

# NEBRASKA OECD TRACTOR TEST 1811—SUMMARY 377

## JOHN DEERE 9220 DIESEL

### 18 SPEED

#### 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—1108 rpm)</b>					
282.16 (210.41)	2101	17.03 (64.45)	0.424 (0.258)	16.57 (3.26)	
<b>Standard Power Take-off Speed—(PTO speed—1000 rpm)</b>					
317.95 (237.10)	1894	17.62 (66.70)	0.389 (0.237)	18.05 (3.55)	
<b>Maximum Power (2 hours)</b>					
334.09 (249.13)	1801	18.43 (69.75)	0.387 (0.236)	18.13 (3.57)	

#### VARYING POWER AND FUEL CONSUMPTION

282.16 (210.41)	2101	17.03 (64.46)	0.424 (0.258)	16.57 (3.26)	Air temperature
246.47 (183.79)	2155	15.55 (58.86)	0.443 (0.270)	15.85 (3.12)	78°F (25°C)
185.96 (138.67)	2172	13.16 (49.80)	0.497 (0.302)	14.13 (2.78)	Relative humidity
123.70 (92.24)	2188	10.98 (41.56)	0.623 (0.379)	11.27 (2.22)	56%
63.27 (47.18)	2209	8.16 (30.88)	0.906 (0.551)	7.75 (1.53)	Barometer
1.12 (0.83)	2228	5.04 (19.08)	31.620 (19.234)	0.22 (0.04)	28.52" Hg (98.58 kPa)

Maximum Torque - 1094 lb.-ft. (1483 Nm) at 1398 rpm  
 Maximum Torque Rise - 54.9%  
 Torque rise at 1699 engine rpm - 45%

#### DRAWBAR PERFORMANCE (Unballasted)

##### 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)
<b>Maximum Power—6th Gear</b>									
264.34 (197.12)	22019 (97.94)	4.50 (7.25)	2097	3.30	0.451 (0.275)	15.56 (3.06)	190 (88)	68 (20)	28.86 (97.73)
<b>75% of Pull at Maximum Power—6th Gear</b>									
206.25 (153.80)	16542 (73.58)	4.68 (7.52)	2163	2.64	0.502 (0.305)	14.00 (2.76)	186 (85)	64 (18)	29.09 (98.51)
<b>50% of Pull at Maximum Power—6th Gear</b>									
139.82 (104.26)	11021 (49.02)	4.76 (7.66)	2184	1.88	0.591 (0.360)	11.88 (2.34)	183 (84)	64 (18)	29.09 (98.51)
<b>75% of Pull at Reduced Engine Speed—8th Gear</b>									
206.08 (153.68)	16502 (73.40)	4.68 (7.54)	1752	2.55	0.448 (0.272)	15.69 (3.09)	182 (83)	65 (18)	29.09 (98.51)
<b>50% of Pull at Reduced Engine Speed—8th Gear</b>									
139.90 (104.32)	10978 (48.83)	4.78 (7.69)	1774	1.68	0.507 (0.308)	13.86 (2.73)	179 (82)	65 (18)	29.09 (98.51)

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

**Dates of Test:** September 20-27, 2002

**Manufacturer:** John Deere Tractor Works, 3500 East Donald St., P.O. Box 270, Waterloo Ia, 50704-0270

**FUEL, OIL and TIME:** Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8435 Fuel weight 7.023 lbs/gal (0.842 kg/l) Oil SAE 15W-40 API service classification CH-4 Transmission, hydraulic and final drive lubricant John Deere Hy-Gard fluid Total time engine was operated: 23.5 hours

**ENGINE: Make** John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air aftercooler **Serial No.**\*RG6125H031928\* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 5.00" x 6.50" (127.0 mm x 165.0 mm) **Compression ratio** 17.0 to 1 **Displacement** 765 cu in (12536 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 oil, radiator for transmission, front and rear axle oil **Fuel filter** two paper cartridges **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

**ENGINE OPERATING PARAMETERS: Fuel rate:** 112.7-120.2 lb/h (51.1-54.5 kg/h) **High idle:** 2205-2255 rpm **Turbo boost:** nominal 16.0-17.4 psi (110-120 kPa) as measured 16.8 psi (116 kPa)

**CHASSIS: Type** four wheel drive with duals **Serial No.**\*RW9220P002071\* **Tread width** rear 66.5" (1689 mm) to 142.3" (3615 mm), front 66.5" (1689 mm) to 142.3" (3615 mm) **Wheelbase** 137.8" (3500 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 2.44 (3.92) second 3.00 (4.83) third 3.32 (5.35) fourth 3.72 (5.98) fifth 4.09 (6.59) sixth 4.57 (7.36) seventh 5.06 (8.15) eighth 5.65 (9.09) ninth 6.23 (10.02) tenth 6.95 (11.19) eleventh 7.70 (12.39) twelfth 8.51 (13.69) thirteenth 9.47 (15.24) fourteenth 10.47 (16.85) fifteenth 12.94 (20.83) sixteenth 15.93 (25.63) seventeenth 19.69 (31.69) eighteenth 24.23 (39.00) reverse 2.43 (3.92), 3.32 (5.35), 3.72 (5.98), 5.06 (8.15), 5.65 (9.09), 7.70 (12.39)

## DRAWBAR PERFORMANCE

(Unballasted at 2100 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)	
1st Gear									
220.45 (164.39)	35831 (159.38)	2.31 (3.71)	2155	9.52	0.506 (0.308)	13.87 (2.73)	184 (84)	54 (12)	28.98 (98.14)
2nd Gear									
253.23 (188.83)	33483 (148.94)	2.84 (4.56)	2098	7.34	0.469 (0.285)	14.98 (2.95)	185 (85)	58 (14)	29.02 (98.27)
3rd Gear									
261.63 (195.10)	30773 (136.89)	3.19 (5.13)	2100	5.85	0.455 (0.277)	15.44 (3.04)	185 (85)	62 (17)	29.06 (98.41)
4th Gear									
264.57 (197.29)	27543 (122.52)	3.60 (5.80)	2098	4.68	0.449 (0.273)	15.63 (3.08)	185 (85)	62 (17)	29.06 (98.41)
5th Gear									
267.14 (199.21)	25057 (111.46)	4.00 (6.43)	2098	3.95	0.449 (0.273)	15.65 (3.08)	190 (88)	72 (22)	28.87 (97.77)
6th Gear									
264.34 (197.12)	22019 (97.94)	4.50 (7.25)	2097	3.30	0.451 (0.275)	15.56 (3.06)	190 (88)	68 (20)	28.86 (97.73)
7th Gear									
267.74 (199.65)	20064 (89.25)	5.00 (8.05)	2099	3.02	0.447 (0.272)	15.71 (3.09)	199 (93)	70 (21)	28.87 (97.77)
8th Gear									
266.32 (198.60)	17804 (79.20)	5.61 (9.03)	2099	2.64	0.450 (0.274)	15.59 (3.07)	196 (91)	71 (22)	28.87 (97.77)
9th Gear									
260.18 (194.02)	15728 (69.96)	6.20 (9.98)	2100	2.36	0.461 (0.280)	15.24 (3.00)	187 (86)	64 (18)	28.82 (97.60)
10th Gear									
259.79 (193.73)	14062 (62.55)	6.93 (11.15)	2095	2.07	0.462 (0.281)	15.21 (3.00)	192 (89)	65 (18)	28.84 (97.66)
11th Gear									
258.70 (192.91)	12583 (55.97)	7.71 (12.41)	2101	1.88	0.464 (0.282)	15.13 (2.98)	190 (88)	66 (19)	28.86 (97.73)
12th Gear									
259.47 (193.49)	11449 (50.93)	8.50 (13.68)	2094	1.68	0.462 (0.281)	15.21 (3.00)	190 (88)	67 (19)	28.86 (97.73)

**Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated foot pedal **Steering** hydrostatic and articulated **Power take-off** 1000 rpm at 1895 engine rpm **Unladen tractor mass** 36505 lb (16558 kg)

**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 106°F (41°C). The pull in 1st gear was limited to avoid 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. **1811**, Nebraska Summary 377, December 13, 2002.

Leonard L. Bashford  
Director

V.I. Adamchuk  
M.F. Kocher  
W.P. Campbell  
Board of Tractor Test Engineers

### TRACTOR SOUND LEVEL WITH CAB

dB(A)

At no load in 6th gear	73.8
Transport speed - no load - 18th gear	75.7
Bystander in 18th gear	90.5

### TIRES, BALLAST AND WEIGHT

**Rear Tires** - No., size, ply & psi (kPa)

**Front Tires** - No., size, ply & psi (kPa)

**Height of Drawbar**

**Static Weight with operator** - Rear

- Front

- Total

### Tested Without Ballast

Four 620/70R46;\*\*\*;7(50)

Four 620/70R46;\*\*\*;11(75)

21.5 in (545 mm)

15160 lb (6876 kg)

21520 lb (9761 kg)

36680 lb (16637 kg)

**DRAWBAR PERFORMANCE**  
**(Unballasted at 1800 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. <sup>o</sup> F(°C) cool- ing med	Temp. <sup>o</sup> F(°C) Air dry bulb	Barom. inch Hg (kPa)	
1st Gear									
222.91 (166.22)	36064 (160.42)	2.32 (3.73)	2155	9.11	0.501 (0.305)	14.01 (2.76)	184 (84)	54 (12)	28.98 (98.13)
2nd Gear									
252.94 (188.62)	34843 (154.99)	2.72 (4.38)	2055	9.11	0.473 (0.288)	14.84 (2.92)	184 (84)	60 (16)	29.03 (98.31)
3rd Gear									
266.51 (198.74)	33965 (151.08)	2.94 (4.74)	1995	8.69	0.454 (0.276)	15.48 (3.05)	186 (85)	62 (17)	29.05 (98.37)
4th Gear									
276.65 (206.30)	32517 (144.64)	3.19 (5.13)	1922	8.02	0.445 (0.270)	15.80 (3.11)	186 (86)	63 (17)	29.08 (98.48)
5th Gear									
289.95 (216.22)	32402 (144.13)	3.36 (5.40)	1823	7.34	0.438 (0.267)	16.03 (3.16)	188 (86)	63 (17)	29.07 (98.44)
6th Gear									
291.84 (217.62)	28920 (128.64)	3.78 (6.09)	1802	5.23	0.440 (0.268)	15.95 (3.14)	196 (91)	73 (23)	28.87 (97.77)
7th Gear									
297.88 (222.13)	26388 (117.38)	4.23 (6.81)	1799	4.14	0.430 (0.262)	16.33 (3.22)	197 (92)	67 (19)	28.87 (97.77)
8th Gear									
300.80 (224.30)	23755 (105.67)	4.75 (7.64)	1799	3.67	0.428 (0.261)	16.39 (3.23)	202 (94)	70 (21)	28.87 (97.77)
9th Gear									
298.92 (222.90)	21274 (94.63)	5.27 (8.48)	1802	3.21	0.429 (0.261)	16.37 (3.22)	202 (94)	72 (22)	28.87 (97.77)
10th Gear									
294.69 (219.75)	18628 (82.86)	5.93 (9.55)	1806	2.74	0.434 (0.264)	16.19 (3.19)	192 (89)	64 (18)	28.83 (97.63)
11th Gear									
295.81 (220.58)	16877 (75.07)	6.57 (10.58)	1802	2.45	0.434 (0.264)	16.18 (3.19)	196 (91)	65 (18)	28.85 (97.70)
12th Gear									
297.16 (221.59)	15326 (68.17)	7.27 (11.70)	1801	2.07	0.433 (0.263)	16.23 (3.20)	195 (90)	66 (19)	28.86 (97.73)
13th Gear									
289.38 (215.79)	13331 (59.30)	8.14 (13.10)	1804	1.97	0.443 (0.269)	15.87 (3.13)	196 (91)	67 (19)	28.86 (97.73)

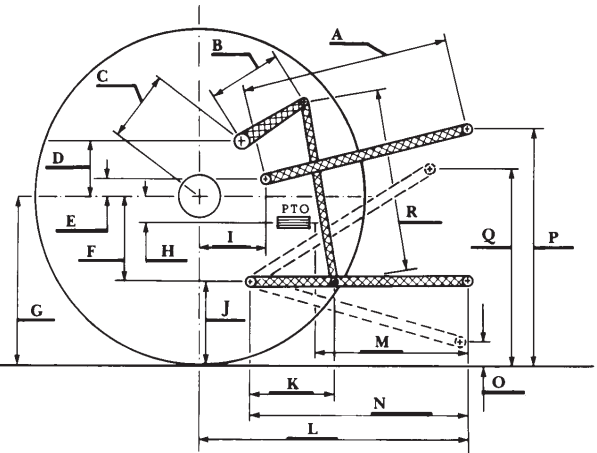
## THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: yes

Maximum Force Exerted Through Whole Range: 13104 lbs (58.3 kN)

i) Opening pressure of relief valve:	NA
Sustained pressure at compensator cutoff:	2920 psi (201 bar)
	<b>Single outlet set      Two outlet sets combined</b>
Pump delivery rate at minimum pressure and rated engine speed:	34.5 GPM (130.6 l/min) 48.8 GPM (184.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	30.6 GPM (115.8 l/min) 45.1 GPM (170.7 l/min)
Delivery pressure:	2000 psi (138 bar) 2110 psi (145 bar)
Power:	35.7 HP (26.6 kW) 55.5 HP (41.4 kW)



### THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi.(bar)	2950 (203)
Location:	remote outlet
Hydraulic oil temperature: °F (°C)	147 (64)
Location:	hydraulic sump
Category:	III
Quick attach:	Yes

### HITCH DIMENSIONS AS TESTED—NO LOAD

Category III (lift cylinders - 2x90 mm)					
SAE Static Test—System pressure 2575 psi (177 Bar)					
Hitchpoint distance to ground level in. (mm)	8.0 (203)	16.0 (409)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb	14589	14463	14418	13995	12978
" " " " " " (kN)	(64.9)	(64.3)	(64.1)	(62.3)	(57.7)
ASAE Static Test—System pressure 2775 psi (191 Bar)					
Hitchpoint distance to ground level in. (mm)	8.0 (203)	16.0 (409)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb	15715	15580	15531	15076	13980
" " " " " " (kN)	(69.9)	(69.3)	(69.1)	(67.1)	(62.2)

	inch	mm
A	30.8	780
B	18.6	472
C	26.2	660
D	24.4	620
E	11.3	288
F	13.8	350
G	35.6	905
H	4.8	122
I	22.7	577
J	21.9	555
K	28.8	731
L	55.3	1405
*L'	61.8	1570
M	25.4	645
N	44.0	1117
O	8.0	203
P	48.6	1234
Q	39.1	993
R	44.8	1137

\*L' to Quick Attach ends



**JOHN DEERE 9220 DIESEL**

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