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January 1995

## Test 1688: John Deere 8100 Diesel 16-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA OECD TRACTOR TEST 1688—SUMMARY 174

## JOHN DEERE 8100 DIESEL

### 16 SPEED

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

**Dates of Test:** April 19 to May 15, 1995

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

**FUEL OIL and TIME:** Fuel No. 2 Diesel  
**Cetane No.** 50.6 **Specific gravity converted to 60°/60° F (15°/15°C)** 0.8374 **Fuel weight** 6.972 lbs/gal (0.836 kg/l) **Oil SAE 15W-40 API service classification** CD, CE, CF-4 **To motor** 4.963 gal (18.787 l) **Drained from motor** 4.708 gal (17.823 l) **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant **Total time engine was operated** 27.5 hours.

**ENGINE:** Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** \*RG6076H543173\* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 4.75" (115.8 mm × 120.7 mm) **Compression ratio** 15.0 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 return fuel **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan

**ENGINE OPERATING PARAMETERS:** **Fuel rate:** 62.4-69.0 lb/h (28.3-31.3 kg/h) **High idle:** 2275-2325 rpm **Turbo boost** nominal 16.4-20.2 psi (113-139 kPa) as measured 18.2 psi (126 kPa)

**CHASSIS:** **Type** front wheel assist **Serial No.** \*RW8100P 001621\* **Tread width** rear 60.0" (1524 mm) to 108.3" (2752 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheel base** 116.1" (2950 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 1.35 (2.18) second 1.73 (2.79) third 2.21 (3.55) fourth 2.81 (4.53) fifth 3.41 (5.49) sixth 3.85 (6.19) seventh 4.36 (7.01) eighth 4.92 (7.91) ninth 5.54 (8.92) tenth 6.26 (10.07) eleventh 7.08 (11.40) twelfth 7.99 (12.86) thirteenth 10.17 (16.36) fourteenth 12.99 (20.91) fifteenth 16.53 (26.61) sixteenth 21.13 (34.01) reverse 1.18 (1.90), 2.98 (4.79), 3.36 (5.40), 6.45 (10.38) — 1600 engine rpm **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** 1000 rpm at 2180 engine rpm **Unladen tractor mass** 18914 lb (8579 kg)

#### 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—1009 rpm)					
160.40 (119.61)	2200	9.24 (34.98)	0.402 (0.244)	17.36 (3.42)	
Maximum Power (2 hours)					
179.15 (133.59)	2000	9.70 (36.70)	0.377 (0.230)	18.48 (3.64)	

#### VARYING POWER AND FUEL CONSUMPTION

160.40 (119.61)	2200	9.24 (34.98)	0.402 (0.244)	17.36 (3.42)	Air temperature
139.71 (104.18)	2254	8.39 (31.76)	0.419 (0.255)	16.65 (3.28)	74°F (23°C)
105.31 (78.53)	2265	6.84 (25.90)	0.453 (0.276)	15.39 (3.03)	Relative humidity
70.50 (52.57)	2274	5.38 (20.36)	0.532 (0.324)	13.11 (2.58)	42%
35.40 (26.40)	2284	3.87 (14.66)	0.763 (0.464)	9.14 (1.80)	Barometer
0.50 (0.37)	2292	2.45 (9.28)	34.168 (20.784)	0.20 (0.04)	28.48"Hg (96.45 kPa)

Maximum Torque 552 lb.-ft. (748 Nm) at 1398 rpm  
Maximum Torque Rise 44.3%  
Torque rise at 1799 engine rpm 27%

#### DRAWBAR PERFORMANCE

(Unballasted—Front Drive Engaged)

#### 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—8th Gear									
141.81 (105.75)	10971 (48.80)	4.85 (7.80)	2199	3.33	0.448 (0.272)	15.58 (3.07)	198 (92)	55 (13)	28.82 (97.60)
75% of Pull at Maximum Power—8th Gear									
110.35 (82.29)	8224 (36.58)	5.03 (8.10)	2258	2.34	0.486 (0.296)	14.34 (2.82)	190 (88)	56 (13)	28.81 (97.56)
50% of Pull at Maximum Power—8th Gear									
74.37 (55.46)	5482 (24.39)	5.09 (8.19)	2264	1.52	0.563 (0.343)	12.37 (2.44)	182 (83)	56 (13)	28.81 (97.56)
75% of Pull at Reduced Engine Speed—10th Gear									
110.31 (82.26)	8205 (36.50)	5.04 (8.11)	1778	2.44	0.430 (0.261)	16.23 (3.20)	189 (87)	56 (13)	28.81 (97.56)
50% of Pull at Reduced Engine Speed—10th Gear									
74.24 (55.36)	5477 (24.36)	5.08 (8.18)	1778	1.52	0.484 (0.295)	14.39 (2.83)	181 (83)	56 (13)	28.81 (97.56)

**DRAWBAR PERFORMANCE AT 2000 RPM  
(Unballasted—Front Drive Engaged)  
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 Gear									
127.38 (94.99)	18874 (83.95)	2.53 (4.07)	2222	12.93	0.504 (0.306)	13.85 (2.73)	188 (86)	53 (12)	28.82 (97.60)
5th Gear									
143.66 (107.13)	17970 (79.93)	3.00 (4.82)	2112	10.41	0.461 (0.280)	15.14 (2.98)	189 (87)	54 (12)	28.82 (97.60)
6th Gear									
151.51 (112.98)	17628 (78.41)	3.22 (5.19)	2000	9.88	0.444 (0.270)	15.71 (3.10)	195 (91)	55 (13)	28.83 (97.63)
7th Gear									
157.13 (117.17)	15521 (69.04)	3.80 (6.11)	2000	6.18	0.427 (0.260)	16.31 (3.21)	195 (91)	55 (13)	28.83 (97.63)
8th Gear									
158.73 (118.37)	13691 (60.90)	4.35 (7.00)	1999	4.56	0.422 (0.257)	16.51 (3.25)	199 (93)	55 (13)	28.83 (97.63)
9th Gear									
159.04 (118.60)	12063 (53.66)	4.94 (7.96)	1997	3.77	0.420 (0.256)	16.59 (3.27)	199 (93)	55 (13)	28.82 (97.60)
10th Gear									
159.48 (118.93)	10620 (47.24)	5.63 (9.06)	2003	3.15	0.420 (0.255)	16.62 (3.27)	201 (94)	56 (13)	28.81 (97.56)
11th Gear									
158.44 (118.15)	9275 (41.26)	6.41 (10.31)	2002	2.71	0.423 (0.257)	16.49 (3.25)	199 (93)	56 (13)	28.81 (97.56)
12th Gear									
156.37 (116.61)	8096 (36.01)	7.24 (11.66)	1999	2.25	0.426 (0.259)	16.38 (3.23)	198 (92)	56 (13)	28.81 (97.56)
13th Gear									
152.63 (113.82)	6167 (27.43)	9.28 (14.94)	2000	1.71	0.437 (0.265)	15.97 (3.15)	195 (91)	56 (13)	28.81 (97.56)

**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. The pull in 3rd gear (ballasted tractor) was limited to avoid excessive tractor bouncing. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 163° F (73°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. **1688**, Summary 174, July 12, 1995.

LOUIS I. LEVITICUS  
Engineer-in-Charge

L.L. BASHFORD  
R.D. GRISSO  
M. F. KOCHER  
Board of Tractor Test Engineers

**TRACTOR SOUND LEVEL WITH CAB**

**dB(A)**

Maximum sound level	74.0
Transport sound level in 16th gear	76.0
Bystander in 16th gear	89.0

**TIRES, BALLAST AND WEIGHT**

	With Ballast	Without Ballast
<b>Rear Tires</b> —No., size, ply & psi (kPa)	Four 20.8R42; **, 7 (50)	Two 20.8R42; **, 13 (90)
<b>Ballast</b> —Duals (total)	1972 lb (895 kg)	None
—Test Equip. (total)	228 lb (103 kg)	None
<b>Front Tires</b> —No., size, ply & psi (kPa)	Two 16.9R30; **, 22 (150)	Two 16.9R30; **, 17 (120)
<b>Ballast</b> —Liquid (total)	None	None
—Cast Iron (total)	None	None
<b>Height of Drawbar</b>	20.0 in (510 mm)	20.0 in (510 mm)
<b>Static Weight with Operator</b> —Rear	13558 lb (6150 kg)	11358 lb (5152 kg)
—Front	7720 lb (3502 kg)	7720 lb (3502 kg)
—Total	21278 lb (9652 kg)	19078 lb (8654 kg)

**DRAWBAR PERFORMANCE AT 2200 RPM  
(Ballasted—Front Drive Engaged)  
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)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
3rd Gear									
119.31 (88.97)	21366 (95.04)	2.09 (3.37)	2247	8.37	0.499 (0.304)	13.96 (2.75)	188 (86)	56 (13)	28.99 (98.17)
4th Gear									
137.71 (102.69)	19045 (84.71)	2.71 (4.36)	2199	5.17	0.469 (0.285)	14.87 (2.93)	189 (87)	56 (13)	28.99 (98.17)
5th Gear									
142.73 (106.43)	16034 (71.32)	3.34 (5.37)	2199	3.79	0.451 (0.274)	15.47 (3.05)	192 (89)	57 (14)	29.00 (98.21)
6th Gear									
142.00 (105.89)	14052 (62.51)	3.79 (6.10)	2199	3.08	0.451 (0.274)	15.46 (3.05)	197 (92)	58 (14)	29.01 (98.24)
7th Gear									
142.18 (106.03)	12364 (55.00)	4.31 (6.94)	2200	2.55	0.448 (0.273)	15.55 (3.06)	197 (91)	58 (14)	29.01 (98.24)
8th Gear									
140.74 (104.95)	10812 (48.09)	4.88 (7.86)	2199	2.37	0.451 (0.274)	15.48 (3.05)	197 (91)	57 (14)	29.02 (98.27)
9th Gear									
140.31 (104.63)	9546 (42.46)	5.51 (8.87)	2200	2.19	0.454 (0.276)	15.35 (3.02)	195 (90)	57 (14)	29.02 (98.27)
10th Gear									
138.00 (102.91)	8292 (36.88)	6.24 (10.04)	2198	1.73	0.466 (0.283)	14.97 (2.95)	197 (91)	56 (13)	28.80 (97.53)
11th Gear									
136.35 (101.67)	7226 (32.14)	7.08 (11.39)	2196	1.55	0.469 (0.285)	14.88 (2.93)	195 (91)	56 (13)	28.80 (97.53)
12th Gear									
134.19 (100.07)	6288 (27.97)	8.00 (12.88)	2197	1.46	0.472 (0.287)	14.76 (2.91)	192 (89)	56 (13)	28.80 (97.53)

**DRAWBAR PERFORMANCE AT 2000 RPM  
(Ballasted—Front Drive Engaged)  
MAXIMUM POWER IN SELECTED GEARS**

3rd Gear									
120.56 (89.90)	21586 (96.02)	2.09 (3.37)	2246	8.45	0.496 (0.302)	14.05 (2.77)	186 (86)	56 (13)	28.99 (98.17)
4th Gear									
141.54 (105.55)	20816 (92.59)	2.55 (4.10)	2128	7.89	0.467 (0.284)	14.93 (2.94)	196 (91)	57 (14)	29.00 (98.21)
5th Gear									
155.69 (116.10)	19750 (87.85)	2.96 (4.76)	2001	6.26	0.433 (0.263)	16.10 (3.17)	198 (92)	57 (14)	29.00 (98.21)
6th Gear									
158.49 (118.18)	17473 (77.72)	3.40 (5.47)	2001	4.31	0.424 (0.258)	16.45 (3.24)	199 (93)	58 (14)	29.01 (98.24)
7th Gear									
160.03 (119.34)	15425 (68.61)	3.89 (6.26)	2001	3.44	0.418 (0.255)	16.66 (3.28)	201 (94)	58 (14)	29.01 (98.24)
8th Gear									
159.82 (119.18)	13611 (60.54)	4.40 (7.09)	1997	2.82	0.419 (0.255)	16.64 (3.28)	201 (94)	58 (14)	29.01 (98.24)
9th Gear									
159.15 (118.68)	11962 (53.21)	4.99 (8.03)	1997	2.46	0.420 (0.256)	16.58 (3.27)	197 (92)	57 (14)	29.02 (98.27)
10th Gear									
158.77 (118.39)	10523 (46.81)	5.66 (9.11)	2001	2.28	0.425 (0.259)	16.39 (3.23)	203 (95)	56 (13)	28.79 (97.49)
11th Gear									
156.79 (116.91)	9158 (40.74)	6.42 (10.33)	2000	1.91	0.426 (0.259)	16.37 (3.22)	201 (94)	56 (13)	28.80 (97.53)
12th Gear									
154.89 (115.50)	8012 (35.64)	7.25 (11.67)	1997	1.73	0.432 (0.263)	16.12 (3.18)	200 (93)	56 (13)	28.80 (97.53)
13th Gear									
150.20 (112.00)	6070 (27.00)	9.28 (14.93)	2002	1.37	0.450 (0.274)	15.49 (3.05)	197 (91)	56 (13)	28.80 (97.53)

**SUPPLEMENT TO NEBRASKA OECD TRACTOR TEST 1688—SUMMARY 174**  
**JOHN DEERE 8100 DIESEL**  
**16 SPEED**  
**(CHASSIS SERIAL NUMBERS \*RW8100P010001\* AND HIGHER)**

**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
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**MAXIMUM POWER AND FUEL CONSUMPTION**

<b>Rated Engine Speed—(PTO speed—1009 rpm)</b>					
164.68 (122.80)	2200	9.47 (35.84)	0.403 (0.245)	17.40 (3.43)	
<b>Maximum Power (2 hours)</b>					
182.18 (135.85)	2000	9.73 (36.83)	0.374 (0.228)	18.73 (3.69)	

**VARYING POWER AND FUEL CONSUMPTION**

164.68 (122.80)	2200	9.47 (35.84)	0.403 (0.245)	17.40 (3.43)	Air temperature
142.81 (106.49)	2249	8.60 (32.55)	0.422 (0.257)	16.61 (3.27)	82°F (28°C)
108.00 (80.53)	2258	7.06 (26.72)	0.458 (0.279)	15.30 (3.01)	Relative humidity
72.35 (53.95)	2270	5.65 (21.38)	0.547 (0.333)	12.81 (2.52)	42%
36.31 (27.08)	2279	4.06 (15.39)	0.785 (0.477)	8.93 (1.76)	Barometer
1.00 (0.74)	2288	2.65 (10.04)	18.625 (11.329)	0.38 (0.07)	28.66" Hg (97.05 kPa)

Maximum Torque 555 lb.-ft. (753 Nm) at 1400 rpm  
Maximum Torque Rise 41.4%  
Torque rise at 1800 engine rpm 24%

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

**Dates of Test:** October 22, 1996

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

**ENGINE: Make** John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** \*RG6081H007612\* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 5.06" (115.8 mm × 128.5 mm) **Compression ratio** 16.5 to 1 **Displacement** 495 cu in (8120 ml)

**CHASSIS: Type** standard **Serial No.** \*RW8100P 010122\*

**NOTE :** The performance figures presented here apply to tractor chassis serial numbers \*RW8100P010001\* and higher.

We, the undersigned, certify that this is a true and correct supplement to official Tractor Test No. **1688**, Summary 174, November 8, 1996.

LOUIS I. LEVITICUS

Engineer-in-Charge

L.L. BASHFORD

R.D. GRISSO

M. F. KOCHER

Board of Tractor Test Engineers

### THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: yes

Maximum Force Exerted Through Whole Range: 9617 lbs (42.8 kN)  
13622 lbs (60.6 kN) (with cylinders (1) 90 mm & (1) 100 mm)

- i) Opening pressure of relief valve: NA  
Sustained pressure with pump stalled: 2910 psi (201 bar)  
ii) Pump delivery rate at minimum pressure: 30.2 GPM (114.3 l/min)  
iii) Pump delivery rate at maximum hydraulic power: 27.6 GPM (104.5 l/min)  
Delivery pressure: 2680 psi (185 bar)  
Power: 43.2 HP (32.2 kW)

### THREE POINT LIFT PERFORMANCE

Observed Maximum Pressure psi (bar) 2920 (201)  
Location remote outlet  
Hydraulic oil Temperature °F (°C) 150 (65)  
Location pump inlet  
Category III  
Quick Attach yes

#### As per current SAE test procedures

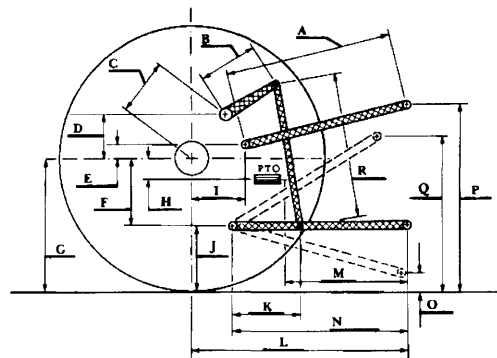
with lift cylinders (1) 80 mm and (1) 90 mm					
Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb.	10967	10611	10647	10440	9599
" " " " (kN)	(48.8)	(47.2)	(47.4)	(46.4)	(42.7)

with lift cylinders (1) 90 mm and (1) 100 mm					
Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb.	15413	14990	14990	14621	13689
" " " " (kN)	(68.6)	(66.7)	(66.7)	(65.0)	(60.9)

#### As per current ASAE test procedures

with lift cylinders (1) 80 mm and (1) 90 mm					
Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb.	12020	11694	11733	11474	10518
" " " " (kN)	(53.5)	(52.0)	(52.2)	(51.0)	(46.8)

with lift cylinders (1) 90 mm and (1) 100 mm					
Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb.	16922	16458	16458	16132	15011
" " " " (kN)	(75.3)	(73.2)	(73.2)	(71.8)	(66.8)



#### HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.3	718
B	19.5	495
C	21.7	550
D	19.5	495
E	4.8	123
F	13.8	350
G	35.6	905
H	7.8	197
I	20.3	515
J	21.8	555
K	28.2	716
L	48.9	1242
*L'	52.4	1331
M	22.0	558
N	38.1	967
O	9.0	229
P	43.8	1114
Q	40.1	1019
R	41.5	1054

\*L' to end of Quick Attach



JOHN DEERE 8100 DIESEL

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