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January 2003

Test 1820: John Deere 8220 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1820—SUMMARY 397

JOHN DEERE 8220 DIESEL

16 SPEED

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

Dates of Test: March 21 - 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: 21.0 hours

ENGINE: Make John Deere Diesel **Type** six
cylinder vertical with turbocharger and air to air
aftercooler **Serial No.** *RG6081H217955*
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: 73.0 - 80.5 lb/h (33.1 - 36.5 kg/h) **High idle:**
2275 - 2325 rpm **Turbo boost:** nominal 17.4 - 21.8
psi (120 - 150 kPa) as measured 21.2 psi (146 kPa)

CHASSIS: **Type** front wheel assist **Serial**
No. *RW8220P011565* **Tread width** rear 60.0"
(1524 mm) to 130.6 (3318 mm) front 60.0" (1524
mm) to 88.0" (2235 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** 20045 lb (9092 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)					
191.21 (142.58)	2200	11.08 (41.95)	0.405 (0.247)	17.26 (3.40)	
Maximum Power (2 hours)					
222.35 (165.81)	1900	11.53 (43.63)	0.363 (0.221)	19.29 (3.80)	

VARYING POWER AND FUEL CONSUMPTION

191.21 (142.58)	2200	11.08 (41.95)	0.405 (0.247)	17.26 (3.40)	Air temperature
166.39 (124.08)	2252	10.12 (38.32)	0.425 (0.259)	16.44 (3.24)	75°F (24°C)
125.38 (93.49)	2261	8.24 (31.18)	0.459 (0.279)	15.22 (3.00)	Relative humidity
83.74 (62.45)	2270	6.48 (24.52)	0.541 (0.329)	12.93 (2.5)	24%
42.32 (31.56)	2281	4.55 (17.21)	0.751 (0.457)	9.31 (1.83)	Barometer
2.00 (1.49)	2290	2.92 (11.04)	10.194 (6.201)	0.69 (0.14)	28.77" Hg (97.43 kPa)

Maximum Torque - 706 lb.-ft. (958 Nm) at 1401 rpm

Maximum Torque Rise -54.7%

Torque rise at 1800 engine rpm - 42%

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									
164.50 (122.66)	12972 (57.70)	4.76 (7.65)	2199	4.86	0.472 (0.287)	14.83 (2.92)	187 (86)	68 (20)	28.69 (97.16)
75% of Pull at Maximum Power—8th Gear									
128.92 (96.14)	9750 (43.37)	4.96 (7.98)	2257	3.38	0.524 (0.319)	13.35 (2.63)	183 (84)	63 (17)	28.68 (97.12)
50% of Pull at Maximum Power—8th Gear									
87.40 (65.17)	6503 (28.92)	5.04 (8.11)	2260	1.76	0.606 (0.369)	11.54 (2.27)	181 (83)	62 (17)	28.68 (97.12)
75% of Pull at Reduced Engine Speed—10th Gear									
128.96 (96.17)	9758 (43.41)	4.96 (7.98)	1694	3.29	0.444 (0.270)	15.74 (3.10)	184 (84)	63 (17)	28.68 (97.12)
50% of Pull at Reduced Engine Speed—10th Gear									
87.72 (65.42)	6509 (28.95)	5.05 (8.13)	1702	1.67	0.496 (0.302)	14.11 (2.78)	179 (82)	61 (16)	28.68 (97.12)

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)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
137.28 (102.37)	18291 (81.36)	2.81 (4.53)	2241	14.63	0.539 (0.328)	12.97 (2.56)	179 (82)	44 (7)	28.90 (97.87)
6th Gear									
158.05 (117.86)	17761 (79.00)	3.34 (5.37)	2204	10.88	0.497 (0.302)	14.07 (2.77)	182 (83)	45 (7)	28.91 (97.90)
7th Gear									
161.55 (120.47)	15002 (66.73)	4.04 (6.50)	2198	6.71	0.483 (0.294)	14.48 (2.85)	187 (86)	67 (19)	28.68 (97.12)
8th Gear									
164.50 (122.66)	12972 (57.70)	4.76 (7.65)	2199	4.86	0.472 (0.287)	14.83 (2.92)	187 (86)	68 (20)	28.69 (97.16)
9th Gear									
164.27 (122.50)	11059 (49.19)	5.57 (8.96)	2202	3.56	0.476 (0.290)	14.69 (2.89)	187 (86)	66 (19)	28.71 (97.22)
10th Gear									
163.16 (121.67)	9483 (42.18)	6.45 (10.38)	2199	2.94	0.474 (0.288)	14.76 (2.91)	188 (86)	67 (19)	28.70 (97.19)
11th Gear									
159.03 (118.59)	7912 (35.19)	7.54 (12.13)	2197	2.22	0.488 (0.297)	14.33 (2.82)	185 (85)	67 (19)	28.70 (97.19)
12th Gear									
157.02 (117.09)	6731 (29.94)	8.75 (14.08)	2201	1.94	0.497 (0.302)	14.07 (2.77)	188 (87)	67 (19)	28.70 (97.19)

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 101°F(38°C). The pull in 3rd gear(ballasted tractor) was limited to avoid excessive tractor bouncing. 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. **1820**, Nebraska Summary 397, 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	71.0	70.9
Transport speed - no load - 16th gear		73.8
Bystander in 16th Gear		86.7

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Four 480/80R46;**,10(70)	Two 480/80R46;**,18(125)
Ballast - Duals (total)	1830 lb (830 kg)	None
- Cast Iron (total)	1290 lb (585 kg)	None
Front Tires - No., size, ply & psi(kPa)	Two 380/85R34;**,23(160)	Two 380/85R34;***,22(150)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	1110 lb (503 kg)	None
Height of Drawbar	23.0 in (560 mm)	20.5 in(535 mm)
Static Weight with operator - Rear	14675 lb (6656 kg)	12030 lb(5457 kg)
- Front	9775 lb (4434 kg)	8190 lb(3715 kg)
- Total	24450 lb(11090 kg)	20220 lb(9172 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)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
5th Gear									
139.75 (104.21)	18629 (82.87)	2.81 (4.53)	2240	14.50	0.534 (0.325)	13.11 (2.58)	182 (83)	44 (7)	28.90 (97.87)
6th Gear									
158.49 (118.19)	17812 (79.23)	3.34 (5.37)	2204	10.81	0.495 (0.301)	14.14 (2.79)	182 (83)	45 (7)	28.91 (97.90)
7th Gear									
171.18 (127.65)	16832 (74.87)	3.81 (6.14)	2141	9.67	0.473 (0.288)	14.79 (2.91)	183 (84)	50 (10)	28.95 (98.04)
8th Gear									
182.63 (136.18)	16133 (71.76)	4.25 (6.83)	2046	8.65	0.448 (0.272)	15.61 (3.08)	187 (86)	53 (12)	28.96 (98.07)
9th Gear									
188.12 (140.28)	15202 (67.62)	4.64 (7.47)	1905	7.12	0.429 (0.261)	16.32 (3.22)	189 (87)	65 (18)	28.68 (97.12)
10th Gear									
191.15 (142.54)	13085 (58.20)	5.48 (8.82)	1907	5.03	0.425 (0.259)	16.45 (3.24)	189 (87)	68 (20)	28.69 (97.16)
11th Gear									
190.36 (141.95)	11074 (49.26)	6.45 (10.37)	1905	3.56	0.426 (0.259)	16.43 (3.24)	190 (88)	66 (19)	28.71 (97.22)
12th Gear									
189.18 (141.07)	9486 (42.20)	7.48 (12.04)	1903	2.85	0.430 (0.262)	16.27 (3.20)	190 (88)	67 (19)	28.70 (97.19)
13th Gear									
188.34 (140.44)	7957 (35.39)	8.88 (14.28)	1904	2.40	0.428 (0.260)	16.34 (3.22)	191 (88)	68 (20)	28.70 (97.19)

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)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
123.86 (92.36)	23872 (106.19)	1.95 (3.13)	2256	11.69	0.561 (0.341)	12.47 (2.46)	179 (81)	51 (11)	28.73 (97.29)
4th Gear									
158.33 (118.07)	22991 (102.27)	2.58 (4.16)	2180	9.42	0.499 (0.304)	14.00 (2.76)	182 (83)	52 (11)	28.74 (97.33)
5th Gear									
170.78 (127.35)	22576 (100.42)	2.84 (4.57)	2136	9.57	0.472 (0.287)	14.82 (2.92)	185 (85)	53 (12)	28.74 (97.33)
6th Gear									
184.77 (137.78)	21901 (97.42)	3.16 (5.09)	2029	7.92	0.443 (0.269)	15.79 (3.11)	185 (85)	54 (12)	28.74 (97.33)
7th Gear									
192.31 (143.40)	20631 (91.77)	3.50 (5.63)	1899	6.29	0.423 (0.257)	16.53 (3.26)	187 (86)	55 (13)	28.74 (97.33)
8th Gear									
195.47 (145.76)	17892 (79.59)	4.10 (6.59)	1897	4.60	0.414 (0.252)	16.90 (3.33)	188 (87)	57 (14)	28.74 (97.33)
9th Gear									
195.43 (145.73)	15330 (68.19)	4.78 (7.69)	1900	3.73	0.416 (0.253)	16.82 (3.31)	190 (88)	57 (14)	28.74 (97.33)
10th Gear									
195.57 (145.84)	13215 (58.78)	5.55 (8.93)	1901	3.12	0.415 (0.252)	16.85 (3.32)	189 (87)	58 (14)	28.74 (97.33)
11th Gear									
192.30 (143.40)	11136 (49.54)	6.48 (10.42)	1899	2.76	0.423 (0.257)	16.53 (3.26)	191 (88)	59 (15)	28.75 (97.36)
12th Gear									
189.56 (141.36)	9478 (42.16)	7.50 (12.07)	1900	2.22	0.428 (0.261)	16.33 (3.22)	192 (89)	59 (15)	28.75 (97.36)
13th Gear									
187.19 (139.59)	7921 (35.23)	8.86 (14.26)	1898	1.86	0.435 (0.265)	16.08 (3.17)	191 (88)	60 (16)	28.74 (97.33)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range: 12353 lbs (54.9 kN)

i) Opening pressure of relief valve:

lift cylinders

2 x 90 mm

NA

lift cylinders

2 x 100 mm

NA

High flow option

Sustained pressure at compensator cutoff:

2920 psi (201 bar)

2955 psi (204 bar)

two outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed:

35.2 GPM(133.2 l/min)

43.5 GPM(164.7 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

33.2 GPM(125.7 l/min)

42.6 GPM(161.3 l/min)

Delivery pressure:

2700 psi (186 bar)

2457 psi (169 bar)

Power:

52.4 HP (39.1 kW)

61.1 HP (45.5 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed:

34.3 GPM(129.8 l/min)

40.9 GPM(154.8 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

32.9 GPM(124.5 l/min)

35.3 GPM(133.6 l/min)

Delivery pressure:

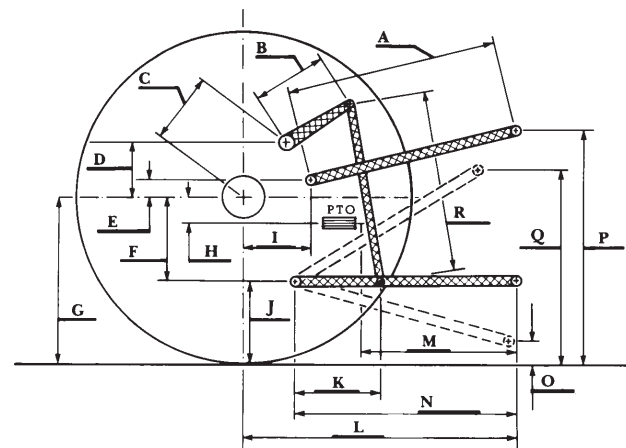
2090 psi (144 bar)

2003 psi (138 bar)

Power:

40.1 HP (29.9 kW)

41.3 HP (30.8 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 8220 DIESEL

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