

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

2015

Test 2129: John Deere 8320RT

Nebraska Tractor Test Lab

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](#)

Nebraska Tractor Test Lab, "Test 2129: John Deere 8320RT" (2015). *Nebraska Tractor Tests*. 2557.
<https://digitalcommons.unl.edu/tractormuseumlit/2557>

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 2129—SUMMARY 999

JOHN DEERE 8320RT DIESEL

e23 TRANSMISSION

Chassis Serial numbers 912001 and higher

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption Gal/hr (l/h)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1053 rpm)						
278.77 (207.88)	2101	15.23 (57.65)	0.383 (0.233)	18.31 (3.61)	0.33 (1.27)	Fuel used during active exhaust regeneration-0.81 gal (3.05 l) (see note 1, p.2)
Standard Power Take-off Speed(1000 rpm)						
301.01 (224.46)	1995	16.12 (61.00)	0.375 (0.228)	18.68 (3.68)	0.36 (1.35)	
Maximum Power (1 hour)						
316.48 (236.00)	1800	16.52 (62.55)	0.366 (0.222)	19.15 (3.77)	0.39 (1.47)	

VARYING POWER AND FUEL CONSUMPTION

278.77 (207.88)	2101	15.23 (57.65)	0.383 (0.233)	18.31 (3.61)	0.33 (1.27)	Air temperature
243.35 (181.46)	2156	13.63 (51.58)	0.392 (0.239)	17.86 (3.52)	0.24 (0.91)	74°F (23°C)
183.10 (136.53)	2166	10.92 (41.34)	0.418 (0.254)	16.76 (3.30)	0.19 (0.73)	Relative humidity
122.84 (91.60)	2178	8.46 (32.02)	0.482 (0.293)	14.52 (2.86)	0.14 (0.54)	47%
61.77 (46.06)	2187	6.20 (23.46)	0.703 (0.427)	9.97 (1.96)	0.09 (0.35)	Barometer
1.05 (0.79)	2198	3.79 (14.34)	25.175 (15.313)	0.28 (0.05)	0.11 (0.42)	28.89" Hg (97.83 kPa)

Maximum Torque - 1019 lb.-ft. (1381 Nm) at 1601 rpm

Maximum Torque Rise - 46.2%

Torque rise at 1700 engine rpm - 41%

Power increase at 1800 rpm - 13.5%

DRAWBAR PERFORMANCE

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)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—9th Gear-Manual mode										
241.37 (179.99)	21037 (93.57)	4.30 (6.92)	2100	3.2	0.442 (0.269)	15.86 (3.12)	0.013 (0.008)	200 (93)	57 (14)	28.98 (98.14)
75% of Pull at Maximum Power—9th Gear-Manual mode										
188.83 (140.81)	15755 (70.08)	4.50 (7.23)	2160	1.6	0.465 (0.283)	15.05 (2.96)	0.012 (0.008)	198 (92)	67 (20)	28.94 (98.00)
50% of Pull at Maximum Power—9th Gear-Manual mode										
127.49 (95.07)	10497 (46.69)	4.55 (7.32)	2171	0.9	0.526 (0.320)	13.32 (2.62)	0.014 (0.008)	188 (86)	69 (21)	28.92 (97.93)
75% of Pull at Reduced Engine Speed—4.6 mph(7.4 km/h)-Auto mode										
188.36 (140.46)	15800 (70.28)	4.47 (7.19)	1380	1.7	0.419 (0.255)	16.70 (3.29)	0.013 (0.008)	211 (99)	68 (20)	28.93 (97.97)
50% of Pull at Reduced Engine Speed—4.6 mph(7.4 km/h)-Auto mode										
127.72 (95.24)	10619 (47.24)	4.51 (7.26)	1190	0.9	0.442 (0.269)	15.86 (3.12)	0.021 (0.013)	208 (98)	69 (20)	28.91 (97.90)

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

Dates of tests: September 29 to October 13, 2015

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

CONSUMABLE Fluids, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8412 **Fuel weight** 7.004 lbs/gal (0.839 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil SAE 10W-30 API service classification CJ-4 Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Total time engine was operated:** 24.5 hours

ENGINE: Make John Deere **Diesel Type** six cylinder vertical with two turbochargers and air to air aftercooler and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** *RG6090U020385* **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** DOC (diesel oxidation catalyst), SCR (selective catalyst reduction) and regenerative DPF (diesel particulate filter) integrated within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 101.5 - 109.8 lb/h (46.0 - 49.8 kg/h) **High idle:** 2190 - 2210 rpm **Turbo boost:** nominal 18.9 - 21.8 psi (130 - 150 kPa) as measured 20.3 psi (140 kPa)

CHASSIS: Type tracklayer-rubber tracked **Serial No.** *1RW8320RJFS914516* **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 1.39 (2.24) second 1.62 (2.60) third 1.87 (3.01) fourth 2.17 (3.49) fifth 2.51 (4.04) sixth 2.91 (4.69) seventh 3.35 (5.39) eighth 3.89 (6.26) ninth 4.49 (7.23) tenth 5.21 (8.39) eleventh 6.05 (9.73) twelfth 7.00 (11.27) thirteenth 8.12 (13.07) fourteenth 9.33 (15.02) fifteenth 10.83 (17.43) sixteenth 12.34 (19.87) seventeenth 14.33 (23.06) eighteenth 16.61

DRAWBAR PERFORMANCE

MANUAL MODE - 2100 ENGINE RPM

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)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
206.78 (154.19)	35577 (158.25)	2.18 (3.51)	2147	14.2	5th Gear 0.504 (0.307)	13.90 (2.74)	0.013 (0.008)	191 (88)	52 (11)	29.05 (98.37)
229.52 (171.15)	32882 (146.26)	2.62 (4.21)	2100	9.2	6th Gear 0.467 (0.284)	15.01 (2.96)	0.013 (0.008)	196 (91)	53 (12)	29.07 (98.44)
234.94 (175.19)	28420 (126.42)	3.10 (4.99)	2100	6.4	7th Gear 0.453 (0.276)	15.46 (3.05)	0.014 (0.008)	209 (98)	66 (19)	28.96 (98.07)
240.24 (179.15)	24612 (109.48)	3.66 (5.89)	2100	4.4	8th Gear 0.441 (0.268)	15.88 (3.13)	0.014 (0.009)	211 (99)	65 (19)	28.97 (98.10)
241.37 (179.99)	21037 (93.57)	4.30 (6.92)	2100	3.2	9th Gear 0.442 (0.269)	15.86 (3.12)	0.013 (0.008)	200 (93)	57 (14)	28.98 (98.14)
241.24 (179.89)	17976 (79.96)	5.03 (8.10)	2100	2.3	10th Gear 0.443 (0.269)	15.83 (3.12)	0.013 (0.008)	201 (94)	56 (13)	28.98 (98.14)
241.55 (180.12)	15399 (68.50)	5.88 (9.46)	2100	1.5	11th Gear 0.441 (0.268)	15.88 (3.13)	0.014 (0.009)	211 (99)	61 (16)	28.98 (98.14)
240.10 (179.04)	13177 (58.61)	6.83 (10.99)	2100	1.2	12th Gear 0.444 (0.270)	15.79 (3.11)	0.014 (0.009)	206 (97)	62 (17)	28.98 (98.14)
235.12 (175.33)	11085 (49.31)	7.96 (12.80)	2100	0.9	13th Gear 0.453 (0.275)	15.48 (3.05)	0.014 (0.009)	204 (95)	64 (18)	28.98 (98.14)
228.76 (170.59)	9371 (41.68)	9.16 (14.73)	2101	0.7	14th Gear 0.465 (0.283)	15.05 (2.97)	0.015 (0.009)	214 (101)	64 (18)	28.98 (98.14)

(26.73) nineteenth 19.28 (31.02) twentieth 22.31 (35.91) twenty-first 25.89 (41.67) twenty-second 26.01 (42.00) twenty-third 26.01 (42.00) electronically limited reverse 1.66 (2.67), 2.23 (3.59), 3.00 (4.82), 3.99 (6.42), 4.62 (7.43), 6.21 (9.99), 8.34 (13.42), 11.12 (17.90), 14.71 (23.68), 19.79 (31.85), 26.10 (42.00), 26.10 (42.00) electronically limited **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 1995 engine rpm **Unladen tractor mass** 35290 lb (16007 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE 1: The manufacturer declares that the average time between active regenerations is 50 hours, while operated in Auto Filter Cleaning Mode, at rated speed, full load, under steady state conditions.

NOTE 2: The performance data on this report applies to tractors with chassis serial numbers that end with 912001 and higher.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. 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. **2129**, Nebraska Summary 999, December 10, 2015.

Roger M. Hoy
Director

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

TRACTOR SOUND LEVEL WITH CAB

	dB(A)
At no load in 9th gear	66.9
Transport speed-no load- 21st gear	70.1
Bystander in 21st gear	86.5

TIRES AND WEIGHT

Track width
Height of Drawbar
Static Weight with operator

Tested Without Ballast

25.0 in (635 mm)
19.0 in (485 mm)
35465 lb (16085 kg)

DRAWBAR PERFORMANCE - AUTO MODE
(Loads based on 2100 engine rpm manual mode performance runs)

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)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3.4 mph (5.4 km/h)										
234.30 (174.72)	28277 (125.78)	3.11 (5.00)	1569	6.5	0.429 (0.261)	16.34 (3.22)	0.015 (0.009)	213 (100)	67 (19)	28.95 (98.04)
3.9 mph (6.2 km/h)										
240.48 (179.33)	24797 (110.30)	3.64 (5.86)	1553	4.7	0.423 (0.257)	16.55 (3.26)	0.014 (0.009)	213 (101)	65 (18)	28.97 (98.10)
4.5 mph (7.2 km/h)										
241.25 (179.90)	21108 (93.89)	4.29 (6.90)	1555	3.4	0.419 (0.255)	16.72 (3.29)	0.015 (0.009)	211 (99)	59 (15)	28.99 (98.17)
5.2 mph (8.3 km/h)										
241.24 (179.89)	17915 (79.69)	5.05 (8.13)	1567	2.4	0.416 (0.253)	16.85 (3.32)	0.014 (0.009)	212 (100)	60 (16)	28.98 (98.14)
6.0 mph (9.7 km/h)										
241.03 (179.74)	15231 (67.75)	5.94 (9.55)	1576	1.7	0.418 (0.254)	16.77 (3.30)	0.013 (0.008)	212 (100)	61 (16)	28.99 (98.17)
7.0 mph (11.2 km/h)										
240.02 (179.98)	13237 (58.88)	6.80 (10.94)	1567	1.3	0.418 (0.254)	16.75 (3.30)	0.014 (0.008)	212 (100)	63 (17)	28.99 (98.17)
8.1 mph (13.0 km/h)										
234.42 (174.81)	11108 (49.41)	7.91 (12.73)	1567	0.9	0.426 (0.259)	16.43 (3.24)	0.014 (0.009)	213 (100)	64 (18)	28.97 (98.10)
9.3 mph (15.0 km/h)										
228.53 (170.41)	9367 (41.67)	9.15 (14.73)	1808	0.7	0.437 (0.266)	16.04 (3.16)	0.017 (0.010)	213 (101)	64 (18)	28.97 (98.10)

DRAWBAR PERFORMANCE **MANUAL MODE - 1800 ENGINE RPM**

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)	D.E.F Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
206.61 (154.07)	35617 (158.43)	2.18 (3.76)	2146	14.4	5th Gear 0.503 (0.306)	13.92 (2.74)	0.013 (0.008)	191 (88)	51 (11)	29.05 (98.37)
231.71 (172.79)	34131 (151.82)	2.55 (4.10)	2078	10.8	6th Gear 0.468 (0.285)	14.96 (2.95)	0.014 (0.008)	196 (91)	52 (11)	29.05 (98.37)
249.77 (186.25)	33259 (147.94)	2.82 (4.54)	1975	9.6	7th Gear 0.454 (0.276)	15.43 (3.04)	0.014 (0.008)	206 (96)	53 (12)	29.06 (98.41)
260.91 (194.56)	31497 (140.10)	3.11 (5.01)	1854	8.5	8th Gear 0.440 (0.268)	15.92 (3.14)	0.015 (0.009)	213 (100)	57 (14)	29.06 (98.41)
268.23 (200.02)	28137 (125.16)	3.58 (5.75)	1800	6.2	9th Gear 0.431 (0.262)	16.24 (3.20)	0.016 (0.009)	213 (101)	58 (14)	29.05 (98.37)
271.27 (202.29)	24042 (106.94)	4.23 (6.81)	1800	4.1	10th Gear 0.425 (0.259)	16.46 (3.24)	0.015 (0.009)	214 (101)	59 (15)	29.05 (98.37)
273.64 (204.05)	20612 (91.68)	4.98 (8.01)	1800	2.9	11th Gear 0.421 (0.256)	16.66 (3.28)	0.015 (0.009)	213 (101)	59 (15)	29.05 (98.37)
274.63 (204.79)	17730 (78.86)	5.81 (9.35)	1800	2.0	12th Gear 0.420 (0.255)	16.68 (3.29)	0.015 (0.009)	214 (101)	60 (16)	29.05 (98.37)
272.39 (203.12)	15074 (67.05)	6.78 (10.90)	1800	1.5	13th Gear 0.423 (0.258)	16.54 (3.26)	0.015 (0.009)	214 (101)	61 (16)	29.05 (98.37)
267.52 (199.49)	12851 (57.16)	7.81 (12.56)	1799	1.2	14th Gear 0.431 (0.262)	16.24 (3.20)	0.015 (0.009)	214 (101)	62 (17)	29.05 (98.37)
260.76 (194.45)	10764 (47.88)	9.09 (14.62)	1799	0.9	15th Gear 0.443 (0.269)	15.81 (3.12)	0.016 (0.010)	214 (101)	62 (17)	29.05 (98.37)

HYDRAULIC PERFORMANCE

CATEGORY: IVN

Quick Attach: yes

OECD Static test

Maximum force exerted through whole range: 22144 lbs (98.5 kN) (lift cylinders - 2x115 mm)
16520 lbs (73.5 kN) (lift cylinders - 2x100 mm)
85 cc pump

i) Sustained pressure at compensator cutoff: 2991 psi (206 bar)
three outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed: 62.1 GPM (235.0 l/min)

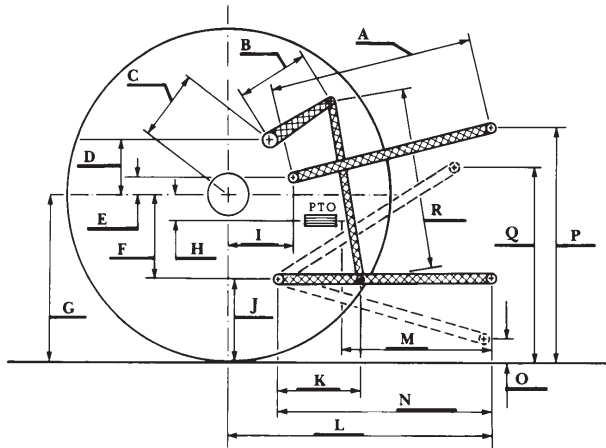
iii) Pump delivery rate at maximum hydraulic power: 61.8 GPM (233.8 l/min)
Delivery pressure: 2558 psi (176 bar)
Power: 92.2 HP (68.7 kW)

ii) Pump delivery rate at minimum pressure and rated engine speed: 36.1 GPM (136.6 l/min) 43.0 GPM (162.9 l/min)
iii) Pump delivery rate at maximum hydraulic power: 34.3 GPM (129.7 l/min) 41.6 GPM (157.6 l/min)
Delivery pressure: 2385 psi (164 bar) 2273 psi (157 bar)
Power: 47.7 HP (35.5 kW) 55.2 HP (41.2 kW)

HITCH DIMENSIONS AS TESTED - NO LOAD

	inch	mm
A	28.3	720
B	20.5	520
C	24.8	631
D	24.2	615
E	15.5	394
F	11.5	292
G	34.5	875
H	3.1	80
I	18.5	470
J	23.0	583
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	50.0	1270
Q	40.6	1030
R	44.3	1124

*L' to Quick Attach ends



JOHN DEERE 8320RT DIESEL