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January 2002

Test 1800: John Deere 8420 Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1800-SUMMARY 366

JOHN DEERE 8420 DIESEL

16 SPEED

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

Dates of Test: May 7 - 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
Front axle lubricant John Deere Hy-Gard fluid
Total time engine was operated: 24.0 hours

ENGINE: Make John Deere **Diesel Type** six cylinder vertical with turbocharger and air to air aftercooler
Serial No.*RG6081H204589*
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 water separator
Fuel cooler radiator for pump inlet fuel
Muffler vertical
Cooling medium temperature control 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: **Fuel rate:** 90.5 - 98.0. lb/h (41.0 - 44.5 kg/h)
High idle: 2275 - 2325 rpm
Turbo boost: nominal 26.1 - 29.0 psi (180 - 200 kPa) as measured 28.0 psi (193 kPa)

CHASSIS: Type front wheel assist
Serial No.*RW8420P001742*
Tread width rear 60.0" (1524 mm) to 130.6 (3318 mm) front 60.0" (1524 mm) to 88.0" (2234 mm)
Wheelbase 116.1" (2950 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 23780 lb (10786 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					
235.45 (175.58)	2200	13.66 (51.69)	0.409 (0.249)	17.24 (3.40)	
269.41 (200.90)	2000	14.47 (54.77)	0.378 (0.230)	18.62 (3.67)	
VARYING POWER AND FUEL CONSUMPTION					
235.45 (175.58)	2200	13.66 (51.69)	0.409 (0.249)	17.24 (3.40)	Air temperature
205.04 (152.90)	2254	12.35 (46.75)	0.424 (0.258)	16.60 (3.27)	77°F (25°C)
154.80 (115.43)	2265	9.92 (37.56)	0.452 (0.275)	15.60 (3.07)	Relative humidity
103.27 (77.00)	2275	7.62 (28.85)	0.520 (0.316)	13.55 (2.67)	56%
51.88 (38.69)	2285	5.07 (19.18)	0.688 (0.419)	10.24 (2.02)	Barometer
1.00 (0.75)	2294	2.98 (11.28)	20.969 (12.755)	0.34 (0.07)	28.75" Hg (97.36 kPa)
Maximum Torque - 823 lb.-ft. (1116 Nm) at 1200 rpm					
Maximum Torque Rise - 46.6%					
Torque rise at 1800 engine rpm - 32%					

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									
207.49 (154.73)	16312 (72.56)	4.77 (7.68)	2201	3.87	0.462 (0.281)	15.23 (3.00)	196 (91)	61 (16)	29.09 (98.51)
75% of Pull at Maximum Power 8th Gear									
161.32 (120.30)	12215 (54.33)	4.95 (7.97)	2258	2.90	0.496 (0.302)	14.20 (2.80)	196 (91)	70 (21)	29.07 (98.44)
50% of Pull at Maximum Power 8th Gear									
109.27 (81.48)	8155 (36.28)	5.02 (8.09)	2271	1.92	0.575 (0.350)	12.24 (2.41)	184 (84)	71 (22)	29.07 (98.44)
75% of Pull at Reduced Engine Speed 10th Gear									
161.35 (120.32)	12221 (54.36)	4.95 (7.97)	1696	2.90	0.424 (0.258)	16.60 (3.27)	194 (90)	70 (21)	29.07 (98.44)
50% of Pull at Reduced Engine Speed 10th Gear									
109.42 (81.60)	8155 (36.27)	5.03 (8.10)	1708	1.92	0.469 (0.285)	15.03 (2.96)	184 (84)	71 (22)	29.06 (98.41)

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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th Gear									
191.11 (142.51)	24276 (107.98)	2.95 (4.75)	2249	10.20	0.498 (0.303)	14.14 (2.78)	188 (87)	47 (8)	29.06 (98.41)
6th Gear									
200.33 (149.38)	21766 (96.82)	3.45 (5.55)	2201	6.74	0.478 (0.291)	14.75 (2.91)	191 (88)	51 (11)	29.08 (98.48)
7th Gear									
205.12 (152.96)	18773 (83.51)	4.10 (6.59)	2201	4.90	0.467 (0.284)	15.08 (2.97)	194 (90)	56 (13)	29.09 (98.51)
8th Gear									
207.49 (154.73)	16312 (72.56)	4.77 (7.68)	2201	3.87	0.462 (0.281)	15.23 (3.00)	196 (91)	61 (16)	29.09 (98.51)
9th Gear									
206.97 (154.34)	13990 (62.23)	5.55 (8.93)	2201	3.26	0.461 (0.281)	15.27 (3.01)	199 (93)	67 (19)	29.08 (98.48)
10th Gear									
205.63 (153.34)	12008 (53.41)	6.42 (10.33)	2198	2.73	0.467 (0.284)	15.10 (2.97)	198 (92)	67 (19)	29.08 (98.48)
11th Gear									
202.79 (151.22)	10155 (45.17)	7.49 (12.05)	2197	2.19	0.472 (0.287)	14.93 (2.94)	200 (93)	68 (20)	29.08 (98.48)
12th Gear									
199.08 (148.45)	8600 (38.25)	8.68 (13.97)	2201	1.92	0.479 (0.291)	14.71 (2.90)	201 (94)	69 (21)	29.08 (98.48)

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 102°F (39°C). The pull in 5th gear was limited to avoid excessive tractor bouncing. 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. **1800**, Nebraska Summary 366, 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	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 8th gear	72.1	72.4
Transport speed-no load-16th gear		77.3
Bystander in 16th Gear		86.1

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Four 480/80R46;***;14(95)	Four 480/80R46;***;10(70)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	4115 lb (1867 kg)	None
Front Tires - No., size, ply & psi(kPa)	Two 380/85R34;***;23(160)	Two 380/85R34;***;23(160)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	None	None
Height of Drawbar	21.0 in (535 mm)	21.0 in (535 mm)
Static Weight with operator - Rear	18170 lb (8241 kg)	14055 lb (6375 kg)
- Front	9900 lb (4491 kg)	9900 lb (4491 kg)
- Total	28070 lb (12732 kg)	23955 lb (10866 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)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
5th Gear								
191.20 (142.58)	24299 (108.09)	2.95 (4.75)	2249	10.05	0.495 (0.301)	14.22 (2.80)	186 (85)	47 (8) (98.41)
6th Gear								
200.48 (149.50)	22151 (98.53)	3.39 (5.46)	2182	7.54	0.477 (0.290)	14.76 (2.91)	192 (89)	54 (12) (98.51)
7th Gear								
216.51 (161.45)	21363 (93.03)	3.80 (6.12)	2092	7.06	0.458 (0.279)	15.39 (3.03)	196 (91)	58 (14) (98.51)
8th Gear								
228.72 (170.56)	20270 (90.16)	4.23 (6.81)	2003	6.24	0.442 (0.269)	15.96 (3.14)	201 (94)	63 (17) (98.48)
9th Gear								
233.35 (174.01)	17583 (78.21)	4.98 (8.01)	2000	4.56	0.431 (0.262)	16.33 (3.22)	202 (94)	67 (19) (98.48)
10th Gear								
233.87 (174.39)	15138 (67.34)	5.79 (9.32)	2000	3.52	0.428 (0.260)	16.47 (3.24)	196 (91)	68 (20) (98.48)
11th Gear								
233.02 (173.77)	12890 (57.34)	6.78 (10.91)	2002	2.90	0.432 (0.263)	16.32 (3.22)	202 (94)	68 (20) (98.48)
12th Gear								
230.34 (171.76)	11001 (48.93)	7.85 (12.64)	2001	2.46	0.436 (0.265)	16.17 (3.19)	204 (95)	69 (21) (98.48)
13th Gear								
228.08 (170.08)	9202 (40.93)	9.30 (14.96)	2002	2.19	0.441 (0.268)	15.97 (3.15)	206 (97)	69 (21) (98.48)

DRAWBAR PERFORMANCE
BALLASTED, Single front tires - 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)
4th Gear									
188.03 (140.21)	27380 (121.79)	2.58 (4.14)	2236	11.59	0.513 (0.312)	13.72 (2.70)	192 (89)	64 (18)	28.70 (97.19)
5th Gear									
195.10 (145.48)	26094 (116.07)	2.80 (4.51)	2152	10.77	0.494 (0.300)	14.26 (2.81)	197 (92)	64 (18)	28.71 (97.22)
6th Gear									
214.51 (159.96)	25176 (111.99)	3.20 (5.14)	2086	8.94	0.464 (0.282)	15.18 (2.99)	199 (93)	65 (18)	28.72 (97.26)
7th Gear									
228.00 (170.02)	23543 (104.72)	3.63 (5.84)	2000	7.03	0.443 (0.270)	15.89 (3.13)	201 (94)	64 (18)	28.74 (97.33)
8th Gear									
235.39 (175.53)	20598 (91.62)	4.29 (6.90)	1998	4.95	0.430 (0.261)	16.40 (3.23)	200 (93)	63 (17)	28.80 (97.53)
9th Gear									
236.32 (176.23)	17729 (78.86)	5.00 (8.04)	1998	4.00	0.429 (0.261)	16.43 (3.24)	204 (96)	63 (17)	28.83 (97.63)
10th Gear									
236.51 (176.36)	15260 (67.88)	5.81 (9.35)	2001	3.30	0.426 (0.259)	16.55 (3.26)	205 (96)	64 (18)	28.85 (97.70)
11th Gear									
234.29 (174.71)	12979 (57.73)	6.77 (10.89)	1995	2.77	0.430 (0.262)	16.38 (3.23)	205 (96)	65 (18)	28.86 (97.73)
12th Gear									
232.42 (173.32)	11122 (49.47)	7.84 (12.61)	1995	2.33	0.431 (0.262)	16.35 (3.22)	206 (96)	65 (18)	28.87 (97.77)
13th Gear									
229.78 (171.35)	9268 (41.22)	9.30 (14.96)	2000	1.97	0.440 (0.268)	16.01 (3.15)	206 (96)	66 (19)	28.88 (97.80)

DRAWBAR PERFORMANCE
BALLASTED, Dual front tires - 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)
3rd Gear									
149.07 (111.16)	29964 (133.28)	1.87 (3.00)	2256	15.00	0.560 (0.340)	12.59 (2.48)	184 (84)	53 (12)	29.09 (98.51)
4th Gear									
195.40 (145.71)	28558 (127.03)	2.57 (4.13)	2177	9.42	0.489 (0.298)	14.39 (2.84)	190 (88)	54 (12)	29.09 (98.51)
5th Gear									
208.76 (155.67)	27407 (121.91)	2.86 (4.60)	2129	8.32	0.467 (0.284)	15.07 (2.97)	195 (90)	56 (13)	29.09 (98.51)
6th Gear									
224.00 (167.04)	26268 (116.85)	3.20 (5.15)	2044	7.20	0.446 (0.271)	15.79 (3.11)	196 (91)	58 (14)	29.09 (98.51)
7th Gear									
232.02 (173.02)	23496 (104.51)	3.70 (5.96)	2003	5.46	0.436 (0.265)	16.17 (3.19)	201 (94)	59 (15)	29.09 (98.51)
8th Gear									
234.82 (175.10)	20404 (90.76)	4.32 (6.95)	1999	4.44	0.431 (0.262)	16.35 (3.22)	201 (94)	59 (15)	29.09 (98.51)
9th Gear									
233.60 (174.20)	17409 (77.44)	5.03 (8.10)	2001	3.58	0.432 (0.263)	16.30 (3.21)	201 (94)	60 (16)	29.09 (98.51)
10th Gear									
234.60 (174.94)	15086 (67.11)	5.83 (9.38)	2000	3.05	0.432 (0.263)	16.32 (3.21)	204 (96)	61 (16)	29.09 (98.51)
11th Gear									
231.40 (172.56)	12751 (56.72)	6.81 (10.95)	1998	2.51	0.436 (0.265)	16.15 (3.18)	205 (96)	63 (17)	29.09 (98.51)
12th Gear									
229.73 (171.31)	10934 (48.63)	7.88 (12.68)	1998	2.06	0.438 (0.267)	16.08 (3.17)	204 (95)	66 (19)	29.09 (98.51)
13th Gear									
225.80 (168.38)	9070 (40.34)	9.34 (15.03)	2002	1.79	0.448 (0.272)	15.74 (3.10)	205 (96)	66 (19)	29.09 (98.51)

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Four 480/80R46;**,14(95)	Four 480/80R46;**,10(70)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	4115 lb (1866 kg)	None
Front Tires - No., size, ply & psi(kPa)	Four 380/85R34;**,17(160)	Two 380/85R34;**,23(160)
Ballast - Duals (total)	1300 lb (590 kg)	None
- Cast Iron (total)	1130 lb (513 kg)	None
Height of Drawbar	21.0 in (535 mm)	21.0 in (535 mm)
Static Weight with operator - Rear	17700 lb (8029 kg)	14055 lb (6375 kg)
- Front	12800 lb (5806 kg)	9900 lb (4491 kg)
- Total	30500 lb(13835 kg)	23955 lb(10866 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range: lift cylinders 2x100 mm lift cylinders 1x100 mm& 1x115 mm

i) Opening pressure of relief valve:

NA

NA

High flow option

Sustained pressure at compensator cutoff:

2950 psi (204 bar)

2975 psi (205 bar)

two outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed:

35.2 GPM(133.2 l/min) 43.2 GPM(163.5 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

33.2 GPM(125.7 l/min) 42.2 GPM(159.7 l/min)

Delivery pressure:

2700 psi (186 bar) 2455 psi (169 bar)

Power:

52.4 HP (39.1 kW) 60.4 HP (45.1 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed:

34.3 GPM(129.8 l/min) 35.4 GPM(134.0 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

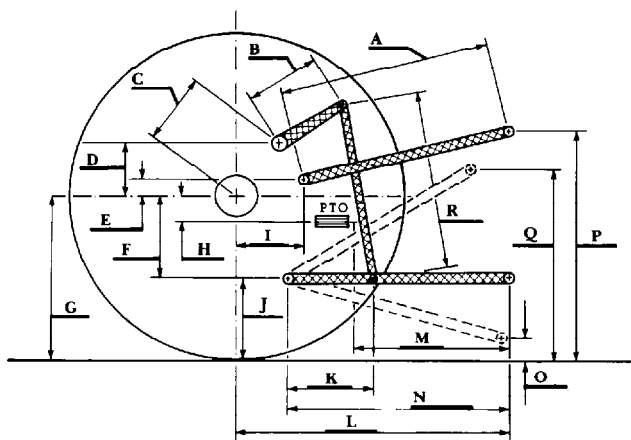
32.9 GPM(124.5 l/min) 30.7 GPM(116.2 l/min)

Delivery pressure:

2090 psi (144 bar) 2100 psi (144 bar)

Power:

40.1 HP (29.9 kW) 37.6 HP (28.0 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 8420 DIESEL

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Institute of Agriculture and Natural Resources
University of Nebraska Lincoln
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