# NEBRASKA OECD TRACTOR TEST 1819–SUMMARY 396
# JOHN DEERE 8120 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—1010 rpm)** | | | | | |
| 172.13 *(128.36)* | 2201 | 10.11 *(38.27)* | 0.411 *(0.250)* | 17.03 *(3.35)* | |
| **Maximum Power (2 hours)** | | | | | |
| 199.71 *(148.93)* | 1900 | 10.49 *(39.69)* | 0.367 *(0.223)* | 19.05 *(3.75)* | |
| **VARYING POWER AND FUEL CONSUMPTION** | | | | | |
| 172.13 *(128.36)* | 2201 | 10.11 *(38.27)* | 0.411 *(0.250)* | 17.03 *(3.35)* | Air temperature |
| 149.91 *(111.79)* | 2257 | 9.22 *(34.91)* | 0.430 *(0.262)* | 16.26 *(3.20)* | 76°F *(24°C)* |
| 112.87 *(84.17)* | 2267 | 7.68 *(29.06)* | 0.476 *(0.289)* | 14.70 *(2.90)* | Relative humidity |
| 75.54 *(56.33)* | 2275 | 6.05 *(22.89)* | 0.560 *(0.341)* | 12.49 *(2.46)* | 31% |
| 37.90 *(28.26)* | 2286 | 4.42 *(16.72)* | 0.815 *(0.496)* | 8.58 *(1.69)* | Barometer |
| 2.00 *(1.50)* | 2295 | 2.96 *(11.20)* | 10.325 *(6.280)* | 0.68 *(0.13)* | 28.84" Hg *(97.66 kPa)* |

Maximum torque - 632 lb.-ft. *(857 Nm)* at 1400 rpm
Maximum torque rise -53.6%
Torque rise at 1800 engine rpm - 40%

## 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)* | Fuel Consumption Hp.hr/gal *(kW.h/l)* | Temp.°F *(°C)* cool-ing med | Temp.°F *(°C)* Air dry bulb | Barom. inch Hg *(kPa)* |
|---|---|---|---|---|---|---|---|---|---|
| **Maximum Power—8th Gear** | | | | | | | | | |
| 148.45 *(110.70)* | 11560 *(51.42)* | 4.82 *(7.75)* | 2200 | 3.96 | 0.480 *(0.292)* | 14.58 *(2.87)* | 187 *(86)* | 68 *(20)* | 28.74 *(97.33)* |
| **75% of Pull at Maximum Power—8th Gear** | | | | | | | | | |
| 116.11 *(86.59)* | 8704 *(38.72)* | 5.00 *(8.05)* | 2261 | 2.81 | 0.537 *(0.327)* | 13.03 *(2.57)* | 185 *(85)* | 75 *(24)* | 28.69 *(97.16)* |
| **50% of Pull at Maximum Power—8th Gear** | | | | | | | | | |
| 78.55 *(58.57)* | 5797 *(25.78)* | 5.08 *(8.18)* | 2271 | 1.75 | 0.635 *(0.386)* | 11.01 *(2.17)* | 181 *(83)* | 76 *(24)* | 28.68 *(97.12)* |
| **75% of Pull at Reduced Engine Speed—10th Gear** | | | | | | | | | |
| 116.24 *(86.68)* | 8686 *(38.64)* | 5.02 *(8.08)* | 1703 | 2.81 | 0.458 *(0.279)* | 15.26 *(3.01)* | 187 *(86)* | 75 *(24)* | 28.69 *(97.16)* |
| **50% of Pull at Reduced Engine Speed—10th Gear** | | | | | | | | | |
| 78.50 *(58.54)* | 5793 *(25.77)* | 5.08 *(8.18)* | 1706 | 1.81 | 0.513 *(0.312)* | 13.64 *(2.69)* | 181 *(83)* | 77 *(25)* | 28.67 *(97.08)* |

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

**Dates of Test:** March 28 - April 8, 2003

**Manufacturer:** John Deere Waterloo Works, P.O. Box 270, Waterloo Ia, USA 50704

**FUEL, OIL and TIME: Fuel** No. 2 Diesel **Specific gravity converted to 60°/60°F *(15°/15°C)*** 0.8400 **Fuel weight** 6.994 lbs/gal *(0.838 kg/l)* **Oil SAE** 15W-40 **API service classification** CF-4 **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** SAE 85W - 140 API GL-5 **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.** *RG6081H217953* **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 heatexchanger 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:** 68.3 - 75.8 lb/h *(31.0 - 34.4 kg/h)* **High idle:** 2275 - 2325 rpm **Turbo boost:** nominal 16.0 - 20.3 psi *(110 - 140 kPa)* as measured 19.4 psi *(134 kPa)*

**CHASSIS: Type** front wheel assist **Serial No.***RW8120P11518* **Tread width** rear 60.0" *(1524 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** 20060 lb *(9099 kg)*

## DRAWBAR PERFORMANCE

### UNBALLASTED - FRONT DRIVE ENGAGED (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) | Fuel Consumption Hp.hr/gal (kW.h/l) | Temp.°F (°C) cool-ing med | Temp.°F (°C) Air dry bulb | Barom. inch Hg (kPa) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4th Gear | | | | |
| 127.50 (95.08) | 18768 (83.48) | 2.55 (4.10) | 2255 | 14.07 | 0.554 (0.337) | 12.63 (2.49) | 181 (83) | 56 (13) | 28.52 (96.58) |
| | | | | | 5th Gear | | | | |
| 139.11 (103.74) | 17824 (79.29) | 2.93 (4.71) | 2240 | 11.47 | 0.520 (0.316) | 13.45 (2.65) | 183 (84) | 61 (16) | 28.51 (96.55) |
| | | | | | 6th Gear | | | | |
| 146.54 (109.27) | 15962 (71.00) | 3.44 (5.54) | 2196 | 7.67 | 0.489 (0.297) | 14.31 (2.82) | 185 (85) | 68 (20) | 28.51 (96.55) |
| | | | | | 7th Gear | | | | |
| 147.19 (109.76) | 13389 (59.56) | 4.12 (6.63) | 2199 | 5.09 | 0.487 (0.296) | 14.38 (2.83) | 186 (85) | 72 (22) | 28.72 (97.26) |
| | | | | | 8th Gear | | | | |
| 148.45 (110.70) | 11560 (51.42) | 4.82 (7.75) | 2200 | 3.96 | 0.480 (0.292) | 14.58 (2.87) | 187 (86) | 68 (20) | 28.74 (97.33) |
| | | | | | 9th Gear | | | | |
| 148.91 (111.04) | 9972 (44.36) | 5.60 (9.01) | 2198 | 3.17 | 0.477 (0.290) | 14.68 (2.89) | 186 (85) | 64 (18) | 28.75 (97.36) |
| | | | | | 10th Gear | | | | |
| 147.21 (109.77) | 8512 (37.86) | 6.49 (10.44) | 2195 | 2.54 | 0.482 (0.293) | 14.52 (2.86) | 184 (84) | 55 (13) | 28.79 (97.49) |
| | | | | | 11th Gear | | | | |
| 143.62 (107.10) | 7107 (31.61) | 7.58 (12.20) | 2198 | 1.99 | 0.493 (0.300) | 14.18 (2.79) | 185 (85) | 60 (16) | 28.75 (97.36) |
| | | | | | 12th Gear | | | | |
| 140.31 (104.63) | 6002 (26.70) | 8.77 (14.11) | 2197 | 1.81 | 0.508 (0.309) | 13.77 (2.71) | 184 (84) | 61 (16) | 28.75 (97.36) |

| TRACTOR SOUND LEVEL WITH CAB | Front Wheel Drive Engaged dB(A) | Front Wheel Drive Disengaged dB(A) |
|---|---|---|
| At no load in 8th gear | 71.9 | 71.8 |
| Transport speed - no load - 16th gear | | 74.3 |
| Bystander in 16th gear | | 84.8 |

| TIRES, BALLAST AND WEIGHT | With Ballast | Without Ballast |
|---|---|---|
| **Rear Tires** - No., size, ply & psi(*kPa*) | Four 480/80R46;***;8(*55*) | Two 480/80R46;***;18(*125*) |
| **Ballast** - Duals (total) | 1830 lb (*830 kg*) | None |
| - Cast Iron (total) | None | None |
| **Front Tires** - No., size, ply & psi(*kPa*) | Two 380/85R34;**;20(*150*) | Two 380/85R34;**;20(*150*) |
| **Ballast** - Liquid (total) | None | None |
| - Cast Iron (total) | 330 lb (*150 kg*) | None |
| **Height of Drawbar** | 22.5 in (*560 mm*) | 23.0 in(*585 mm*) |
| **Static Weight with operator** - Rear | 13795 lb (*6258 kg*) | 12020 lb(*5452 kg*) |
| - Front | 8600 lb (*3900 kg*) | 8215 lb(*3726 kg*) |
| - Total | 22395 lb(*10158 kg*) | 20235 lb(*9178 kg*) |

**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 96°F *(36°C)*. 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. **1819**, Nebraska Summary 396, June 26, 2003.

Leonard L. Bashford
Director

M.F. Kocher
W.P. Campbell
G.J. Hoffman
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)* | Hp.hr/gal *(kW.h/l)* | Temp.°F*(°C)* cool-ing med | Air dry bulb | Barom. inch Hg *(kPa)* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4th Gear | | | | |
| 127.84 *(95.33)* | 18762 *(83.46)* | 2.55 *(4.11)* | 2255 | 13.85 | 0.551 *(0.335)* | 12.70 *(2.50)* | 180 *(82)* | 56 *(13)* | 28.52 *(96.58)* |
| | | | | | 5th Gear | | | | |
| 139.85 *(104.29)* | 17949 *(79.84)* | 2.92 *(4.70)* | 2237 | 11.54 | 0.513 *(0.312)* | 13.64 *(2.69)* | 183 *(84)* | 61 *(16)* | 28.51 *(96.55)* |
| | | | | | 6th Gear | | | | |
| 146.41 *(109.18)* | 16342 *(72.69)* | 3.36 *(5.41)* | 2168 | 8.87 | 0.491 *(0.298)* | 14.25 *(2.81)* | 186 *(85)* | 69 *(21)* | 28.52 *(96.58)* |
| | | | | | 7th Gear | | | | |
| 159.85 *(119.20)* | 16390 *(72.91)* | 3.66 *(5.89)* | 2045 | 9.34 | 0.461 *(0.281)* | 15.16 *(2.99)* | 186 *(86)* | 69 *(21)* | 28.53 *(96.61)* |
| | | | | | 8th Gear | | | | |
| 169.22 *(126.19)* | 15790 *(70.24)* | 4.02 *(6.47)* | 1901 | 7.18 | 0.434 *(0.264)* | 16.12 *(3.18)* | 190 *(88)* | 74 *(23)* | 28.70 *(97.19)* |
| | | | | | 9th Gear | | | | |
| 172.46 *(128.60)* | 13678 *(60.84)* | 4.73 *(7.61)* | 1895 | 5.17 | 0.426 *(0.259)* | 16.43 *(3.24)* | 190 *(88)* | 70 *(21)* | 28.73 *(97.29)* |
| | | | | | 10th Gear | | | | |
| 173.41 *(129.31)* | 11734 *(52.19)* | 5.54 *(8.92)* | 1902 | 3.96 | 0.427 *(0.260)* | 16.38 *(3.23)* | 189 *(87)* | 66 *(19)* | 28.74 *(97.33)* |
| | | | | | 11th Gear | | | | |
| 172.30 *(128.48)* | 9946 *(44.24)* | 6.50 *(10.46)* | 1902 | 3.08 | 0.428 *(0.260)* | 16.34 *(3.22)* | 186 *(86)* | 58 *(14)* | 28.76 *(97.39)* |
| | | | | | 12th Gear | | | | |
| 170.36 *(127.04)* | 8484 *(37.74)* | 7.53 *(12.12)* | 1903 | 2.54 | 0.434 *(0.264)* | 16.11 *(3.17)* | 187 *(86)* | 56 *(13)* | 28.78 *(97.46)* |
| | | | | | 13th Gear | | | | |
| 169.00 *(126.02)* | 7127 *(31.70)* | 8.89 *(14.31)* | 1898 | 1.99 | 0.433 *(0.264)* | 16.14 *(3.18)* | 188 *(86)* | 62 *(17)* | 28.75 *(97.36)* |

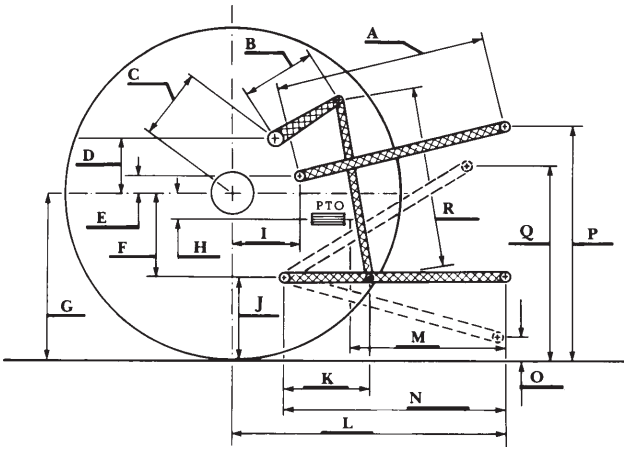
# DRAWBAR PERFORMANCE
## BALLASTED - FRONT DRIVE ENGAGED(1900 RPM)
### MAXIMUM POWER IN SELECTED GEARS

| Power Hp *(kW)* | Drawbar pull lbs *(kN)* | Speed mph *(km/h)* | Crank-shaft speed rpm | Slip % | Fuel Consumption lb/hp.hr *(kg/kW.h)* | Hp.hr/gal *(kW.h/l)* | Temp.°F*(°C)* cool-ing med | Air dry bulb | Barom. inch Hg *(kPa)* |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3rd Gear | | | | |
| 111.93 | 22308 | 1.88 | 2260 | 14.62 | 0.584 | 11.98 | 180 | 59 | 28.42 |
| *(83.47)* | *(99.23)* | *(3.03)* | | | *(0.355)* | *(2.36)* | *(82)* | *(15)* | *(96.24)* |
| | | | | | 4th Gear | | | | |
| 141.78 | 21339 | 2.49 | 2142 | 10.89 | 0.510 | 13.70 | 185 | 60 | 28.43 |
| *(105.73)* | *(94.92)* | *(4.01)* | | | *(0.310)* | *(2.70)* | *(85)* | *(16)* | *(96.28)* |
| | | | | | 5th Gear | | | | |
| 154.89 | 20793 | 2.79 | 2101 | 9.21 | 0.475 | 14.72 | 185 | 62 | 28.43 |
| *(115.50)* | *(92.49)* | *(4.50)* | | | *(0.289)* | *(2.90)* | *(85)* | *(17)* | *(96.28)* |
| | | | | | 6th Gear | | | | |
| 166.02 | 19757 | 3.15 | 2010 | 7.31 | 0.449 | 15.58 | 186 | 64 | 28.43 |
| *(123.80)* | *(87.88)* | *(5.07)* | | | *(0.273)* | *(3.07)* | *(85)* | *(18)* | *(96.28)* |
| | | | | | 7th Gear | | | | |
| 170.76 | 18294 | 3.50 | 1899 | 6.16 | 0.434 | 16.11 | 190 | 66 | 28.44 |
| *(127.33)* | *(81.37)* | *(5.63)* | | | *(0.264)* | *(3.17)* | *(88)* | *(19)* | *(96.31)* |
| | | | | | 8th Gear | | | | |
| 174.13 | 15859 | 4.12 | 1902 | 4.38 | 0.427 | 16.38 | 191 | 67 | 28.44 |
| *(129.85)* | *(70.54)* | *(6.63)* | | | *(0.260)* | *(3.23)* | *(88)* | *(19)* | *(96.31)* |
| | | | | | 9th Gear | | | | |
| 173.58 | 13622 | 4.78 | 1897 | 3.59 | 0.426 | 16.42 | 193 | 68 | 28.44 |
| *(129.44)* | *(60.59)* | *(7.69)* | | | *(0.259)* | *(3.23)* | *(89)* | *(20)* | *(96.31)* |
| | | | | | 10th Gear | | | | |
| 172.50 | 11659 | 5.55 | 1899 | 3.07 | 0.430 | 16.28 | 191 | 69 | 28.44 |
| *(128.64)* | *(51.86)* | *(8.93)* | | | *(0.261)* | *(3.21)* | *(88)* | *(21)* | *(96.31)* |
| | | | | | 11th Gear | | | | |
| 169.68 | 9822 | 6.48 | 1899 | 2.62 | 0.435 | 16.06 | 194 | 69 | 28.44 |
| *(126.53)* | *(43.69)* | *(10.43)* | | | *(0.265)* | *(3.16)* | *(90)* | *(21)* | *(96.31)* |
| | | | | | 12th Gear | | | | |
| 167.11 | 8342 | 7.51 | 1903 | 2.17 | 0.442 | 15.84 | 191 | 69 | 28.44 |
| *(124.61)* | *(37.10)* | *(12.09)* | | | *(0.269)* | *(3.12)* | *(88)* | *(21)* | *(96.31)* |
| | | | | | 13th Gear | | | | |
| 164.06 | 6946 | 8.86 | 1898 | 1.81 | 0.450 | 15.53 | 193 | 70 | 28.44 |
| *(122.34)* | *(30.90)* | *(14.26)* | | | *(0.274)* | *(3.06)* | *(89)* | *(21)* | *(96.31)* |

## THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III
Quick Attach: Yes

| | lift cylinders 2 x 90 mm | lift cylinders 2 x 100 mm |
|---|---|---|
| Maximum Force Exerted Through Whole Range: | 12353 lbs *(54.9 kN)* | 15387 lbs *(68.4 kN)* |
| i) Opening pressure of relief valve: | NA | NA |
| | | **High flow option** |
| Sustained pressure at compensator cutoff: | 2920 psi *(201 bar)* | 2994 psi *(206 bar)* |
| | **two outlet sets combined** | |
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 35.2 GPM *(133.2 l/min)* | 43.6 GPM *(165.0 l/min)* |
| iii) Pump delivery rate at maximum hydraulic power: | 33.2 GPM *(125.7 l/min)* | 42.4 GPM *(160.5 l/min)* |
| Delivery pressure: | 2700 psi *(186 bar)* | 2504 psi *(173 bar)* |
| Power: | 52.4 HP *(39.1 kW)* | 61.9 HP *(46.2 kW)* |
| | **single outlet set** | |
| ii) Pump delivery rate at minimum pressure and rated engine speed: | 34.3 GPM *(129.8 l/min)* | 40.1 GPM *(151.8 l/min)* |
| iii) Pump delivery rate at maximum hydraulic power: | 32.9 GPM *(124.5 l/min)* | 35.2 GPM *(133.2 l/min)* |
| Delivery pressure: | 2090 psi *(144 bar)* | 2155 psi *(149 bar)* |
| Power: | 40.1 HP *(29.9 kW)* | 44.3 HP *(33.0 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 8120 DIESEL

**Agricultural Research Division**
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