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January 2002

## Test 1798: John Deere 8320 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 1798-SUMMARY 364

## JOHN DEERE 8320 DIESEL

### 16 SPEED

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

**Dates of Test:** May 10 - 31, 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) 0.8457 Fuel weight 7.042 lbs/gal (0.844 kg/l) Oil SAE 15W-40 API service classification CH-4 Transmission and hydraulic lubricant John Deere Hy-Gard fluid Front axle lubricant John Deere Hy-Gard fluid Total time engine was operated: 20.0 hours

**ENGINE:** Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air aftercooler **Serial No.**\*RG6081H202158\* **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 water separator **Fuel cooler** radiator for pump inlet fuel **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

**ENGINE OPERATING PARAMETERS:** Fuel rate: 84.8 - 92.3 lb/h (38.5 - 41.9 kg/h) High idle: 2275 - 2325 rpm Turbo boost: nominal 23.2 - 26.1 psi (160 - 180 kPa) as measured 25.0 psi (172 kPa)

**CHASSIS:** Type front wheel assist **Serial No.**\*RW8320P001274\* **Tread width** rear 60.0" (1523 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** 20030 lb (9085 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					
218.52 (162.95)	2200	12.57 (47.58)	0.405 (0.246)	17.39 (3.42)	
Maximum Power (2 hours)					
247.89 (184.85)	1950	13.04 (49.38)	0.371 (0.226)	19.00 (3.74)	
VARYING POWER AND FUEL CONSUMPTION					
218.52 (162.95)	2200	12.57 (47.58)	0.405 (0.246)	17.39 (3.42)	Air temperature
190.36 (141.95)	2257	11.37 (43.04)	0.421 (0.256)	16.74 (3.30)	76°F (24°C)
143.56 (107.05)	2267	9.24 (34.98)	0.453 (0.276)	15.54 (3.06)	Relative humidity
96.00 (71.59)	2278	7.07 (26.76)	0.519 (0.316)	13.58 (2.68)	22%
48.43 (36.12)	2287	4.90 (18.54)	0.712 (0.433)	9.89 (1.95)	Barometer
1.00 (0.75)	2297	2.98 (11.28)	20.949 (12.743)	0.34 (0.07)	29.12" Hg (98.61 kPa)
Maximum Torque - 760 lb.-ft. (1030 Nm) at 1300 rpm					
Maximum Torque Rise - 45.7%					
Torque rise at 1801 engine rpm - 31%					

#### 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									
189.39 (141.23)	15054 (66.96)	4.72 (7.59)	2202	5.51	0.467 (0.284)	15.09 (2.97)	188 (87)	56 (13)	29.00 (98.21)
75% of Pull at Maximum Power 8th Gear									
148.79 (110.95)	11290 (50.22)	4.94 (7.95)	2262	3.79	0.502 (0.305)	14.05 (2.77)	186 (86)	68 (20)	28.98 (98.14)
50% of Pull at Maximum Power 8th Gear									
101.23 (75.49)	7525 (33.47)	5.04 (8.12)	2273	2.28	0.568 (0.346)	12.40 (2.44)	182 (83)	70 (21)	28.96 (98.07)
75% of Pull at Reduced Engine Speed 10th Gear									
148.84 (110.99)	11291 (50.22)	4.94 (7.96)	1700	3.62	0.430 (0.261)	16.40 (3.23)	188 (86)	69 (21)	28.97 (98.10)
50% of Pull at Reduced Engine Speed 10th Gear									
101.46 (75.66)	7523 (33.46)	5.06 (8.14)	1712	2.19	0.468 (0.285)	15.04 (2.96)	183 (84)	70 (21)	28.95 (98.04)

## DRAWBAR PERFORMANCE

### UNBALLASTED - 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.gal (kW/l)	Temp. °F cool- ing med	°C Air dry bulb	Barom. inch Hg (kPa)
6th Gear									
171.80 (128.11)	19460 (86.56)	3.31 (5.33)	2253	13.27	0.508 (0.309)	13.88 (2.73)	182 (83)	46 (8)	29.02 (98.27)
7th Gear									
186.43 (139.02)	17393 (77.37)	4.02 (6.47)	2198	7.01	0.470 (0.286)	14.98 (2.95)	187 (86)	50 (10)	29.01 (98.24)
8th Gear									
189.39 (141.23)	15054 (66.96)	4.72 (7.59)	2202	5.51	0.467 (0.284)	15.09 (2.97)	188 (87)	56 (13)	29.00 (98.21)
9th Gear									
189.54 (141.34)	12895 (57.36)	5.51 (8.87)	2201	4.49	0.468 (0.285)	15.04 (2.96)	190 (88)	58 (14)	29.00 (98.21)
10th Gear									
189.58 (141.37)	11097 (49.36)	6.41 (10.31)	2200	3.70	0.464 (0.282)	15.19 (2.99)	190 (88)	60 (16)	28.99 (98.17)
11th Gear									
187.49 (139.81)	9386 (41.75)	7.49 (12.06)	2198	2.91	0.473 (0.287)	14.91 (2.94)	190 (88)	63 (17)	28.99 (98.17)
12th Gear									
186.08 (138.76)	8030 (35.72)	8.69 (13.99)	2199	2.37	0.476 (0.289)	14.80 (2.92)	191 (88)	65 (18)	28.99 (98.17)

**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 98°F(37°C). The pull in 6th gear (unballasted tractor) and 4th 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. **1798**, Nebraska Summary 364, July 23, 2002.

Brent T. Sampson  
Test Engineer

L.L. Bashford  
G.J. Hoffman  
V.I. Adamchuk  
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	72.0	71.9
Transport speed-no load- 16th gear		75.7
Bystander in 16th Gear		86.3

## TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
<b>Rear Tires</b> - No., size, ply & psi(kPa)	Four 480/80R46;***;11(75)	Two 480/80R46;***;17(115)
<b>Ballast</b> - Duals (total)	1830 lb (830 kg)	None
- Cast Iron (total)	2245 lb (1018 kg)	None
<b>Front Tires</b> - No., size, ply & psi(kPa)	Two 380/85R34;***;23(160)	Two 380/85R34;***;18(125)
<b>Ballast</b> - Liquid (total)	None	None
- Cast Iron (total)	1150 lb (521 kg)	None
<b>Height of Drawbar</b>	20.5 in (535 mm)	21.0 in (535 mm)
<b>Static Weight with operator</b> - Rear	15580 lb (7066 kg)	12035 lb (5459 kg)
- Front	9850 lb (4468 kg)	8170 lb (3706 kg)
- Total	25430 lb(11534 kg)	20205 lb (9165 kg)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - 1950 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)
6th Gear									
173.02 (129.02)	19504 (86.76)	3.33 (5.35)	2253	12.91	0.502 (0.305)	14.04 (2.77)	184 (84)	46 (8)	29.02 (98.27)
7th Gear									
186.64 (139.18)	18074 (80.40)	3.87 (6.23)	2167	9.32	0.474 (0.289)	14.85 (2.93)	186 (86)	55 (13)	29.01 (98.24)
8th Gear									
203.39 (151.67)	17100 (76.06)	4.46 (7.18)	2127	7.66	0.450 (0.274)	15.64 (3.08)	190 (88)	57 (14)	29.00 (98.21)
9th Gear									
213.41 (159.14)	16611 (73.89)	4.82 (7.75)	1978	7.01	0.430 (0.262)	16.37 (3.22)	192 (89)	59 (15)	29.00 (98.21)
10th Gear									
216.79 (161.66)	14603 (64.96)	5.57 (8.96)	1949	5.34	0.423 (0.257)	16.65 (3.28)	193 (89)	61 (16)	28.99 (98.17)
11th Gear									
216.18 (161.20)	12381 (55.07)	6.55 (10.54)	1948	4.32	0.424 (0.258)	16.62 (3.27)	194 (90)	64 (18)	28.99 (98.17)
12th Gear									
216.02 (161.09)	10642 (47.34)	7.61 (12.25)	1947	3.35	0.424 (0.258)	16.61 (3.27)	195 (91)	66 (19)	28.99 (98.17)
13th Gear									
214.29 (159.80)	8894 (39.56)	9.04 (14.54)	1947	2.73	0.427 (0.260)	16.48 (3.25)	197 (91)	67 (19)	28.99 (98.17)

**DRAWBAR PERFORMANCE**  
**BALLASTED-1950 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)
4th Gear									
177.88 (132.64)	25231 (112.23)	2.64 (4.25)	2234	9.30	0.497 (0.302)	14.18 (2.79)	185 (85)	56 (13)	28.74 (97.33)
5th Gear									
188.90 (140.86)	24136 (107.36)	2.93 (4.72)	2166	7.48	0.469 (0.285)	15.01 (2.96)	186 (85)	56 (13)	28.74 (97.33)
6th Gear									
207.01 (154.37)	23371 (103.96)	3.32 (5.35)	2108	6.58	0.448 (0.273)	15.72 (3.10)	187 (86)	55 (13)	28.75 (97.36)
7th Gear									
215.40 (160.62)	22398 (99.63)	3.61 (5.80)	1954	5.83	0.430 (0.261)	16.40 (3.23)	191 (88)	55 (13)	28.75 (97.36)
8th Gear									
219.36 (163.58)	19522 (86.84)	4.21 (6.78)	1950	4.39	0.421 (0.256)	16.74 (3.30)	192 (89)	56 (13)	28.75 (97.36)
9th Gear									
219.37 (163.58)	16718 (74.37)	4.92 (7.92)	1954	3.69	0.419 (0.255)	16.80 (3.31)	194 (90)	56 (13)	28.75 (97.36)
10th Gear									
219.71 (163.84)	14453 (64.29)	5.70 (9.17)	1952	2.99	0.418 (0.254)	16.86 (3.32)	193 (89)	57 (14)	28.75 (97.36)
11th Gear									
216.65 (161.55)	12212 (54.32)	6.65 (10.71)	1952	2.54	0.425 (0.258)	16.58 (3.27)	194 (90)	57 (14)	28.76 (97.39)
12th Gear									
214.28 (159.79)	10437 (46.43)	7.70 (12.39)	1952	2.18	0.431 (0.262)	16.36 (3.22)	193 (89)	57 (14)	28.76 (97.39)
13th Gear									
210.21 (156.75)	8667 (38.55)	9.10 (14.64)	1950	1.91	0.434 (0.264)	16.23 (3.20)	193 (89)	58 (14)	28.77 (97.43)

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

CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range: lift cylinders 1x90 & 1x100 mm 2x100 mm  
13870 lbs (61.7 kN) 15387 lbs (68.4 kN)

i) Opening pressure of relief valve: NA NA

Sustained pressure at compensator cutoff: 2980 psi (205 bar) 2990 psi (206 bar)  
**High flow option**

#### two outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed: 35.2 GPM (133.2 l/min) 43.8 GPM (165.8 l/min)

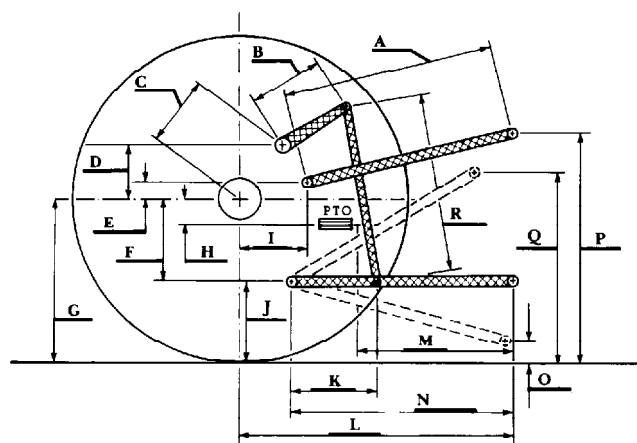
iii) Pump delivery rate at maximum hydraulic power: 33.2 GPM (125.7 l/min) 43.2 GPM (163.5 l/min)  
Delivery pressure: 2700 psi (186 bar) 2250 psi (155 bar)  
Power: 52.4 HP (39.1 kW) 56.8 HP (42.3 kW)

#### single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed: 34.3 GPM (129.8 l/min) 33.6 GPM (127.2 l/min)

iii) Pump delivery rate at maximum hydraulic power: 32.9 GPM (124.5 l/min) 28.3 GPM (107.1 l/min)  
Delivery pressure: 2090 psi (144 bar) 2100 psi (145 bar)  
Power: 40.1 HP (29.9 kW) 34.7 HP (25.9 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 8320 DIESEL

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