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January 2003

## Test 1819: John Deere 8120 16-Speed

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# NEBRASKA OECD TRACTOR TEST 1819—SUMMARY 396

## JOHN DEERE 8120 DIESEL

### 16 SPEED

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

**Dates of Test:** March 28 - April 8, 2003

**Manufacturer:** John Deere Waterloo Works, P.O.  
Box 270, Waterloo Ia, USA 50704

**FUEL, OIL and TIME:** Fuel No. 2 Diesel  
**Specific gravity converted to 60°/60°F (15°/15°C)**  
0.8400 **Fuel weight** 6.994 lbs/gal (0.838 kg/l) **Oil**  
**SAE 15W-40 API service classification** CF-4  
**Transmission and hydraulic lubricant** John  
Deere Hy-Gard fluid **Front axle lubricant** SAE  
85W-140 API GL-5 **Total time engine was**  
**operated:** 21.5 hours

**ENGINE: Make** John Deere Diesel **Type** six  
cylinder vertical with turbocharger and air to air  
aftercooler **Serial No.** \*RG6081H217953\*  
**Crankshaft** lengthwise **Rated engine speed** 2200  
**Bore and stroke** 4.56" x 5.06" (115.8 mm x 128.5  
mm) **Compression ratio** 16.5 to 1 **Displacement**  
496 cu in (8134 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 pump  
inlet fuel **Muffler** vertical **Cooling medium**  
**temperature control** 2 thermostats and variable  
speed fan

**ENGINE OPERATING PARAMETERS: Fuel**  
**rate:** 68.3 - 75.8 lb/h (31.0 - 34.4 kg/h) **High idle:**  
2275 - 2325 rpm **Turbo boost:** nominal 16.0-20.3  
psi (110 - 140 kPa) as measured 19.4 psi (134 kPa)

**CHASSIS: Type** front wheel assist **Serial**  
**No.**\*RW8120P11518\* **Tread width** rear 60.0"  
(1524 mm) to 130.6 (3318 mm) front 60.0" (1523  
mm) to 88.0" (2234 mm) **Wheelbase** 116.9" (2970  
mm) **Hydraulic control system** direct engine  
drive **Transmission** selective gear fixed ratio with  
full range operator controlled power shift **Nominal**  
**travel speeds mph (km/h)** first 1.19 (1.91) second  
1.59 (2.56) third 2.11 (3.40) fourth 2.84 (4.57) fifth  
3.18 (5.12) sixth 3.67 (5.90) seventh 4.26 (6.85)  
eighth 4.92 (7.91) ninth 5.67 (9.12) tenth 6.54  
(10.52) eleventh 7.59 (12.22) twelfth 8.76 (14.09)  
thirteenth 10.32 (16.61) fourteenth 13.82 (22.24)  
fifteenth 18.40 (29.61) sixteenth 24.03 (38.67)  
reverse 1.11 (1.79), 2.98 (4.79), 3.74 (6.02), 6.58  
(10.59)@1500 engine rpm **Clutch** wet multiple  
disc hydraulically actuated by foot pedal **Brakes** wet  
multiple disc hydraulically operated by two foot  
pedals that can be locked together **Steering**  
hydrostatic **Power take-off** 1 3/4" shaft -1000 rpm  
at 2179 engine rpm, (optional - 1 3/8" shaft, 540 rpm  
at 1978 engine rpm or 1000 rpm at 2179 engine  
rpm) **Unladen tractor mass** 20060 lb (9099 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>Rated Engine Speed—(PTO speed—1010 rpm)</b>					
172.13 (128.36)	2201	10.11 (38.27)	0.411 (0.250)	17.03 (3.35)	
<b>Maximum Power (2 hours)</b>					
199.71 (148.93)	1900	10.49 (39.69)	0.367 (0.223)	19.05 (3.75)	

#### VARYING POWER AND FUEL CONSUMPTION

172.13 (128.36)	2201	10.11 (38.27)	0.411 (0.250)	17.03 (3.35)	Air temperature
149.91 (111.79)	2257	9.22 (34.91)	0.430 (0.262)	16.26 (3.20)	76°F (24°C)
112.87 (84.17)	2267	7.68 (29.06)	0.476 (0.289)	14.70 (2.90)	Relative humidity
75.54 (56.33)	2275	6.05 (22.89)	0.560 (0.341)	12.49 (2.46)	31%
37.90 (28.26)	2286	4.42 (16.72)	0.815 (0.496)	8.58 (1.69)	Barometer
2.00 (1.50)	2295	2.96 (11.20)	10.325 (6.280)	0.68 (0.13)	28.84" Hg (97.66 kPa)

Maximum Torque - 632 lb.-ft. (857 Nm) at 1400 rpm

Maximum Torque Rise - 53.6%

Torque rise at 1800 engine rpm - 40%

#### 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	Barom. inch Hg (kPa)
<b>Maximum Power—8th Gear</b>								
148.45 (110.70)	11560 (51.42)	4.82 (7.75)	2200	3.96	0.480 (0.292)	14.58 (2.87)	187 (86)	68 (20)
<b>75% of Pull at Maximum Power—8th Gear</b>								
116.11 (86.59)	8704 (38.72)	5.00 (8.05)	2261	2.81	0.537 (0.327)	13.03 (2.57)	185 (85)	75 (24)
<b>50% of Pull at Maximum Power—8th Gear</b>								
78.55 (58.57)	5797 (25.78)	5.08 (8.18)	2271	1.75	0.635 (0.386)	11.01 (2.17)	181 (83)	76 (24)
<b>75% of Pull at Reduced Engine Speed—10th Gear</b>								
116.24 (86.68)	8686 (38.64)	5.02 (8.08)	1703	2.81	0.458 (0.279)	15.26 (3.01)	187 (86)	75 (24)
<b>50% of Pull at Reduced Engine Speed—10th Gear</b>								
78.50 (58.54)	5793 (25.77)	5.08 (8.18)	1706	1.81	0.513 (0.312)	13.64 (2.69)	181 (83)	77 (25)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED (2200 RPM)**  
**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	Barom. inch Hg (kPa)
4th Gear							
127.50 (95.08)	18768 (83.48)	2.55 (4.10)	2255	14.07	0.554 (0.337)	12.63 (2.49)	28.52 (96.58)
5th Gear							
139.11 (103.74)	17824 (79.29)	2.93 (4.71)	2240	11.47	0.520 (0.316)	13.45 (2.65)	28.51 (96.55)
6th Gear							
146.54 (109.27)	15962 (71.00)	3.44 (5.54)	2196	7.67	0.489 (0.297)	14.31 (2.82)	28.51 (96.55)
7th Gear							
147.19 (109.76)	13389 (59.56)	4.12 (6.63)	2199	5.09	0.487 (0.296)	14.38 (2.83)	28.72 (97.26)
8th Gear							
148.45 (110.70)	11560 (51.42)	4.82 (7.75)	2200	3.96	0.480 (0.292)	14.58 (2.87)	28.74 (97.33)
9th Gear							
148.91 (111.04)	9972 (44.36)	5.60 (9.01)	2198	3.17	0.477 (0.290)	14.68 (2.89)	28.75 (97.36)
10th Gear							
147.21 (109.77)	8512 (37.86)	6.49 (10.44)	2195	2.54	0.482 (0.293)	14.52 (2.86)	28.79 (97.49)
11th Gear							
143.62 (107.10)	7107 (31.61)	7.58 (12.20)	2198	1.99	0.493 (0.300)	14.18 (2.79)	28.75 (97.36)
12th Gear							
140.31 (104.63)	6002 (26.70)	8.77 (14.11)	2197	1.81	0.508 (0.309)	13.77 (2.71)	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 inlet was maintained at 96°F (36°C). The performance figures on this summary were taken from a test conducted under the OECD Code II test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1819**, Nebraska Summary 396, June 26, 2003.

Leonard L. Bashford  
 Director

M.F. Kocher  
 W.P. Campbell  
 G.J. Hoffman  
 Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 8th gear	71.9	71.8
Transport speed - no load - 16th gear		74.3
Bystander in 16th Gear		84.8

TIRES, BALLAST AND WEIGHT	With Ballast	Without Ballast
<b>Rear Tires</b> - No., size, ply & psi(kPa)	Four 480/80R46;**,8(55)	Two 480/80R46;**,18(125)
<b>Ballast</b> - Duals (total)	1830 lb (830 kg)	None
- Cast Iron (total)	None	None
<b>Front Tires</b> - No., size, ply & psi(kPa)	Two 380/85R34;**,20(150)	Two 380/85R34;**,20(150)
<b>Ballast</b> - Liquid (total)	None	None
- Cast Iron (total)	330 lb (150 kg)	None
<b>Height of Drawbar</b>	22.5 in (560 mm)	23.0 in(585 mm)
<b>Static Weight with operator</b> - Rear	13795 lb (6258 kg)	12020 lb(5452 kg)
- Front	8600 lb (3900 kg)	8215 lb(3726 kg)
- Total	22395 lb(10158 kg)	20235 lb(9178 kg)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED(1900 RPM)**  
**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)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
4th Gear									
127.84 (95.33)	18762 (83.46)	2.55 (4.11)	2255	13.85	0.551 (0.335)	12.70 (2.50)	180 (82)	56 (13)	28.52 (96.58)
5th Gear									
139.85 (104.29)	17949 (79.84)	2.92 (4.70)	2237	11.54	0.513 (0.312)	13.64 (2.69)	183 (84)	61 (16)	28.51 (96.55)
6th Gear									
146.41 (109.18)	16342 (72.69)	3.36 (5.41)	2168	8.87	0.491 (0.298)	14.25 (2.81)	186 (85)	69 (21)	28.52 (96.58)
7th Gear									
159.85 (119.20)	16390 (72.91)	3.66 (5.89)	2045	9.34	0.461 (0.281)	15.16 (2.99)	186 (86)	69 (21)	28.53 (96.61)
8th Gear									
169.22 (126.19)	15790 (70.24)	4.02 (6.47)	1901	7.18	0.434 (0.264)	16.12 (3.18)	190 (88)	74 (23)	28.70 (97.19)
9th Gear									
172.46 (128.60)	13678 (60.84)	4.73 (7.61)	1895	5.17	0.426 (0.259)	16.43 (3.24)	190 (88)	70 (21)	28.73 (97.29)
10th Gear									
173.41 (129.31)	11734 (52.19)	5.54 (8.92)	1902	3.96	0.427 (0.260)	16.38 (3.23)	189 (87)	66 (19)	28.74 (97.33)
11th Gear									
172.30 (128.48)	9946 (44.24)	6.50 (10.46)	1902	3.08	0.428 (0.260)	16.34 (3.22)	186 (86)	58 (14)	28.76 (97.39)
12th Gear									
170.36 (127.04)	8484 (37.74)	7.53 (12.12)	1903	2.54	0.434 (0.264)	16.11 (3.17)	187 (86)	56 (13)	28.78 (97.46)
13th Gear									
169.00 (126.02)	7127 (31.70)	8.89 (14.31)	1898	1.99	0.433 (0.264)	16.14 (3.18)	188 (86)	62 (17)	28.75 (97.36)

**DRAWBAR PERFORMANCE**  
**BALLASTED - FRONT DRIVE ENGAGED(1900 RPM)**  
**MAXIMUM POWER IN SELECTED GEARS**

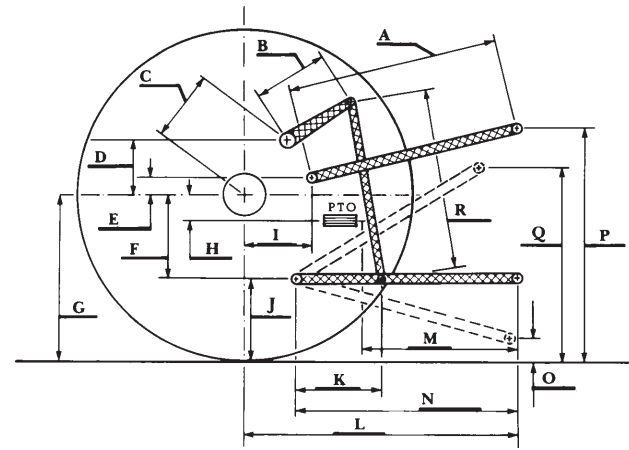
Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
111.93 (83.47)	22308 (99.23)	1.88 (3.03)	2260	14.62	0.584 (0.355)	11.98 (2.36)	180 (82)	59 (15)	28.42 (96.24)
4th Gear									
141.78 (105.73)	21339 (94.92)	2.49 (4.01)	2142	10.89	0.510 (0.310)	13.70 (2.70)	185 (85)	60 (16)	28.43 (96.28)
5th Gear									
154.89 (115.50)	20793 (92.49)	2.79 (4.50)	2101	9.21	0.475 (0.289)	14.72 (2.90)	185 (85)	62 (17)	28.43 (96.28)
6th Gear									
166.02 (123.80)	19757 (87.88)	3.15 (5.07)	2010	7.31	0.449 (0.273)	15.58 (3.07)	186 (85)	64 (18)	28.43 (96.28)
7th Gear									
170.76 (127.33)	18294 (81.37)	3.50 (5.63)	1899	6.16	0.434 (0.264)	16.11 (3.17)	190 (88)	66 (19)	28.44 (96.31)
8th Gear									
174.13 (129.85)	15859 (70.54)	4.12 (6.63)	1902	4.38	0.427 (0.260)	16.38 (3.23)	191 (88)	67 (19)	28.44 (96.31)
9th Gear									
173.58 (129.44)	13622 (60.59)	4.78 (7.69)	1897	3.59	0.426 (0.259)	16.42 (3.23)	193 (89)	68 (20)	28.44 (96.31)
10th Gear									
172.50 (128.64)	11659 (51.86)	5.55 (8.93)	1899	3.07	0.430 (0.261)	16.28 (3.21)	191 (88)	69 (21)	28.44 (96.31)
11th Gear									
169.68 (126.53)	9822 (43.69)	6.48 (10.43)	1899	2.62	0.435 (0.265)	16.06 (3.16)	194 (90)	69 (21)	28.44 (96.31)
12th Gear									
167.11 (124.61)	8342 (37.10)	7.51 (12.09)	1903	2.17	0.442 (0.269)	15.84 (3.12)	191 (88)	69 (21)	28.44 (96.31)
13th Gear									
164.06 (122.34)	6946 (30.90)	8.86 (14.26)	1898	1.81	0.450 (0.274)	15.53 (3.06)	193 (89)	70 (21)	28.44 (96.31)



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

CATEGORY: III  
Quick Attach: Yes

	<u>lift cylinders</u> 2 x 90 mm	<u>lift cylinders</u> 2 x 100 mm
Maximum Force Exerted Through Whole Range:	12353 lbs (54.9 kN)	15387 lbs (68.4 kN)
i) Opening pressure of relief valve:	NA	NA
Sustained pressure at compensator cutoff:	2920 psi (201 bar)	2994 psi (206 bar)
<b>two outlet sets combined</b>		
ii) Pump delivery rate at minimum pressure and rated engine speed:	35.2 GPM (133.2 l/min)	43.6 GPM (165.0 l/min)
iii) Pump delivery rate at maximum hydraulic power:	33.2 GPM (125.7 l/min)	42.4 GPM (160.5 l/min)
Delivery pressure:	2700 psi (186 bar)	2504 psi (173 bar)
Power:	52.4 HP (39.1 kW)	61.9 HP (46.2 kW)
<b>single outlet set</b>		
ii) Pump delivery rate at minimum pressure and rated engine speed:	34.3 GPM (129.8 l/min)	40.1 GPM (151.8 l/min)
iii) Pump delivery rate at maximum hydraulic power:	32.9 GPM (124.5 l/min)	35.2 GPM (133.2 l/min)
Delivery pressure:	2090 psi (144 bar)	2155 psi (149 bar)
Power:	40.1 HP (29.9 kW)	44.3 HP (33.0 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.8	732
B	20.5	520
C	21.7	550
D	19.5	495
E	7.3	185
F	13.8	350
G	37.6	955
H	7.8	197
I	20.3	515
J	23.8	605
K	28.9	733
L	49.9	1268
*L'	53.4	1357
M	22.0	558
N	38.1	1082
O	9.0	230
P	42.6	1164
Q	39.2	995
R	45.3	1150

\*L' to Quick Attach ends



JOHN DEERE 8120 DIESEL

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