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Test 1668: John Deere 7800 Powerquad Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1668—SUMMARY 135

JOHN DEERE 7800 POWRQUAD DIESEL

16 SPEED

Location of Test: Tractor Testing Laboratory,
University of Nebraska, Lincoln, Nebraska 68583-0832

Dates of Test: May 19 to June 4, 1993

Manufacturer: John Deere Tractor Works, P.O.
Box 270, Waterloo, Iowa 50704

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1007 rpm)					
147.08 (109.68)	2101	8.77 (33.20)	0.415 (0.252)	16.77 (3.30)	
Maximum Power (2 hours)					
158.83 (118.43)	1696	9.03 (34.17)	0.395 (0.241)	17.60 (3.47)	

VARYING POWER AND FUEL CONSUMPTION

147.08 (109.68)	2101	8.77 (33.20)	0.415 (0.252)	16.77 (3.30)	Air temperature
128.99 (96.19)	2166	7.85 (29.70)	0.423 (0.257)	16.44 (3.24)	76°F (25°C)
98.75 (73.64)	2207	6.64 (25.13)	0.468 (0.285)	14.87 (2.93)	Relative humidity
67.22 (50.13)	2248	5.35 (20.24)	0.553 (0.337)	12.57 (2.48)	50%
33.53 (25.00)	2260	3.88 (14.69)	0.805 (0.490)	8.64 (1.70)	Barometer
1.05 (0.78)	2296	2.59 (9.79)	17.176 (10.448)	0.41 (0.08)	28.95" Hg (98.04 kPa)

Maximum Torque 515 lb.-ft. (699 Nm) at 1299 rpm

Maximum Torque Rise 40.2%

Torque rise at 1701 engine rpm 33.2%

DRAWBAR PERFORMANCE

FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th (B3) Gear									
131.99 (98.43)	11124 (49.48)	4.45 (7.16)	2098	4.50	0.461 (0.280)	15.09 (2.97)	196 (91)	63 (17)	29.15 (98.71)
75% of Pull at Maximum Power—7th (B3) Gear									
103.93 (77.50)	8325 (37.03)	4.68 (7.53)	2175	3.07	0.490 (0.298)	14.19 (2.79)	195 (90)	67 (19)	29.16 (98.75)
50% of Pull at Maximum Power—7th (B3) Gear									
71.44 (53.27)	5551 (24.69)	4.83 (7.77)	2216	2.03	0.565 (0.344)	12.31 (2.42)	189 (87)	67 (19)	29.16 (98.75)
75% of Pull at Reduced Engine Speed—10th (C2) Gear									
103.93 (77.50)	8323 (37.02)	4.68 (7.54)	1637	3.15	0.446 (0.271)	15.61 (3.07)	198 (92)	67 (19)	29.16 (98.75)
50% of Pull at Reduced Engine Speed—10th (C2) Gear									
71.44 (53.27)	5555 (24.71)	4.82 (7.76)	1667	2.03	0.488 (0.297)	14.27 (2.81)	184 (84)	67 (19)	29.16 (98.75)

FUEL OIL and TIME: Fuel No. 2 Diesel Cetane No. 53.9 Specific gravity converted to 60°/60° F (15°/15°C) 0.8357 Fuel weight 6.958 lbs/gal (0.834 kg/l) Oil SAE 15W-40 API service classification SG/CE To motor 4.321 gal (16.355 l) Drained from motor 3.951 gal (14.958 l) Transmission and hydraulic lubricant John Deere Hy-Gard fluid Front axle lubricant John Deere GL-5 Gear Lubricant Total time engine was operated 23.0 hours.

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger Serial No. *RG6076T510807* Crankshaft lengthwise Rated engine speed 2100 Bore and stroke (as specified) 4.56" × 4.75" (115.8 mm × 120.7 mm) Compression ratio 15.5 to 1 Displacement 466 cu in (7627 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and aspirator Oil filter one full flow cartridge Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter one paper element and prestrainer Fuel cooler radiator for inlet fuel Muffler underhood Exhaust vertical Cooling medium temperature control two thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 59.3-63.3 lb/h (26.9-28.7 kg/h) High idle: 2225-2325 rpm Turbo boost nominal 14.5-18.1 psi (100-125 kPa) as measured 15.0 psi (103 kPa)

CHASSIS: Type front wheel assist Serial No. *RW7800H-003219* Tread width rear 59.8" (1518 mm) to 108.3" (2752 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) Wheel base 110.2" (2800 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial (4) range operator controlled powershift Nominal travel speeds mph (km/h) first 1.50 (2.41) second 1.81 (2.91) third 2.16 (3.48) fourth 2.65 (4.26) fifth 3.18 (5.11) sixth 3.83 (6.16) seventh 4.58 (7.37) eighth 5.05 (8.13) ninth 5.61 (9.03) tenth 6.09 (9.80) eleventh 7.29 (11.73) twelfth 8.93 (14.37) thirteenth 10.64 (17.12) fourteenth 12.82 (20.63) fifteenth 15.34 (24.68) sixteenth 18.80 (30.25) reverse 1.78 (2.86), 2.14 (3.45), 2.56 (4.12), 3.14 (5.05), 3.77 (6.06), 4.54 (7.31), 5.43 (8.74), 5.99 (9.64), 6.66 (10.71), 7.23 (11.63), 8.64 (13.91), 10.59 (17.04) Clutch multiple wet disc hydraulically actuated by foot pedal Brakes wet multiple disc hydraulically actuated by two foot pedals which can be locked together Steering hydrostatic Power take-off 540 rpm at 2072 engine rpm and 1000 rpm at 2086 engine rpm Unladen tractor mass 15102 lb (6850 kg)

**DRAWBAR PERFORMANCE
MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th (B1) Gear									
111.72 (83.31)	14755 (65.63)	2.84 (4.57)	2151	14.34	0.529 (0.322)	13.16 (2.59)	190 (88)	62 (17)	29.15 (98.71)
6th (B2) Gear									
129.82 (96.81)	14037 (62.44)	3.47 (5.58)	2048	8.79	0.474 (0.288)	14.68 (2.89)	198 (92)	62 (17)	29.15 (98.71)
7th (B3) Gear									
138.34 (103.16)	13183 (58.64)	3.94 (6.34)	1909	7.24	0.451 (0.274)	15.44 (3.04)	204 (95)	63 (17)	29.16 (98.75)
8th (C1) Gear									
140.56 (104.81)	12386 (55.10)	4.26 (6.85)	1845	5.89	0.443 (0.269)	15.71 (3.10)	204 (96)	64 (18)	29.17 (98.78)
9th (B4) Gear									
141.37 (105.42)	11586 (51.53)	4.58 (7.37)	1775	5.16	0.441 (0.268)	15.78 (3.11)	208 (98)	64 (18)	29.17 (98.78)
10th (C2) Gear									
142.73 (106.44)	11183 (49.74)	4.79 (7.70)	1706	4.75	0.436 (0.265)	15.98 (3.15)	207 (97)	65 (18)	29.17 (98.78)
11th (C3) Gear									
142.43 (106.21)	9215 (40.99)	5.80 (9.33)	1701	3.58	0.438 (0.267)	15.87 (3.13)	204 (96)	66 (19)	29.17 (98.78)
12th (C4) Gear									
141.21 (105.30)	7395 (32.89)	7.16 (11.52)	1699	2.81	0.445 (0.270)	15.65 (3.08)	209 (98)	67 (19)	29.16 (98.75)
13th (D1) Gear									
139.25 (103.84)	6185 (27.51)	8.44 (13.59)	1698	2.29	0.448 (0.273)	15.52 (3.06)	208 (98)	68 (20)	29.16 (98.75)

**DRAWBAR PERFORMANCE (BALLASTED)
MAXIMUM POWER IN SELECTED GEARS**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th (A4) Gear									
117.47 (87.60)	19052 (84.75)	2.31 (3.72)	2103	14.19	0.519 (0.315)	13.42 (2.64)	195 (91)	59 (15)	28.76 (97.39)
5th (B1) Gear									
134.87 (100.57)	17881 (79.54)	2.83 (4.55)	1976	7.00	0.461 (0.280)	15.11 (2.98)	198 (92)	60 (16)	28.76 (97.39)
6th (B2) Gear									
140.76 (104.97)	17126 (76.18)	3.08 (4.96)	1768	6.05	0.445 (0.271)	15.63 (3.08)	208 (98)	60 (16)	28.76 (97.39)
7th (B3) Gear									
143.81 (107.24)	14863 (66.11)	3.63 (5.84)	1699	3.83	0.436 (0.265)	15.97 (3.15)	207 (97)	58 (14)	28.75 (97.36)
8th (C1) Gear									
144.61 (107.84)	13438 (59.78)	4.04 (6.49)	1701	3.06	0.433 (0.264)	16.06 (3.16)	207 (97)	55 (13)	28.79 (97.49)
9th (B4) Gear									
144.25 (107.57)	12038 (53.55)	4.49 (7.23)	1701	2.89	0.436 (0.265)	15.96 (3.14)	207 (97)	58 (14)	28.76 (97.39)
10th (C2) Gear									
143.87 (107.29)	11064 (49.21)	4.88 (7.85)	1696	2.63	0.435 (0.265)	16.00 (3.15)	206 (96)	55 (13)	28.78 (97.46)
11th (C3) Gear									
144.08 (107.44)	9184 (40.85)	5.88 (9.47)	1701	2.03	0.436 (0.265)	15.98 (3.15)	207 (97)	56 (13)	28.77 (97.43)
12th (C4) Gear									
141.76 (105.71)	7350 (32.69)	7.23 (11.64)	1700	1.59	0.442 (0.269)	15.75 (3.10)	204 (96)	57 (14)	28.76 (97.39)
13th (D1) Gear									
138.87 (103.55)	6118 (27.21)	8.51 (13.70)	1700	1.41	0.453 (0.276)	15.36 (3.03)	208 (98)	58 (14)	28.75 (97.36)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 125°F (52°C). The performance results on this summary were taken from OECD tests conducted under the Code II Restricted Standard Test Code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1668**, Summary 135, July 6, 1993.

LOUIS I. LEVITICUS

Engineer-in-Charge

L.L. BASHFORD

R.D. GRISSO

K. VON BARGEN

Board of Tractor Test Engineers

DRAWBAR PERFORMANCE (FRONT DRIVE DISENGAGED)

FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—7th (B3) Gear									
134.25 (100.11)	11133 (49.52)	4.52 (7.28)	2100	2.76	0.455 (0.277)	15.28 (3.01)	200 (93)	58 (14)	28.75 (97.36)
75% of Pull at Maximum Power—7th (B3) Gear									
104.59 (77.99)	8339 (37.09)	4.70 (7.57)	2170	2.07	0.490 (0.298)	14.19 (2.80)	193 (89)	61 (16)	28.75 (97.36)
50% of Pull at Maximum Power—7th (B3) Gear									
71.64 (53.42)	5563 (24.75)	4.83 (7.77)	2213	1.45	0.568 (0.346)	12.24 (2.41)	187 (86)	61 (16)	28.75 (97.36)
75% of Pull at Reduced Engine Speed—10th (C2) Gear									
104.59 (78.00)	8320 (37.01)	4.71 (7.59)	1637	2.15	0.444 (0.270)	15.66 (3.08)	195 (90)	61 (16)	28.75 (97.36)
50% of Pull at Reduced Engine Speed—10th (C2) Gear									
71.60 (53.39)	5565 (24.75)	4.82 (7.76)	1664	1.54	0.488 (0.297)	14.26 (2.81)	187 (86)	61 (16)	28.75 (97.36)

DRAWBAR PERFORMANCE (FRONT DRIVE DISENGAGED)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th (A4) Gear									
106.63 (79.51)	17019 (75.70)	2.35 (3.78)	2144	14.40	0.536 (0.327)	12.97 (2.56)	189 (87)	60 (16)	28.76 (97.39)
5th (B1) Gear									
129.08 (96.25)	16004 (71.19)	3.02 (4.87)	2100	6.16	0.471 (0.287)	14.76 (2.91)	196 (91)	60 (16)	28.76 (97.39)
6th (B2) Gear									
131.59 (98.13)	13228 (58.84)	3.73 (6.00)	2099	3.86	0.460 (0.280)	15.14 (2.98)	204 (95)	60 (16)	28.76 (97.39)
7th (B3) Gear									
134.25 (100.11)	11133 (49.52)	4.52 (7.28)	2100	2.76	0.455 (0.277)	15.28 (3.01)	200 (93)	58 (14)	28.75 (97.36)
8th (C1) Gear									
132.75 (98.99)	9943 (44.23)	5.01 (8.06)	2099	2.41	0.460 (0.280)	15.13 (2.98)	199 (93)	55 (13)	28.79 (97.49)
9th (B4) Gear									
130.91 (97.62)	8812 (39.20)	5.57 (8.97)	2100	2.15	0.465 (0.283)	14.96 (2.95)	203 (95)	59 (15)	28.76 (97.39)
10th (C2) Gear									
131.76 (98.25)	8152 (36.26)	6.06 (9.76)	2102	1.98	0.462 (0.281)	15.08 (2.97)	201 (94)	56 (13)	28.78 (97.46)
11th (C3) Gear									
131.10 (97.76)	6765 (30.09)	7.27 (11.70)	2098	1.54	0.465 (0.283)	14.95 (2.95)	198 (92)	57 (14)	28.77 (97.43)
12th (C4) Gear									
126.32 (94.19)	5295 (23.55)	8.95 (14.40)	2101	1.36	0.479 (0.291)	14.54 (2.86)	201 (94)	58 (14)	28.76 (97.39)

Front Wheel Drive

Disengaged dB(A) Engaged dB(A)

TRACTOR SOUND LEVEL WITH CAB

Gear closest to 4.7 mph (7.5 km/h) 7th (B3) Gear	71.5	71.5
Maximum sound level	71.5	71.5
Transport speed 16th (D4) Gear	73.5	—
Bystander 16th (D4) Gear	86.0	—

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires —No., size, ply & psi (kPa)	Four 18.4R42; **, 12 (85)	Two 18.4R42; **, 16 (110)
Ballast —Duals (total)	1670 lb (757 kg)	None
—Cast Iron (total)	2000 lb (907 kg)	None
Front Tires —No., size, ply & psi (kPa)	Two 14.9R30; ***, 23 (160)	Two 14.9R30; ***, 23 (160)
Ballast —Liquid (total)	None	None
—Cast Iron (total)	None	None
Height of Drawbar	22.5 in (570 mm)	21.5 in (545 mm)
Static Weight with Operator —Rear	13640 lb (6187 kg)	9980 lb (4527 kg)
—Front	5268 lb (2390 kg)	5286 lb (2398 kg)
—Total	18908 lb (8577 kg)	15266 lb (6925 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: Walterscheid lower link ends

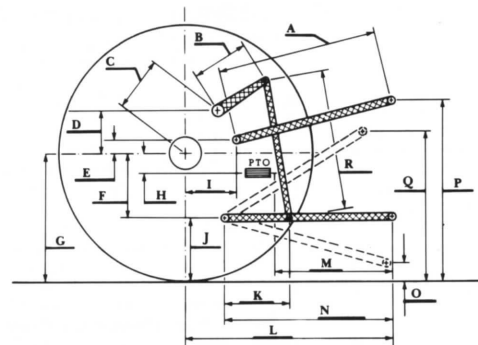
Maximum Force Exerted Through Whole Range:	10161 lbs	(45.2 kN)
i) Opening pressure of relief valve:	NA	
Sustained pressure with pump stalled:	2880 psi	(198 bar)
ii) Pump delivery rate at minimum pressure:	26.0 GPM	(98.4 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	23.8 GPM	(90.1 l/min)
Delivery pressure:	2570 psi	(177 bar)
Power:	35.7 HP	(26.6 kW)

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. (bar)	2880 (198)
Location	remote outlet
Hydraulic oil temperature °F (°C)	144 (62)
Location	hydraulic sump
Category	IIIN
Quick attach	No

With lift cylinders—1 × 70 mm and 1 × 80 mm					
Hitch point distance to ground level	8.1 (206)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb	11959	11949	11605	10760	9168
Lift force on frame (kN)	(53.2)	(53.2)	(51.6)	(47.9)	(40.8)

With lift cylinders—2 × 80 mm					
Hitch point distance to ground level in. (mm)	7.7 (196)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb.	13295	13718	13295	12303	10426
Lift force on frame (kN)	(59.1)	(61.0)	(59.1)	(54.7)	(46.4)



HITCH DIMENSIONS AS TESTED—NO LOAD

	OECD test		SAE test	
	inch	mm	inch	mm
A	27.2	692	26.6	676
B	14.8	375	14.8	375
C	24.5	623	24.5	623
D	23.1	588	23.1	588
E	11.1	283	7.5	190
F	10.8	275	10.8	275
G	35.6	905	34.3	870
H	4.1	105	4.1	105
I	19.8	504	19.8	504
J	24.8	630	23.4	595
K	24.1	612	23.1	587
L	47.5	1206	46.4	1179
M	23.1	586	22.0	559
N	39.8	1011	38.7	984
O	9.0	229	8.0	203
P	51.8	1315	45.4	1153
Q	38.8	984	36.8	933
R	38.1	968	35.9	911



JOHN DEERE 7800 POWRQUAD DIESEL

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