

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

2011

Test 1998: John Deere 8310RT

Nebraska Tractor Test Laboratory

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Laboratory, Nebraska Tractor Test, "Test 1998: John Deere 8310RT" (2011). *Nebraska Tractor Tests*. 2393. <https://digitalcommons.unl.edu/tractormuseumlit/2393>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA OECD TRACTOR TEST 1998—SUMMARY 781

JOHN DEERE 8310RT DIESEL

16 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
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1049 rpm)					
268.72 (200.39)	2099	14.88 (56.35)	0.388 (0.236)	18.05 (3.56)	
Standard Power Take-off Speed(1000 rpm)					
291.68 (217.51)	2004	15.78 (59.73)	0.379 (0.230)	18.49 (3.64)	
Maximum Power (1 hour)					
299.45 (223.30)	1799	15.89 (60.16)	0.372 (0.226)	18.84 (3.71)	

VARYING POWER AND FUEL CONSUMPTION

268.72 (200.39)	2099	14.88 (56.35)	0.388 (0.236)	18.05 (3.56)	Air temperature
235.02 (175.25)	2156	13.47 (50.99)	0.401 (0.244)	17.45 (3.44)	74°F (23°C)
176.60 (131.69)	2165	10.95 (41.44)	0.434 (0.264)	16.13 (3.18)	Relative humidity
118.50 (88.36)	2177	8.41 (31.84)	0.497 (0.302)	14.09 (2.78)	42%
59.52 (44.38)	2187	6.08 (23.03)	0.716 (0.435)	9.78 (1.93)	Barometer
4.80 (3.58)	2195	4.21 (15.94)	6.150 (3.741)	1.14 (0.22)	28.94" Hg(98.00kPa)

Maximum torque - 968 lb.-ft. (1312 Nm) at 1601 rpm

Maximum torque rise - 43.9%

Torque rise at 1700 engine rpm - 38%

Power increase at 1799 rpm - 11.4%

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 bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—8th Gear									
226.11 (168.61)	18734 (83.33)	4.53 (7.28)	2100	2.5	0.462 (0.281)	15.15 (2.98)	196 (91)	53 (12)	29.24 (99.02)
75% of Pull at Maximum Power—8th Gear									
176.49 (131.60)	14050 (62.50)	4.71 (7.58)	2159	1.3	0.497 (0.302)	14.08 (2.77)	190 (88)	54 (12)	29.23 (98.98)
50% of Pull at Maximum Power—8th Gear									
119.56 (89.15)	9406 (41.84)	4.77 (7.67)	2172	0.7	0.585 (0.356)	11.98 (2.36)	187 (86)	54 (12)	29.22 (98.95)
75% of Pull at Reduced Engine Speed—11th Gear									
176.65 (131.72)	14073 (62.60)	4.71 (7.57)	1396	1.3	0.428 (0.260)	16.36 (3.22)	196 (91)	56 (13)	29.21 (98.92)
50% of Pull at Reduced Engine Speed—11th Gear									
119.63 (89.21)	9406 (41.84)	4.77 (7.67)	1407	0.7	0.469 (0.285)	14.93 (2.94)	189 (87)	55 (13)	29.22 (98.95)

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

Dates of tests: September 13 -27, 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 CI-4 Transmission and hydraulic lubricant John Deere Hy-Gard fluid Total time engine was operated: 25.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with two turbochargers and air to air aftercooler **Serial No.** *RG6090R002420* **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 26.1 - 30.5 psi (180 - 210 kPa) as measured 27.7 psi (191 kPa)

CHASSIS: Type tracklayer-rubber tracked **Serial No.** *1RW8310RHBP905524* **Track width** 76.0" (1930 mm) to 120.0" (3048 mm) **Length of track on ground** 99.0" (2515 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 1.13 (1.82) second 1.52 (2.44) third 2.01 (3.24) fourth 2.70 (4.34) fifth 3.03 (4.87) sixth 3.49 (5.62) seventh 4.06 (6.53) eighth 4.67 (7.52) ninth 5.40 (8.69) tenth 6.23 (10.02) eleventh 7.23 (11.64) twelfth 8.34 (13.42) thirteenth 9.82 (15.81) fourteenth 13.16 (21.18) fifteenth 17.52 (28.20) sixteenth 23.46 (37.76) reverse 1.06 (1.70), 2.83 (4.56), 3.57 (5.75), 6.56 (10.56) @1500 engine rpm **Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated by foot pedal **Steering** electro-hydraulic differential steering controlled by steering wheel **Power take-off** 1000 rpm at 2004 engine rpm **Unladen tractor mass** 34905 lb (15832 kg)

DRAWBAR PERFORMANCE

Unballasted - 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)	Injection Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
					3rd Gear				
166.28 (123.99)	35070 (156.00)	1.78 (2.86)	2157	13.4	0.554 (0.337)	12.64 (2.49)	191 (88)	55 (13)	28.96 (98.07)
					4th Gear				
208.81 (155.71)	32075 (142.67)	2.44 (3.93)	2100	8.8	0.499 (0.304)	14.03 (2.76)	193 (89)	54 (12)	29.00 (98.21)
					5th Gear				
218.73 (163.11)	29238 (130.05)	2.81 (4.51)	2099	6.6	0.476 (0.290)	14.71 (2.90)	193 (89)	54 (12)	28.99 (98.17)
					6th Gear				
221.54 (165.20)	25151 (111.87)	3.30 (5.31)	2100	4.7	0.472 (0.287)	14.85 (2.92)	190 (88)	49 (9)	29.23 (98.98)
					7th Gear				
224.01 (167.04)	21627 (96.20)	3.88 (6.24)	2100	3.5	0.469 (0.285)	14.93 (2.94)	191 (88)	50 (10)	29.24 (99.02)
					8th Gear				
226.11 (168.61)	18734 (83.33)	4.53 (7.28)	2100	2.5	0.462 (0.281)	15.15 (2.98)	196 (91)	53 (12)	29.24 (99.02)
					9th Gear				
226.01 (168.54)	16125 (71.73)	5.26 (8.46)	2100	1.9	0.462 (0.281)	15.16 (2.99)	194 (90)	54 (12)	29.25 (99.05)
					10th Gear				
224.80 (167.63)	13839 (61.56)	6.09 (9.80)	2100	1.4	0.465 (0.283)	15.05 (2.96)	199 (93)	54 (12)	29.24 (99.02)
					11th Gear				
220.97 (164.78)	11650 (51.82)	7.11 (11.44)	2101	1.0	0.471 (0.286)	14.87 (2.93)	195 (90)	54 (12)	29.24 (99.02)
					12th Gear				
218.59 (163.00)	9976 (44.38)	8.22 (13.23)	2100	0.8	0.480 (0.292)	14.59 (2.87)	200 (93)	54 (12)	29.24 (99.02)

TRACTOR SOUND LEVEL WITH CAB

dB(A)

At no load in 8th gear	72.0
Transport speed-no load- 16th gear	72.3
Bystander in 16th gear	84.0

TRACKS, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Track width	25.0 in (635 mm)	25.0 in (635 mm)
Ballast - Cast iron(front)	2550 lb (1156 kg)	None
- Cast iron(front frame)	800 lb (363 kg)	None
Height of Drawbar	19.5 in (495 mm)	19.0 in (485 mm)
Static Weight with operator	38430 lb(17431 kg)	35080 lb(15912 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE 1: During testing the engine was operated for 25.5 hours. During this period, the tractor experienced one active exhaust filter cleaning while operated in Auto Filter Cleaning Mode. This occurred after 19.0 hours of operation.

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. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 106°F(41°C). This tractor did not meet the manufacturer's initial claims of 45% torque rise nor 12% power bulge. The performance figures on this summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1998**, Nebraska Summary 781, December 15, 2011.

Roger M. Hoy
Director

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

DRAWBAR PERFORMANCE
Unballasted - 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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
166.77 (124.36)	34996 (155.67)	1.79 (2.87)	2157	13.0	0.555 (0.338)	12.61 (2.49)	191 (88)	55 (13)	28.96 (98.07)
4th Gear									
211.21 (157.50)	33258 (147.94)	2.39 (3.84)	2076	10.0	0.502 (0.305)	13.96 (2.75)	194 (90)	54 (12)	29.00 (98.21)
5th Gear									
227.14 (169.38)	32078 (142.69)	2.66 (4.28)	2038	9.0	0.480 (0.292)	14.59 (2.88)	197 (91)	55 (13)	28.98 (98.13)
6th Gear									
241.14 (179.82)	30655 (136.36)	2.95 (4.75)	1943	8.0	0.464 (0.282)	15.08 (2.97)	197 (91)	49 (10)	29.22 (98.95)
7th Gear									
247.66 (184.68)	28387 (126.27)	3.27 (5.26)	1830	6.7	0.453 (0.276)	15.45 (3.04)	205 (96)	52 (11)	29.24 (99.02)
8th Gear									
253.18 (188.80)	25109 (111.69)	3.78 (6.08)	1801	4.8	0.443 (0.270)	15.80 (3.11)	206 (96)	54 (12)	29.25 (99.05)
9th Gear									
255.98 (190.88)	21670 (96.39)	4.43 (7.13)	1802	3.5	0.435 (0.265)	16.09 (3.17)	210 (99)	54 (12)	29.24 (99.02)
10th Gear									
257.42 (191.95)	18711 (83.23)	5.16 (8.30)	1801	2.6	0.438 (0.266)	15.99 (3.15)	207 (97)	54 (12)	29.24 (99.02)
11th Gear									
257.32 (191.88)	15987 (71.11)	6.04 (9.71)	1801	1.8	0.437 (0.266)	16.04 (3.16)	212 (100)	54 (12)	29.24 (99.02)
12th Gear									
254.71 (189.93)	13659 (60.76)	6.99 (11.25)	1801	1.3	0.436 (0.265)	16.07 (3.16)	213 (101)	54 (12)	29.23 (98.98)
13th Gear									
254.23 (189.58)	11521 (51.25)	8.28 (13.32)	1798	0.9	0.441 (0.268)	15.88 (3.13)	213 (101)	54 (12)	29.24 (99.02)

DRAWBAR PERFORMANCE
Ballasted - 1800 Engine 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									
182.63 (136.18)	38196 (169.90)	1.79 (2.88)	2154	12.7	0.539 (0.328)	13.00 (2.56)	192 (89)	54 (12)	28.97 (98.10)
4th Gear									
220.74 (164.60)	35559 (158.17)	2.33 (3.74)	2039	10.6	0.493 (0.300)	14.20 (2.80)	204 (95)	56 (14)	28.98 (98.14)
5th Gear									
235.80 (175.83)	33966 (151.09)	2.61 (4.19)	2003	9.3	0.472 (0.287)	14.83 (2.92)	208 (98)	59 (15)	28.98 (98.14)
6th Gear									
247.48 (184.55)	32143 (142.98)	2.89 (4.65)	1899	7.9	0.457 (0.278)	15.32 (3.02)	214 (101)	61 (16)	28.98 (98.14)
7th Gear									
252.11 (188.00)	29253 (130.12)	3.24 (5.21)	1801	6.3	0.445 (0.271)	15.72 (3.10)	212 (100)	61 (16)	28.98 (98.14)
8th Gear									
256.78 (191.48)	25270 (112.40)	3.81 (6.13)	1803	4.2	0.436 (0.265)	16.06 (3.16)	214 (101)	62 (17)	28.98 (98.14)
9th Gear									
259.52 (193.52)	21795 (96.95)	4.47 (7.19)	1800	2.9	0.433 (0.263)	16.17 (3.19)	215 (101)	63 (17)	28.98 (98.14)
10th Gear									
260.13 (193.98)	18797 (83.61)	5.19 (8.35)	1798	2.2	0.431 (0.262)	16.24 (3.20)	215 (101)	63 (17)	28.98 (98.14)
11th Gear									
257.25 (191.83)	15915 (70.79)	6.06 (9.75)	1801	1.6	0.436 (0.265)	16.07 (3.17)	215 (101)	64 (18)	28.99 (98.17)
12th Gear									
256.36 (191.17)	13717 (61.01)	7.01 (11.27)	1803	1.4	0.437 (0.266)	16.01 (3.15)	214 (101)	65 (18)	28.99 (98.17)
13th Gear									
253.25 (188.94)	11456 (50.96)	8.29 (13.34)	1798	1.1	0.439 (0.267)	15.95 (3.14)	215 (101)	65 (19)	28.98 (98.14)

HYDRAULIC PERFORMANCE

CATEGORY: IVN

Quick Attach: yes

OECD Static test

Maximum force exerted through whole range:

21167 lbs (94.2 kN)

	<u>63 cc pump</u>	<u>85 cc pump</u>
i) Sustained pressure at compensator cutoff:	2959 psi (204 bar)	2909 psi (201 bar)
	three outlet sets combined	

ii) Pump delivery rate at minimum pressure and rated engine speed:	48.7 GPM (184.4 l/min)	64.3 GPM (243.4 l/min)
--------------------------------------------------------------------	------------------------	------------------------

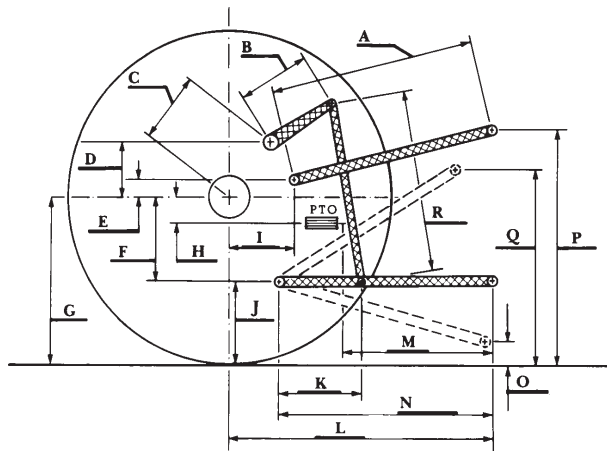
iii) Pump delivery rate at maximum hydraulic power:	48.6 GPM (184.0 l/min)	64.4 GPM (243.7 l/min)
Delivery pressure:	2652 psi (183 bar)	2425 psi (167 bar)
Power:	75.2 HP (56.1 kW)	91.1 HP (67.9 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed:	38.8 GPM (146.9 l/min)	37.6 GPM (142.4 l/min)
--------------------------------------------------------------------	------------------------	------------------------

iii) Pump delivery rate at maximum hydraulic power:	37.4 GPM (141.5 l/min)	36.1 GPM (136.8 l/min)
Delivery pressure:	2289 psi (158 bar)	2232 psi (154 bar)
Power:	49.9 HP (37.2 kW)	47.0 HP (35.1 kW)

HITCH DIMENSIONS AS TESTED - NO LOAD



	inch	mm
A	28.1	715
B	20.5	520
C	24.8	631
D	24.2	615
E	15.5	394
F	11.5	292
G	35.0	888
H	3.1	80
I	18.5	470
J	23.5	596
K	39.8	1011
L	53.6	1361
*L'	59.5	1511
M	30.6	777
N	45.7	1161
O	9.0	230
P	50.5	1283
Q	41.1	1043
R	44.7	1135

*L' to Quick Attach ends



JOHN DEERE 8310RT DIESEL