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January 1993

Test 1669: John Deere 7800 Powershift Diesel 19-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1669—SUMMARY 136

JOHN DEERE 7800 POWERSHIFT DIESEL

19 SPEED

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

Dates of Test: May 6 to July 19, 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/kWh)	Hp.hr/gal (kWh/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1008 rpm)					
146.73 (109.42)	2102	8.59 (32.52)	0.407 (0.248)	17.08 (3.36)	
Maximum Power (2 hours)					
158.97 (118.55)	1700	8.87 (33.58)	0.388 (0.236)	17.92 (3.53)	

VARYING POWER AND FUEL CONSUMPTION

Power HP (kW)	Crank shaft speed rpm	Gal/hr (l/h)	lb/hp.hr (kg/kWh)	Hp.hr/gal (kWh/l)	Mean Atmospheric Conditions
146.73 (109.42)	2102	8.59 (32.52)	0.407 (0.248)	17.08 (3.36)	Air temperature
129.18 (96.33)	2177	7.72 (29.21)	0.416 (0.253)	16.74 (3.30)	76°F (24°C)
98.31 (73.31)	2209	6.47 (24.48)	0.458 (0.278)	15.20 (2.99)	Relative humidity
66.34 (49.47)	2236	5.17 (19.59)	0.543 (0.330)	12.82 (2.53)	77%
33.56 (25.03)	2262	3.79 (14.36)	0.787 (0.478)	8.85 (1.74)	Barometer
1.56 (1.16)	2280	2.50 (9.47)	11.145 (6.779)	0.62 (0.12)	28.69" Hg (97.17 kPa)

Maximum Torque 531 lb.-ft. (720 Nm) at 1305 rpm
Maximum Torque Rise 44.8%
Torque rise at 1699 engine rpm 33.4%

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/kWh)	Hp.hr/gal (kWh/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—9th Gear									
124.12 (92.56)	10701 (47.60)	4.35 (7.00)	2101	4.94	0.479 (0.292)	14.52 (2.86)	193 (89)	67 (19)	28.91 (97.90)
75% of Pull at Maximum Power—9th Gear									
98.47 (73.43)	8021 (35.68)	4.60 (7.41)	2187	3.34	0.513 (0.312)	13.55 (2.67)	184 (84)	67 (19)	28.91 (97.90)
50% of Pull at Maximum Power—9th Gear									
67.48 (50.32)	5349 (23.79)	4.73 (7.61)	2223	2.13	0.594 (0.362)	11.70 (2.31)	184 (84)	67 (19)	28.92 (97.93)
75% of Pull at Reduced Engine Speed—11th Gear									
98.36 (73.35)	8024 (35.69)	4.60 (7.40)	1670	3.34	0.459 (0.280)	15.14 (2.98)	191 (88)	68 (20)	28.93 (97.97)
50% of Pull at Reduced Engine Speed—11th Gear									
67.50 (50.33)	5353 (23.81)	4.73 (7.61)	1699	2.22	0.511 (0.311)	13.62 (2.68)	182 (83)	68 (20)	28.93 (97.97)

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 4.485 gal (16.978 l) Drained from motor 4.142 gal (15.679 l) Transmission and hydraulic lubricant John Deere Hy-Gard fluid Front axle lubricant John Deere GL-5 Gear Lubricant Total time engine was operated 44.0 hours.

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger Serial No. *RG6076T505638* 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. *RW7800P 003109* 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 full range operator controlled powershift Nominal travel speeds mph (km/h) first 0.99 (1.60) second 1.43 (2.30) third 1.79 (2.88) fourth 2.16 (3.48) fifth 2.49 (4.01) sixth 2.83 (4.56) seventh 3.26 (5.25) eighth 3.88 (6.25) ninth 4.47 (7.20) tenth 5.08 (8.17) eleventh 5.85 (9.41) twelfth 6.71 (10.80) thirteenth 7.73 (12.44) fourteenth 8.77 (14.12) fifteenth 10.10 (16.26) sixteenth 11.32 (18.22) seventeenth 14.01 (22.54) eighteenth 19.55 (31.46) nineteenth 24.21 (38.96) reverse 1.60 (2.58), 2.29 (3.69), 3.48 (5.60), 4.01 (6.45), 4.53 (7.32), 5.24 (8.44), 10.15 (16.34), 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 15394 lb (6982 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/kWh)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
6th Gear									
101.81 (75.92)	14866 (66.13)	2.57 (4.13)	2169	14.11	0.547 (0.333)	12.71 (2.50)	184 (84)	60 (16)	28.91 (97.90)
7th Gear									
114.96 (85.73)	13979 (62.18)	3.08 (4.96)	2156	9.95	0.506 (0.308)	13.76 (2.71)	190 (88)	63 (17)	28.92 (97.93)
8th Gear									
123.91 (92.40)	13577 (60.39)	3.42 (5.51)	1981	8.67	0.491 (0.299)	14.16 (2.79)	190 (88)	63 (17)	28.92 (97.93)
9th Gear									
130.48 (97.30)	12998 (57.82)	3.76 (6.06)	1868	7.35	0.471 (0.286)	14.78 (2.91)	190 (88)	64 (18)	28.92 (97.93)
10th Gear									
132.86 (99.07)	12704 (56.51)	3.92 (6.31)	1707	6.88	0.465 (0.283)	14.98 (2.95)	193 (89)	64 (18)	28.92 (97.93)
11th Gear									
136.04 (101.44)	11119 (49.46)	4.59 (7.38)	1700	5.10	0.452 (0.275)	15.38 (3.03)	198 (92)	65 (18)	28.92 (97.93)
12th Gear									
134.80 (100.52)	9475 (42.15)	5.34 (8.59)	1702	4.11	0.458 (0.278)	15.21 (3.00)	194 (90)	65 (18)	28.92 (97.93)
13th Gear									
135.01 (100.68)	8195 (36.45)	6.18 (9.94)	1699	3.51	0.457 (0.278)	15.24 (3.00)	196 (91)	66 (19)	28.92 (97.93)
14th Gear									
133.69 (99.70)	7121 (31.68)	7.04 (11.33)	1698	2.83	0.462 (0.281)	15.07 (2.97)	197 (91)	66 (19)	28.92 (97.93)
15th Gear									
134.53 (100.32)	6196 (27.56)	8.14 (13.10)	1698	2.39	0.460 (0.280)	15.13 (2.98)	194 (90)	67 (19)	28.91 (97.90)

**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/kWh)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
112.17 (83.65)	18921 (84.16)	2.22 (3.58)	2133	13.91	0.528 (0.321)	13.17 (2.59)	184 (84)	58 (14)	28.94 (98.00)
6th Gear									
123.51 (92.10)	17164 (76.35)	2.70 (4.34)	2112	6.97	0.486 (0.295)	14.33 (2.82)	186 (85)	60 (16)	28.93 (97.97)
7th Gear									
130.87 (97.59)	16647 (74.05)	2.95 (4.74)	1986	6.26	0.465 (0.283)	14.96 (2.95)	186 (86)	62 (17)	28.93 (97.97)
8th Gear									
133.81 (99.78)	16130 (71.75)	3.11 (5.01)	1749	5.45	0.462 (0.281)	15.08 (2.97)	194 (90)	63 (17)	28.92 (97.93)
9th Gear									
135.56 (101.08)	14393 (64.02)	3.53 (5.68)	1701	4.29	0.454 (0.276)	15.33 (3.02)	202 (94)	63 (17)	28.92 (97.93)
10th Gear									
137.49 (102.53)	12770 (56.80)	4.04 (6.50)	1698	3.45	0.450 (0.274)	15.47 (3.05)	197 (91)	64 (18)	28.91 (97.90)
11th Gear									
136.82 (102.03)	10939 (48.66)	4.69 (7.55)	1701	2.77	0.453 (0.275)	15.38 (3.03)	188 (87)	66 (19)	28.90 (97.87)
12th Gear									
134.15 (100.04)	9289 (41.32)	5.42 (8.72)	1702	2.42	0.463 (0.281)	15.04 (2.96)	187 (86)	67 (19)	28.89 (97.83)
13th Gear									
135.47 (101.02)	8101 (36.04)	6.27 (10.09)	1705	2.07	0.457 (0.278)	15.22 (3.00)	193 (89)	67 (19)	28.88 (97.80)
14th Gear									
134.78 (100.51)	7090 (31.54)	7.13 (11.47)	1703	1.72	0.455 (0.277)	15.29 (3.01)	187 (86)	67 (19)	28.88 (97.80)
15th Gear									
132.08 (98.49)	6024 (26.79)	8.22 (13.23)	1700	1.46	0.467 (0.284)	14.91 (2.94)	187 (86)	67 (19)	28.88 (97.80)

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 130°F (54°C). This tractor did not meet manufacturers claim of 72.0 dB(A) cab sound level. 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. **1669**, Summary 136, July 26, 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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—10th Gear									
126.21 (94.11)	9442 (42.00)	5.01 (8.07)	2095	2.81	0.474 (0.288)	14.68 (2.89)	192 (89)	64 (18)	28.90 (97.87)
75% of Pull at Maximum Power—10th Gear									
99.27 (74.02)	7065 (31.43)	5.27 (8.48)	2185	2.03	0.514 (0.313)	13.54 (2.67)	187 (86)	68 (20)	28.85 (97.70)
50% of Pull at Maximum Power—10th Gear									
67.72 (50.50)	4717 (20.98)	5.38 (8.66)	2219	1.42	0.603 (0.367)	11.54 (2.27)	186 (86)	68 (20)	28.85 (97.70)
75% of Pull at Reduced Engine Speed—12th Gear									
99.41 (74.13)	7066 (31.43)	5.28 (8.49)	1655	1.86	0.470 (0.286)	14.82 (2.92)	184 (84)	68 (20)	28.85 (97.70)
50% of Pull at Reduced Engine Speed—12th Gear									
67.77 (50.54)	4713 (20.96)	5.39 (8.68)	1681	1.42	0.519 (0.316)	13.40 (2.64)	181 (83)	68 (20)	28.85 (97.70)

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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
6th Gear									
112.78 (84.10)	16873 (75.05)	2.51 (4.03)	2130	14.12	0.532 (0.323)	13.09 (2.58)	185 (85)	58 (14)	28.94 (98.00)
7th Gear									
124.64 (92.94)	15052 (66.95)	3.11 (5.00)	2098	6.29	0.480 (0.292)	14.49 (2.85)	186 (85)	62 (17)	28.93 (97.97)
8th Gear									
124.06 (92.51)	12261 (54.54)	3.79 (6.11)	2098	3.92	0.484 (0.295)	14.36 (2.83)	189 (87)	63 (17)	28.92 (97.93)
9th Gear									
124.97 (93.19)	10648 (47.36)	4.40 (7.08)	2099	3.15	0.480 (0.292)	14.50 (2.86)	190 (88)	63 (17)	28.91 (97.90)
10th Gear									
126.21 (94.11)	9442 (42.00)	5.01 (8.07)	2095	2.81	0.474 (0.288)	14.68 (2.89)	192 (89)	64 (18)	28.90 (97.87)
11th Gear									
123.90 (92.39)	7988 (35.53)	5.82 (9.36)	2101	2.21	0.481 (0.293)	14.47 (2.85)	190 (88)	65 (18)	28.89 (97.83)
12th Gear									
120.42 (89.80)	6736 (29.96)	6.70 (10.79)	2102	1.86	0.497 (0.302)	14.01 (2.76)	190 (88)	67 (19)	28.88 (97.80)
13th Gear									
121.37 (90.51)	5897 (26.23)	7.72 (12.42)	2095	1.59	0.494 (0.300)	14.10 (2.78)	194 (90)	67 (19)	28.88 (97.80)
14th Gear									
118.94 (88.69)	5066 (22.53)	8.81 (14.17)	2101	1.42	0.500 (0.304)	13.91 (2.74)	191 (88)	67 (19)	28.88 (97.80)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Disengaged dB(A)	Engaged dB(A)
Gear closest to 4.7 mph (7.5 km/h) 9th Gear	72.5	72.5
Maximum sound level	73.5	75.0
Transport speed 19th Gear	75.0	—
Bystander 19th Gear	86.0	—

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires	Four 18.4R42:***; 12 (85)	Two 18.4R42: **; 16 (110)
Ballast	1670 lb (757 kg)	None
—Duals (total)	2000 lb (907 kg)	None
—Cast Iron (total)	None	None
Front Tires	Two 14.9R30:***; 23 (160)	Two 14.9R30:***; 23 (160)
Ballast	None	None
—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	13874 lb (6293 kg)	10210 lb (4631 kg)
—Front	5342 lb (2423 kg)	5350 lb (2427 kg)
—Total	19216 lb (8716 kg)	15560 lb (7058 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:	2890 psi	(199 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	26.0 GPM	(98.4 l/min)
iii) Pump delivery rate at maximum hydraulic power:	24.2 GPM	(91.6 l/min)
Delivery pressure:	2550 psi	(176 bar)
Power:	36.0 HP	(26.8 kW)

THREE POINT HITCH PERFORMANCE (SAE Static Test)

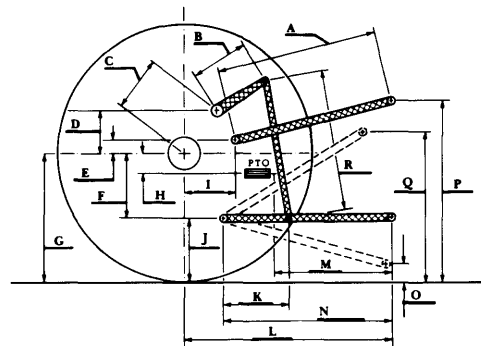
Observed Maximum Pressure psi. (bar)	2880 (198)
Location	remote outlet
Hydraulic oil temperature °F (°C)	144 (62)
Location	hydraulic sump
Category	IIIN
Quick attach	No

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 POWERSHIFT DIESEL

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln
Darrell Nelson, Dean and Director