 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)	None	None
	—Cast Iron (each)	50 lb (23 kg)	None
Height of Drawbar		21.5 in (545 mm)	21.5 in (545 mm)
Static Weight with Operator—Rear		12880 lb (5842 kg)	10600 lb (4808 kg)
	—Front	3800 lb (1724 kg)	3700 lb (1678 kg)
	—Total	16680 lb (7566 kg)	14300 lb (6486 kg)

Radial Ply Tires

With Ballast	Without Ballast
Inner Two 18.4R38; 8; 12 (85)	Inner Two 18.4R38; 8; 12 (85)
Outer Two 18.4R38; 6; 12 (85)	Outer Two 18.4R38; 6; 12 (85)
953 lb (432 kg)	None
None	None
Two 11.00-16; 8; 40 (275)	Two 11.00-16; 8; 40 (275)
None	None
50 lb (23 kg)	None
20 in (510 mm)	20 in (510 mm)
12945 lb (5872 kg)	11040 lb (5008 kg)
3815 lb (1730 kg)	3715 lb (1685 kg)
16760 lb (7602 kg)	14755 lb (6693 kg)

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.

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 117°F (47.2°C). Nine gears were chosen between 15% slip (bias ply tires), front end stability limit (radial ply tires) and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1476.

LOUIS I. LEVITICUS

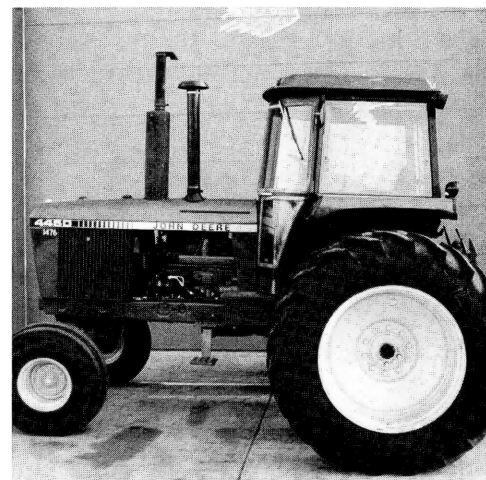
Engineer-in-Charge

K. VON BARGEN

W. E. SPLINTER

L. L. BASHFORD

Board of Tractor Test Engineers



John Deere 4450 Quadrange Diesel