

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

January 2002

Test 1799: John Deere 8320T Diesel 16-Speed

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 1799: John Deere 8320T Diesel 16-Speed" (2002). *Nebraska Tractor Tests*. 2175.

<https://digitalcommons.unl.edu/tractormuseumlit/2175>

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 1799—SUMMARY 365

JOHN DEERE 8320T 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 | | | | | |
| 217.63 (162.29) | 2200 | 12.86 (48.69) | 0.416 (0.253) | 16.92 (3.33) | |
| Maximum Power (2 hours) | | | | | |
| 246.65 (183.93) | 2000 | 13.41 (50.75) | 0.383 (0.233) | 18.40 (3.62) | |
| VARYING POWER AND FUEL CONSUMPTION | | | | | |
| 217.63 (162.29) | 2200 | 12.86 (48.69) | 0.416 (0.253) | 16.92 (3.33) | Air temperature |
| 189.67 (141.44) | 2257 | 11.63 (44.01) | 0.432 (0.263) | 16.32 (3.21) | 75°F (24°C) |
| 142.93 (106.58) | 2266 | 9.50 (35.95) | 0.468 (0.285) | 15.05 (2.97) | Relative humidity |
| 95.91 (71.52) | 2277 | 7.32 (27.73) | 0.538 (0.327) | 13.09 (2.58) | 40% |
| 47.89 (35.71) | 2286 | 5.07 (19.18) | 0.745 (0.453) | 9.45 (1.86) | Barometer |
| 1.00 (0.75) | 2296 | 3.15 (11.93) | 22.146 (13.471) | 0.32 (0.06) | 28.95" Hg (98.04 kPa) |
| Maximum Torque - 780 lb.-ft. (1058 Nm) at 1405 rpm | | | | | |
| Maximum Torque Rise - 50.2% | | | | | |
| Torque rise at 1802 engine rpm - 33% | | | | | |

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 cool- ing med | °C Air dry bulb | Barom. inch Hg (kPa) |
|---|--------------------------------|------------------------|---------------------------------|-----------|---|-----------------------|---------------------------------|--------------------------|-------------------------------|
| Maximum Power 10th Gear | | | | | | | | | |
| 184.86 (137.85) | 13229 (58.85) | 5.24 (8.43) | 2199 | 2.00 | 0.486 (0.296) | 14.48 (2.85) | 187 (86) | 65 (18) | 29.17 (98.78) |
| 75% of Pull at Maximum Power 10th Gear | | | | | | | | | |
| 143.35 (106.89) | 9900 (44.04) | 5.43 (8.74) | 2261 | 1.22 | 0.536 (0.326) | 13.14 (2.59) | 186 (85) | 69 (21) | 29.15 (98.71) |
| 50% of Pull at Maximum Power 10th Gear | | | | | | | | | |
| 96.43 (71.91) | 6596 (29.34) | 5.48 (8.82) | 2272 | 0.75 | 0.624 (0.380) | 11.28 (2.22) | 182 (83) | 70 (21) | 29.15 (98.71) |
| 75% of Pull at Reduced Engine Speed 12th Gear | | | | | | | | | |
| 143.50 (107.01) | 9906 (44.06) | 5.43 (8.74) | 1689 | 1.30 | 0.450 (0.274) | 15.66 (3.09) | 186 (85) | 69 (21) | 29.15 (98.71) |
| 50% of Pull at Reduced Engine Speed 12th Gear | | | | | | | | | |
| 96.66 (72.08) | 6597 (29.34) | 5.49 (8.84) | 1700 | 0.81 | 0.504 (0.307) | 13.97 (2.75) | 183 (84) | 71 (22) | 29.15 (98.71) |

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

Dates of Test: May 16 - 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 Total time engine was operated: 21.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air aftercooler **Serial No.** *RG6081H202236* **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 prestrainer **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 25.1 psi (173 kPa)

CHASSIS: Type tracklayer-rubber tracked **Serial No.** *RW8320T901132* **Track width** 88.0" (2235 mm) to 119.5 (3035 mm) **Length of track on ground** 89.0" (2261 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 0.96 (1.55) second 1.29 (2.08) third 1.72 (2.77) fourth 2.31 (3.71) fifth 2.58 (4.16) sixth 2.99 (4.80) seventh 3.46 (5.57) eighth 3.99 (6.42) ninth 4.61 (7.42) tenth 5.31 (8.55) eleventh 6.18 (9.94) twelfth 7.12 (11.46) thirteenth 8.39 (13.50) fourteenth 11.24 (18.09) fifteenth 14.96 (24.08) sixteenth 19.11 (30.78) reverse 0.90 (1.45), 2.42 (3.89), 3.04 (4.89), 5.35 (8.61) @1500 engine rpm **Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated foot pedal **Steering** electro-hydraulic differential steering controlled by steering wheel **Power take-off** 1000 rpm at 2179 engine rpm **Unladen tractor mass** 26735 lb (12127 kg)

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) | Consumption Hp.hr/gal (kW.h/l) | Temp.°F cool- ing med | (°C) Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|--------------------------------------|--------------------------------|----------------------------|-------------------------------|
| 5th Gear | | | | | | | | | |
| 162.39 (121.09) | 26656 (118.57) | 2.28 (3.68) | 2254 | 14.28 | 0.553 (0.337) | 12.73 (2.51) | 180 (82) | 50 (10) | 29.19 (98.85) |
| 6th Gear | | | | | | | | | |
| 176.96 (131.96) | 24154 (107.44) | 2.75 (4.42) | 2200 | 8.35 | 0.507 (0.308) | 13.91 (2.74) | 182 (83) | 52 (11) | 29.19 (98.85) |
| 7th Gear | | | | | | | | | |
| 180.93 (134.92) | 20645 (91.83) | 3.29 (5.29) | 2197 | 5.57 | 0.497 (0.302) | 14.18 (2.79) | 184 (84) | 58 (14) | 29.19 (98.85) |
| 8th Gear | | | | | | | | | |
| 184.50 (137.58) | 17904 (79.64) | 3.86 (6.22) | 2199 | 3.75 | 0.485 (0.295) | 14.51 (2.86) | 186 (85) | 61 (16) | 29.18 (98.82) |
| 9th Gear | | | | | | | | | |
| 184.22 (137.37) | 15314 (68.12) | 4.51 (7.26) | 2198 | 2.61 | 0.487 (0.296) | 14.45 (2.85) | 186 (86) | 65 (18) | 29.18 (98.82) |
| 10th Gear | | | | | | | | | |
| 184.86 (137.85) | 13229 (58.85) | 5.24 (8.43) | 2199 | 2.00 | 0.486 (0.296) | 14.48 (2.85) | 187 (86) | 65 (18) | 29.17 (98.78) |
| 11th Gear | | | | | | | | | |
| 180.96 (134.94) | 11101 (49.38) | 6.11 (9.84) | 2195 | 1.38 | 0.498 (0.303) | 14.16 (2.79) | 187 (86) | 67 (19) | 29.17 (98.78) |
| 12th Gear | | | | | | | | | |
| 179.23 (133.65) | 9510 (42.30) | 7.07 (11.37) | 2195 | 1.14 | 0.502 (0.305) | 14.04 (2.77) | 187 (86) | 67 (19) | 29.16 (98.75) |
| 13th Gear | | | | | | | | | |
| 176.33 (131.49) | 7903 (35.15) | 8.37 (13.47) | 2199 | 0.75 | 0.511 (0.311) | 13.78 (2.72) | 188 (86) | 67 (19) | 29.16 (98.75) |

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 99°F(37°C). The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1799**, Nebraska Summary 365, 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

dB(A)

| | |
|---------------------------------------|------|
| At no load in 9th gear | 75.2 |
| Transport speed - no load - 16th gear | 76.8 |
| Bystander in 16th Gear | 88.7 |

TIRES, BALLAST AND WEIGHT

| | With Ballast | Without Ballast |
|-----------------------------|--------------------|--------------------|
| Track width | 24.0 in (610 mm) | 24.0 in (610 mm) |
| Ballast - Cast iron(front) | 2250 lb (1021 kg) | None |
| Height of Drawbar | 18.5 in (470 mm) | 18.5 in (470 mm) |
| Static Weight with operator | 29160 lb(13227 kg) | 26910 lb(12206 kg) |

DRAWBAR PERFORMANCE
Unballasted - 2000 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(°C) cool- ing med | Air dry bulb | Barom. inch Hg (kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|--------------------------------------|-------------------------------------|--------------------|-------------------------------|
| 5th Gear | | | | | | | | | |
| 164.13 (122.39) | 27225 (121.10) | 2.26 (3.64) | 2243 | 14.69 | 0.553 (0.337) | 12.73 (2.51) | 180 (82) | 50 (10) | 29.19 (98.85) |
| 6th Gear | | | | | | | | | |
| 177.08 (132.05) | 24198 (107.64) | 2.74 (4.42) | 2202 | 8.62 | 0.506 (0.308) | 13.91 (2.74) | 183 (84) | 52 (11) | 29.19 (98.85) |
| 7th Gear | | | | | | | | | |
| 191.48 (142.79) | 23767 (105.72) | 3.02 (4.86) | 2099 | 9.15 | 0.487 (0.296) | 14.48 (2.85) | 184 (84) | 56 (13) | 29.19 (98.85) |
| 8th Gear | | | | | | | | | |
| 201.37 (150.16) | 22378 (99.54) | 3.37 (5.43) | 2004 | 7.80 | 0.471 (0.286) | 14.97 (2.95) | 187 (86) | 62 (17) | 29.18 (98.82) |
| 9th Gear | | | | | | | | | |
| 208.50 (155.48) | 19486 (86.68) | 4.01 (6.46) | 2001 | 4.84 | 0.455 (0.277) | 15.48 (3.05) | 187 (86) | 64 (18) | 29.18 (98.82) |
| 10th Gear | | | | | | | | | |
| 211.83 (157.96) | 16910 (75.22) | 4.70 (7.56) | 2000 | 3.52 | 0.446 (0.271) | 15.79 (3.11) | 189 (87) | 66 (19) | 29.17 (98.78) |
| 11th Gear | | | | | | | | | |
| 210.71 (157.13) | 14339 (63.78) | 5.51 (8.87) | 1999 | 2.38 | 0.450 (0.274) | 15.65 (3.08) | 190 (88) | 67 (19) | 29.17 (98.78) |
| 12th Gear | | | | | | | | | |
| 209.96 (156.56) | 12294 (54.68) | 6.40 (10.31) | 2001 | 1.77 | 0.453 (0.275) | 15.57 (3.07) | 190 (88) | 67 (19) | 29.16 (98.75) |
| 13th Gear | | | | | | | | | |
| 208.57 (155.53) | 10327 (45.94) | 7.57 (12.19) | 1999 | 1.30 | 0.452 (0.275) | 15.57 (3.07) | 190 (88) | 67 (19) | 29.16 (98.75) |

DRAWBAR PERFORMANCE
Ballasted - 2000 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) | |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|-------------------------------------|--------------------|-------------------------------|------------------|
| 4th Gear | | | | | | | | | |
| 158.04 (117.85) | 28906 (128.58) | 2.05 (3.30) | 2249 | 13.77 | 0.570 (0.347) | 12.36 (2.44) | 182 (83) | 68 (20) | 28.62 (96.92) |
| 5th Gear | | | | | | | | | |
| 171.04 (127.54) | 26952 (119.89) | 2.38 (3.83) | 2227 | 9.82 | 0.529 (0.322) | 13.32 (2.62) | 184 (84) | 69 (21) | 28.63 (96.95) |
| 6th Gear | | | | | | | | | |
| 184.51 (137.59) | 26121 (116.19) | 2.65 (4.26) | 2132 | 9.10 | 0.499 (0.303) | 14.12 (2.78) | 182 (83) | 72 (22) | 28.63 (96.95) |
| 7th Gear | | | | | | | | | |
| 199.97 (149.12) | 25544 (113.63) | 2.94 (4.72) | 2020 | 8.50 | 0.476 (0.289) | 14.80 (2.92) | 187 (86) | 74 (23) | 28.63 (96.95) |
| 8th Gear | | | | | | | | | |
| 206.53 (154.01) | 22359 (99.46) | 3.46 (5.57) | 2000 | 5.36 | 0.460 (0.280) | 15.33 (3.02) | 190 (88) | 76 (24) | 28.68 (97.12) |
| 9th Gear | | | | | | | | | |
| 211.16 (157.46) | 19337 (86.01) | 4.10 (6.59) | 2002 | 3.22 | 0.448 (0.273) | 15.71 (3.09) | 189 (87) | 71 (22) | 28.70 (97.19) |
| 10th Gear | | | | | | | | | |
| 210.37 (156.87) | 16577 (73.74) | 4.76 (7.66) | 2000 | 2.38 | 0.453 (0.275) | 15.56 (3.07) | 191 (88) | 72 (22) | 28.69 (97.16) |
| 11th Gear | | | | | | | | | |
| 208.69 (155.62) | 14082 (62.64) | 5.56 (8.94) | 1998 | 1.76 | 0.456 (0.277) | 15.46 (3.05) | 192 (89) | 73 (23) | 28.69 (97.16) |
| 12th Gear | | | | | | | | | |
| 208.71 (155.63) | 12144 (54.02) | 6.44 (10.37) | 2001 | 1.37 | 0.455 (0.277) | 15.49 (3.05) | 192 (89) | 74 (23) | 28.69 (97.16) |
| 13th Gear | | | | | | | | | |
| 205.01 (152.88) | 10093 (44.90) | 7.62 (12.26) | 2001 | 1.14 | 0.465 (0.283) | 15.15 (2.98) | 192 (89) | 75 (24) | 28.68 (97.12) |

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: yes

Maximum Force Exerted Through Whole Range: ~~16520~~ **16520** ~~lb~~ (73.5 kN)

i) Opening pressure of relief valve: NA

Sustained pressure at compensator cutoff: 2940 psi (203 bar) High flow option
2930 psi (202 bar)
two outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed: 34.6 GPM (131.0 l/min) 43.3 GPM (163.9 l/min)

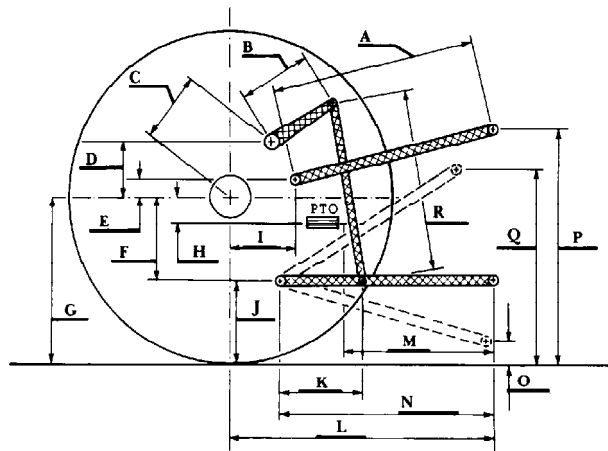
iii) Pump delivery rate at maximum hydraulic power: 34.2 GPM (129.5 l/min) 42.7 GPM (161.6 l/min)
Delivery pressure: 2490 psi (172 bar) 2295 psi (158 bar)
Power: 49.7 HP (37.1 kW) 57.2 HP (42.7 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed: 33.1 GPM (125.3 l/min) 34.2 GPM (129.5 l/min)

iii) Pump delivery rate at maximum hydraulic power: 31.6 GPM (119.6 l/min) 30.8 GPM (116.6 l/min)
Delivery pressure: 2150 psi (148 bar) 2090 psi (144 bar)
Power: 39.6 HP (29.5 kW) 37.6 HP (28.0 kW)

HITCH DIMENSIONS AS TESTED - NO LOAD



| | inch | mm |
|-----|------|------|
| A | 29.5 | 750 |
| B | 20.5 | 520 |
| C | 22.9 | 582 |
| D | 22.2 | 565 |
| E | 10.2 | 260 |
| F | 11.0 | 280 |
| G | 33.5 | 851 |
| H | 3.1 | 79 |
| I | 15.6 | 395 |
| J | 22.5 | 571 |
| K | 28.9 | 733 |
| L | 49.9 | 1268 |
| *L' | 53.4 | 1357 |
| M | 25.5 | 647 |
| N | 42.6 | 1082 |
| O | 9.0 | 230 |
| P | 40.8 | 1037 |
| Q | 38.7 | 983 |
| R | 45.1 | 1146 |

*L' to Quick Attach ends



JOHN DEERE 8320T DIESEL

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska Lincoln
Darrell Nelson, Dean & Director