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2011

Test 2004: John Deere 8310R

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 2004 - SUMMARY 787

JOHN DEERE 8310R DIESEL

16 SPEED

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

Dates of tests: September 20 -October 3, 2011

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) 0.8411 Fuel weight 7.003 lbs/gal (0.839 kg/l) Oil SAE 15W-40 API service classification CJ-4 Transmission and hydraulic lubricant John Deere Hy-Gard fluid Front axle lubricant John Deere Hy-Gard fluid Total time engine was operated: 19.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with two turbochargers and air to air aftercooler **Serial No.***RG6090R002851* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.661" x 5.354" (118.4 mm x 136.0 mm) **Compression ratio** 16.0 to 1 **Displacement** 548 cu in (8984 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 return fuel **Exhaust** regenerative particulate filter integrated within a vertical muffler **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 102.1 - 110.5 lb/h (46.3 - 50.1 kg/h) **High idle:** 2150 - 2250 rpm **Turbo boost:** nominal 27.5 - 30.5 psi (190 - 210 kPa) as measured 29.1 psi (201 kPa)

CHASSIS: Type front wheel assist with duals **Serial No.***1RW8310RBPB042567* **Tread width** rear 60.0" (1524 mm) to 132.6" (3368 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheelbase** 118.9" (3020 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 1.17 (1.88) second 1.57 (2.52) third 2.09 (3.36) fourth 2.80 (4.50) fifth 3.14 (5.05) sixth 3.62 (5.82) seventh 4.20 (6.76) eighth 4.84 (7.79) ninth 5.59 (9.00) tenth 6.45 (10.38) eleventh 7.49 (12.06) twelfth 8.64 (13.90) thirteenth 10.17 (16.38) fourteenth 13.63 (21.94) fifteenth 18.15 (29.21) sixteenth 24.31 (39.13) reverse 1.09 (1.76), 2.93 (4.72), 3.70 (5.96), 6.80 (10.95)@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** 1000 rpm at 2004 engine rpm **Unladen tractor mass** 26845 lb (12177 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—1048 rpm)					
271.62 (202.55)	2099	14.70 (55.64)	0.379 (0.231)	18.48 (3.64)	
Standard Power Take-off Speed(1000 rpm)					
294.79 (219.83)	2003	15.64 (59.19)	0.371 (0.226)	18.85 (3.71)	
Maximum Power (1 hour)					
302.97 (225.92)	1900	15.89 (60.15)	0.367 (0.223)	19.07 (3.76)	

VARYING POWER AND FUEL CONSUMPTION

271.62 (202.55)	2099	14.70 (55.64)	0.379 (0.231)	18.48 (3.64)	Air temperature
237.26 (176.92)	2156	13.30 (50.36)	0.393 (0.239)	17.84 (3.51)	74°F (23°C)
178.66 (133.22)	2166	10.71 (40.55)	0.420 (0.255)	16.68 (3.29)	Relative humidity
119.74 (89.29)	2177	8.25 (31.22)	0.482 (0.293)	14.52 (2.86)	37%
60.14 (44.85)	2188	5.91 (22.36)	0.688 (0.418)	10.18 (2.01)	Barometer
3.96 (2.96)	2197	4.10 (15.53)	7.246 (4.408)	0.97 (0.19)	28.81" Hg (97.09 kPa)

Maximum Torque - 973 lb.-ft. (1319 Nm) at 1600 rpm
Maximum Torque Rise - 43.1%
Torque rise at 1701 engine rpm - 37%
Power increase at 1900 rpm - 11.7%

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									
235.40 (175.54)	18573 (82.61)	4.75 (7.64)	2100	5.4	0.439 (0.267)	15.97 (3.15)	196 (91)	53 (11)	28.80 (97.53)
75% of Pull at Maximum Power—8th Gear									
184.75 (137.77)	13990 (62.23)	4.95 (7.97)	2160	3.7	0.468 (0.285)	14.96 (2.95)	193 (89)	64 (18)	28.80 (97.53)
50% of Pull at Maximum Power—8th Gear									
125.30 (93.44)	9320 (41.46)	5.04 (8.11)	2172	2.5	0.532 (0.323)	13.17 (2.59)	187 (86)	64 (18)	28.81 (97.56)
75% of Pull at Reduced Engine Speed—11th Gear									
184.91 (137.88)	13938 (62.00)	4.98 (8.01)	1399	3.5	0.412 (0.250)	17.01 (3.35)	205 (96)	67 (19)	28.80 (97.53)
50% of Pull at Reduced Engine Speed—11th Gear									
125.56 (93.63)	9320 (41.46)	5.06 (8.14)	1408	2.5	0.436 (0.265)	16.05 (3.16)	193 (89)	65 (19)	28.80 (97.53)

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED - 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)	Consumption Hp.hr/gal (kW.h/l)	Temp.°F cool- ing med	°C Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
199.11 (148.48)	24828 (110.44)	3.01 (4.84)	2155	9.4	0.480 (0.292)	14.60 (2.88)	189 (87)	54 (12)	28.84 (97.66)
6th Gear									
221.79 (165.39)	23701 (105.43)	3.51 (5.64)	2151	8.1	0.462 (0.281)	15.17 (2.99)	193 (89)	57 (14)	28.85 (97.70)
7th Gear									
234.28 (174.70)	21550 (95.86)	4.08 (6.56)	2101	6.0	0.441 (0.268)	15.87 (3.13)	190 (88)	50 (10)	28.80 (97.53)
8th Gear									
235.40 (175.54)	18573 (82.61)	4.75 (7.64)	2100	5.4	0.439 (0.267)	15.97 (3.15)	196 (91)	53 (11)	28.80 (97.53)
9th Gear									
235.40 (175.54)	15944 (70.92)	5.54 (8.92)	2101	4.2	0.437 (0.266)	16.03 (3.16)	194 (90)	56 (13)	28.81 (97.56)
10th Gear									
234.87 (175.14)	13704 (60.96)	6.43 (10.34)	2100	3.7	0.442 (0.269)	15.86 (3.12)	207 (97)	57 (14)	28.82 (97.60)
11th Gear									
232.88 (173.65)	11629 (51.73)	7.51 (12.09)	2100	2.9	0.442 (0.269)	15.85 (3.12)	209 (98)	58 (14)	28.82 (97.60)
12th Gear									
229.12 (170.85)	9907 (44.07)	8.68 (13.96)	2101	2.5	0.452 (0.275)	15.50 (3.05)	211 (99)	62 (17)	28.82 (97.60)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 8th gear	71.7	71.7
Transport speed-no load-16th gear		73.1
Bystander in 16th gear		81.6

TIRES 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 480/80R50;***;12(85)

Two 420/85R34;***;23(160)

21.5 in (545 mm)

15940 lb (7230 kg)

11080 lb (5026 kg)

27020 lb(12256 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE 1: During testing the engine was operated for 19.5 hours. During this period, the tractor experienced no active exhaust filter cleaning while operated in Auto Filter Cleaning Mode.

NOTE 2: The manufacturer declared that the active exhaust filter cleanings consume an average of 0.04 gal/hr (0.15 l/hr) across total tractor use. Fuel consumed during the active exhaust filter cleanings will normally be less than 1% of the total fuel consumed. The manufacturer declared that no active exhaust filter cleanings occurred during 12 hours of continuous operation of the tractor in the Auto Filter Cleaning Mode at 30% loading and the engine speed at which the maximum torque occurs.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor did not meet the manufacturer's initial claims of 44% torque rise nor 12% power bulge. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 110°F (43°C). The pull in 5th gear was limited to avoid excessive tractor power hop. The performance figures on this summary were taken from a test conducted under the OECD Code 2 test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2004**, Nebraska Summary 787, December 14, 2011.

Roger M. Hoy
Director

M.F. Kocher
D.R. Keshwani
P.J. Jasa
Board of Tractor Test Engineers

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									
199.11 (148.48)	24866 (110.61)	3.00 (4.83)	2155	9.5	0.478 (0.291)	14.65 (2.89)	188 (87)	54 (12)	28.84 (97.66)
6th Gear									
221.95 (165.50)	23852 (106.10)	3.49 (5.62)	2149	8.6	0.463 (0.282)	15.11 (2.98)	193 (89)	57 (14)	28.85 (97.70)
7th Gear									
244.63 (182.42)	23670 (105.29)	3.88 (6.24)	2041	8.0	0.445 (0.271)	15.72 (3.10)	196 (91)	51 (10)	28.79 (98.49)
8th Gear									
259.86 (193.78)	22515 (100.15)	4.33 (6.97)	1955	7.3	0.423 (0.257)	16.57 (3.26)	205 (96)	54 (12)	28.80 (97.53)
9th Gear									
265.90 (198.28)	20237 (90.02)	4.93 (7.93)	1900	5.7	0.418 (0.254)	16.76 (3.30)	211 (99)	56 (14)	28.81 (97.56)
10th Gear									
266.56 (198.77)	17416 (77.47)	5.74 (9.24)	1901	4.9	0.418 (0.254)	16.74 (3.30)	214 (101)	58 (14)	28.82 (97.60)
11th Gear									
265.10 (197.68)	14790 (65.79)	6.73 (10.82)	1901	4.1	0.421 (0.256)	16.64 (3.28)	214 (101)	58 (14)	28.82 (97.60)
12th Gear									
263.35 (196.38)	12671 (56.36)	7.80 (12.54)	1901	3.3	0.424 (0.258)	16.51 (3.25)	215 (102)	58 (14)	28.82 (97.60)
13th Gear									
260.63 (194.35)	10572 (47.02)	9.25 (14.88)	1901	2.6	0.431 (0.262)	16.24 (3.20)	215 (102)	63 (17)	28.80 (97.53)

HYDRAULIC PERFORMANCE

CATEGORY: IVN

Quick Attach: Yes

OECD Static test

Maximum force exerted through whole range: 18326 lbs (81.5 kN)

i) Sustained pressure at compensator cutoff: 2898 psi (200 bar)
three outlet sets combined

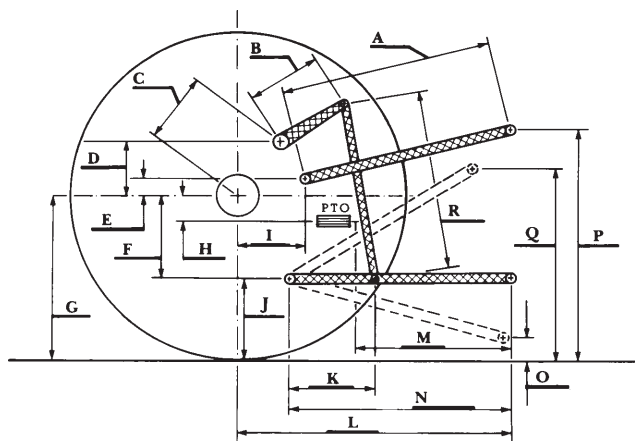
ii) Pump delivery rate at minimum pressure and rated engine speed: 63.8 GPM (241.5 l/min)

iii) Pump delivery rate at maximum hydraulic power: 64.0 GPM (242.1 l/min)
Delivery pressure: 2436 psi (168 bar)
Power: 90.9 HP (67.8 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed: 38.6 GPM (146.1 l/min)

iii) Pump delivery rate at maximum hydraulic power: 37.2 GPM (140.7 l/min)
Delivery pressure: 2220 psi (153 bar)
Power: 48.1 HP (35.9 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	27.1	689
B	20.5	520
C	20.9	532
D	18.9	480
E	12.0	304
F	14.4	365
G	37.0	940
H	7.9	200
I	21.9	555
J	22.6	575
K	28.9	733
L	56.6	1438
*L'	62.5	1588
M	29.7	755
N	45.7	1162
O	9.0	230
P	49.7	1262
Q	40.7	1035
R	43.5	1106

*L' to Quick Attach ends



JOHN DEERE 8310R DIESEL