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Test 1777: John Deere 8410 Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1777—SUMMARY 312

JOHN DEERE 8410 DIESEL

16 SPEED

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

Dates of Test: April 4-May 12, 2000

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

FUEL, OIL and TIME: Fuel No. 2 Diesel Specific gravity converted to 60°/60°F (15°/15°C) 0.8487 Fuel weight 7.067 lbs/gal (0.847 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: 47.5 hours

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger and air to air aftercooler Serial No. *RG6081H096980* 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 return fuel Muffler vertical Cooling medium temperature control 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 93.0 - 100.4 lb/h (42.2 - 45.6 kg/h) High idle: 2275 - 2325 rpm Turbo boost: nominal 20.9 - 25.2 psi (144 - 174 kPa) as measured 23.7 psi (163 kPa)

CHASSIS: Type front wheel assist Serial No. *RW8410P001578* Tread width rear 70.2" (1783 mm) to 141.4 (3591 mm) front 70.1" (1780 mm) to 85.9" (2182 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 1.35 (2.18) second 1.73 (2.79) third 2.21 (3.55) fourth 2.81 (4.53) fifth 3.41 (5.49) sixth 3.85 (6.19) seventh 4.36 (7.01) eighth 4.92 (7.91) ninth 5.54 (8.92) tenth 6.26 (10.07) eleventh 7.08 (11.40) twelfth 7.99 (12.86) thirteenth 10.17 (16.37) fourteenth 12.99 (20.91) fifteenth 16.53 (26.61) sixteenth 23.04 (37.08) @ 2400 engine rpm reverse 1.18 (1.90), 2.98 (4.79), 3.66 (5.89), 6.45 (10.38) @ 1600 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 20440 lb (9271 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					
Rated Engine Speed—(PTO speed—1009 rpm)					
236.79 (176.57)	2200	13.19 (49.94)	0.394 (0.239)	17.95 (3.54)	
Maximum Power (2 hours)					
269.98 (201.32)	2000	14.18 (53.69)	0.371 (0.226)	19.04 (3.75)	
VARYING POWER AND FUEL CONSUMPTION					
236.79 (176.57)	2200	13.19 (49.94)	0.394 (0.239)	17.95 (3.54)	Air temperature
206.57 (154.04)	2256	11.97 (45.32)	0.410 (0.249)	17.26 (3.40)	75°F (24°C)
155.74 (116.13)	2266	9.51 (36.00)	0.431 (0.262)	16.38 (3.23)	Relative humidity
104.21 (77.71)	2276	7.17 (27.16)	0.487 (0.296)	14.53 (2.86)	34%
52.38 (39.06)	2285	4.88 (18.48)	0.659 (0.401)	10.73 (2.11)	Barometer
1.00 (0.75)	2294	2.76 (10.45)	19.471 (11.844)	0.36 (0.07)	28.95" Hg (98.04 kPa)
Maximum Torque - 829 lb.-ft. (1124 Nm) at 1150 rpm					
Maximum Torque Rise - 46.7%					
Torque rise at 1799 engine rpm - 34%					

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 cool- ing med	°C Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—8th Gear									
203.49 (151.74)	16425 (73.06)	4.65 (7.48)	2199	6.52	0.456 (0.277)	15.51 (3.06)	193 (89)	53 (12)	28.82 (97.60)
75% of Pull at Maximum Power—8th Gear									
160.11 (119.40)	12289 (54.66)	4.89 (7.86)	2262	4.33	0.470 (0.286)	15.02 (2.96)	186 (86)	48 (9)	28.83 (97.63)
50% of Pull at Maximum Power—8th Gear									
109.30 (81.51)	8220 (36.56)	4.99 (8.03)	2272	2.76	0.532 (0.324)	13.27 (2.62)	181 (83)	46 (8)	28.87 (97.76)
75% of Pull at Reduced Engine Speed—10th Gear									
160.75 (119.87)	12320 (54.80)	4.89 (7.87)	1779	4.33	0.421 (0.256)	16.78 (3.31)	189 (87)	47 (8)	28.86 (97.73)
50% of Pull at Reduced Engine Speed—10th Gear									
108.96 (81.25)	8221 (36.57)	4.97 (8.00)	1780	2.76	0.455 (0.277)	15.52 (3.06)	181 (83)	46 (8)	28.90 (97.87)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED
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 cool- ing med	°C Air dry bulb	Barom. inch Hg (kPa)
6th Gear									
189.07 (140.99)	20330 (90.43)	3.49 (5.61)	2253	12.38	0.485 (0.295)	14.57 (2.87)	192 (89)	45 (7)	29.31 (99.26)
7th Gear									
201.95 (150.59)	19486 (86.68)	3.89 (6.25)	2171	10.61	0.464 (0.282)	15.22 (3.00)	195 (91)	53 (12)	28.82 (97.60)
8th Gear									
218.29 (162.78)	19367 (86.15)	4.23 (6.80)	2081	10.08	0.451 (0.274)	15.67 (3.09)	199 (93)	53 (12)	28.82 (97.60)
9th Gear									
228.31 (170.25)	18245 (81.16)	4.69 (7.55)	2004	8.06	0.435 (0.265)	16.24 (3.20)	201 (94)	53 (12)	28.82 (97.60)
10th Gear									
232.28 (173.21)	16206 (72.09)	5.37 (8.65)	1997	6.44	0.429 (0.261)	16.48 (3.25)	205 (96)	53 (12)	28.83 (97.63)
11th Gear									
232.89 (173.67)	14155 (62.96)	6.17 (9.93)	2000	5.19	0.427 (0.260)	16.56 (3.26)	204 (95)	53 (12)	28.83 (97.63)
12th Gear									
232.32 (173.24)	12439 (55.33)	7.00 (11.27)	1996	4.50	0.427 (0.260)	16.56 (3.26)	197 (92)	53 (12)	28.83 (97.63)
13th Gear									
230.81 (172.11)	9583 (42.63)	9.03 (14.54)	1998	3.29	0.428 (0.260)	16.52 (3.25)	196 (91)	50 (10)	28.83 (97.63)

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 118°F(48°C). The pull in 3rd gear(ballasted tractor) 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. **1777**, Nebraska Summary 312, July 7, 2000.

Brent T. Sampson
Test Engineer

L. L. Bashford
M. F. Kocher
R. D. Grisso, Jr.
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	73.6	73.4
Transport speed - no load - 16th gear		76.3
Bystander in 16th Gear		89.5

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Four 710/70R38;**,9(62)	Two 710/70R38;**,12(85)
Ballast - Duals (total)	2540 lb (1152 kg)	None
- Cast Iron (total)	5890 lb (2672 kg)	None
Front Tires - No., size, ply & psi(kPa)	Two 600/65R28;***,19(130)	Two 600/65R28;***,15(105)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	2155 lb (977 kg)	None
Height of Drawbar	20.5 in (535 mm)	21.0 in(535 mm)
Static Weight with operator - Rear	19990 lb (9067 kg)	12335 lb(5595 kg)
- Front	11200 lb (5080 kg)	8270 lb(3751 kg)
- Total	31190 lb(14147 kg)	20605 lb(9346 kg)

DRAWBAR PERFORMANCE
BALLASTED - FRONT DRIVE ENGAGED (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)	Hp.hr/gal (kW.h/l)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
158.58 (118.25)	30087 (133.83)	1.98 (3.18)	2257	13.61	0.517 (0.314)	13.68 (2.69)	185 (85)	55 (13)	28.86 (97.73)
4th Gear									
191.33 (142.68)	28955 (128.80)	2.48 (3.99)	2173	11.89	0.488 (0.297)	14.47 (2.85)	193 (89)	58 (14)	28.86 (97.73)
5th Gear									
215.24 (160.50)	28090 (124.95)	2.87 (4.62)	2058	10.78	0.458 (0.279)	15.42 (3.04)	198 (92)	61 (16)	28.87 (97.77)
6th Gear									
223.61 (166.75)	25844 (114.96)	3.24 (5.22)	1998	8.23	0.444 (0.270)	15.90 (3.13)	200 (93)	61 (16)	28.88 (97.80)
7th Gear									
232.55 (173.41)	23266 (103.49)	3.75 (6.03)	2000	6.37	0.426 (0.259)	16.58 (3.27)	202 (94)	62 (17)	28.89 (97.83)
8th Gear									
233.54 (174.15)	20467 (91.04)	4.28 (6.89)	2001	5.37	0.426 (0.259)	16.60 (3.27)	201 (94)	64 (18)	28.90 (97.87)
9th Gear									
234.18 (174.63)	18095 (80.49)	4.85 (7.81)	1998	4.78	0.431 (0.262)	16.39 (3.23)	204 (96)	66 (19)	28.90 (97.87)
10th Gear									
233.32 (173.99)	15862 (70.56)	5.52 (8.88)	2000	4.18	0.432 (0.263)	16.36 (3.22)	203 (95)	66 (19)	28.90 (97.87)
11th Gear									
231.54 (172.66)	13829 (61.51)	6.28 (10.10)	2000	3.57	0.428 (0.260)	16.51 (3.25)	204 (95)	68 (20)	28.90 (97.87)
12th Gear									
231.04 (172.29)	12186 (54.21)	7.11 (11.44)	1998	3.30	0.429 (0.261)	16.48 (3.25)	204 (96)	68 (20)	28.90 (97.87)
13th Gear									
227.46 (169.62)	9340 (41.54)	9.13 (14.70)	2003	2.50	0.435 (0.264)	16.26 (3.20)	207 (97)	67 (19)	28.90 (97.87)

DRAWBAR PERFORMANCE
BALLASTED-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		Temp. °F (°C)		Barom. inch Hg (kPa)
					lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	cool- ing med	Air dry bulb	
3rd Gear									
157.37 (117.35)	29781 (132.47)	1.98 (3.19)	2258	13.33	0.519 (0.315)	13.63 (2.68)	184 (84)	54 (12)	28.86 (97.73)
4th Gear									
190.69 (142.20)	27755 (123.46)	2.58 (4.15)	2199	9.48	0.484 (0.295)	14.59 (2.87)	191 (88)	56 (13)	28.86 (97.73)
5th Gear									
200.88 (149.80)	23334 (103.79)	3.23 (5.20)	2201	6.45	0.459 (0.279)	15.39 (3.03)	194 (90)	61 (16)	28.87 (97.77)
6th Gear									
201.62 (150.35)	20555 (91.43)	3.68 (5.92)	2199	5.54	0.459 (0.279)	15.41 (3.04)	191 (88)	61 (16)	28.88 (97.80)
7th Gear									
204.18 (152.26)	18247 (81.16)	4.20 (6.75)	2199	4.86	0.451 (0.275)	15.66 (3.08)	198 (92)	62 (17)	28.89 (97.83)
8th Gear									
204.73 (152.67)	16126 (71.73)	4.76 (7.66)	2199	4.18	0.451 (0.274)	15.68 (3.09)	201 (94)	63 (17)	28.90 (97.87)
9th Gear									
204.23 (152.29)	14189 (63.11)	5.40 (8.69)	2199	3.74	0.456 (0.278)	15.49 (3.05)	200 (93)	65 (18)	28.90 (97.87)
10th Gear									
201.95 (150.59)	12368 (55.02)	6.12 (9.85)	2200	3.21	0.461 (0.280)	15.33 (3.02)	193 (89)	67 (19)	28.90 (97.87)
11th Gear									
199.50 (148.76)	10751 (47.82)	6.96 (11.20)	2200	2.86	0.462 (0.281)	15.29 (3.01)	202 (94)	68 (20)	28.90 (97.87)
12th Gear									
196.83 (146.78)	9365 (41.66)	7.88 (12.68)	2200	2.50	0.469 (0.286)	15.06 (2.97)	198 (92)	68 (20)	28.90 (97.87)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range:

i) Opening pressure of relief valve:

Sustained pressure at compensator cutoff:

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

iii) Pump delivery rate at maximum

hydraulic power:

Delivery pressure:

Power:

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

iii) Pump delivery rate at maximum

hydraulic power:

Delivery pressure:

Power:

lift cylinders 2x90 mm

10827 lbs (48.2 kN)

NA

2920 psi (201 bar)

two outlet sets combined

35.1 GPM(132.9 l/min)

33.2 GPM(125.7 l/min)

2550 psi (176 bar)

49.4 HP (36.8 kW)

single outlet set

31.8 GPM(120.4 l/min)

30.4 GPM(115.1 l/min)

2250 psi (155 bar)

39.9 HP (29.8 kW)

lift cylinders 2x100 mm

15147 lbs (67.4 kN)

NA

2890 psi (199 bar)

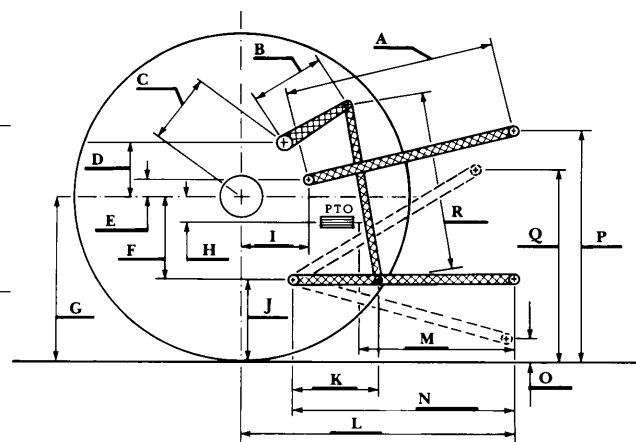
High flow option

44.1 GPM(166.9 l/min)

41.4 GPM(156.7 l/min)

2460 psi (170 bar)

59.4 HP (44.3 kW)



THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi.(bar)

2920(201)

Location:

remote outlet

Hydraulic oil temperature: °F(°C)

150(65)

Location:

pump inlet

Category:

III

Quick attach:

yes

SAE Static Test—System pressure 2640 psi (182 Bar)
with lift cylinders (2) 90 mm

Hitch point distance to ground level in.(mm) 8.0(203) 16.0(406) 24.0(610) 32.0(813) 40.0(1016)

Lift force on frame lb 11637 12371 11957 11642 10755

" " " " " " (kN) (51.8) (55.0) (53.2) (51.8) (47.8)

with lift cylinders (2) 100 mm

Hitch point distance to ground level in.(mm) 8.0(203) 16.0(406) 24.0(610) 32.0(813) 40.0(1016)

Lift force on frame lb 16799 17262 16754 16430 15260

" " " " " " (kN) (74.7) (76.8) (74.5) (73.1) (67.9)

ASAE Static Test—System pressure 2900 psi (200 Bar)
with lift cylinders (2) 90 mm

Hitch point distance to ground level in.(mm) 8.0(203) 16.0(406) 24.0(610) 32.0(813) 40.0(1016)

Lift force on frame lb 12821 13643 13196 12820 11852

" " " " " " (kN) (57.0) (60.7) (58.7) (57.0) (52.7)

with lift cylinders (2) 100 mm

Hitch point distance to ground level in.(mm) 8.0(203) 16.0(406) 24.0(610) 32.0(813) 40.0(1016)

Lift force on frame lb 18591 19018 18376 18070 16742

" " " " " " (kN) (82.7) (84.6) (81.7) (80.4) (74.5)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	28.3	718
B	19.5	495
C	21.7	550
D	19.5	495
E	4.8	123
F	13.8	350
G	35.6	905
H	7.8	197
I	20.3	515
J	21.8	555
K	28.2	716
L	48.9	1242
*L'	52.4	1331
M	22.0	558
N	38.1	967
O	9.0	229
P	43.8	1114
Q	40.1	1019
R	41.5	1054

*L' to Quick Attach ends



JOHN DEERE 8410 DIESEL

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