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Test 1772: John Deere 8110 Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1772-SUMMARY 307

JOHN DEERE 8110 DIESEL

16 SPEED

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

Dates of Test: April 25-May 12, 2000

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) 0.8487 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: 29.5 hours

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger and air to air aftercooler Serial No. *RG6081H098027* 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 return fuel Muffler vertical Cooling medium temperature control 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 65.5 - 73.0 lb/h (29.7 - 33.1 kg/h) High idle: 2275 - 2325 rpm Turbo boost: nominal 14.2 - 18.6 psi (98 - 128 kPa) as measured 16.2 psi (112 kPa)

CHASSIS: Type front wheel assist Serial No.*RW8110P001652* Tread width rear 60.0" (1524 mm) to 130.6 (3318 mm) front 60.0" (1524 mm) to 88.0" (2235 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 1.38 (2.22) second 1.76 (2.83) third 2.24 (3.61) fourth 2.86 (4.61) fifth 3.47 (5.58) sixth 3.91 (6.29) seventh 4.43 (7.13) eighth 5.00 (8.04) ninth 5.64 (9.07) tenth 6.36 (10.23) eleventh 7.20 (11.59) twelfth 8.12 (13.07) thirteenth 10.34 (16.64) fourteenth 13.20 (21.25) fifteenth 16.81 (27.05) sixteenth 23.42 (37.70) @2400 engine rpm, reverse 1.20 (1.93), 3.03 (4.87), 3.72 (5.99), 6.56 (10.55) @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 at 1978 engine rpm or 1000 rpm at 2179 engine rpm) Unladen tractor mass 19345 lb (8775 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					
165.39 (123.33)	2200	9.59 (36.28)	0.410 (0.249)	17.25 (3.40)	
188.26 (140.38)	2000	10.08 (38.17)	0.379 (0.230)	18.67 (3.68)	

VARYING POWER AND FUEL CONSUMPTION

165.39 (123.33)	2200	9.59 (36.28)	0.410 (0.249)	17.25 (3.40)	Air temperature
144.35 (107.64)	2256	8.87 (33.59)	0.434 (0.264)	16.27 (3.21)	74°F (23°C)
108.31 (80.77)	2265	7.26 (27.48)	0.474 (0.288)	14.92 (2.94)	Relative humidity
72.65 (54.18)	2276	5.60 (21.21)	0.545 (0.332)	12.97 (2.55)	58%
36.38 (27.13)	2284	4.12 (15.59)	0.800 (0.487)	8.84 (1.74)	Barometer
1.00 (0.75)	2290	2.67 (10.12)	18.890 (11.490)	0.37 (0.07)	29.01" Hg (98.24 kPa)

Maximum Torque - 586 lb.-ft. (794 Nm) at 1000 rpm

Maximum Torque Rise -48.2%

Torque rise at 1799 engine rpm - 36%

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 7th Gear									
144.65 (107.87)	12430 (55.29)	4.36 (7.02)	2199	3.81	0.467 (0.284)	15.14 (2.98)	199 (93)	60 (16)	28.64 (96.99)
75% of Pull at Maximum Power 7th Gear									
112.56 (83.94)	9299 (41.36)	4.54 (7.31)	2262	2.72	0.511 (0.311)	13.83 (2.72)	194 (90)	60 (16)	28.69 (97.16)
50% of Pull at Maximum Power 7th Gear									
75.98 (56.66)	6201 (27.58)	4.60 (7.40)	2270	1.98	0.597 (0.363)	11.83 (2.33)	187 (86)	59 (15)	28.70 (97.19)
75% of Pull at Reduced Engine Speed 9th Gear									
112.56 (83.94)	9322 (41.46)	4.53 (7.29)	1772	2.63	0.438 (0.266)	16.15 (3.18)	193 (89)	60 (16)	28.69 (97.16)
50% of Pull at Reduced Engine Speed 9th Gear									
75.91 (56.61)	6222 (27.68)	4.58 (7.36)	1776	1.89	0.490 (0.298)	14.42 (2.84)	188 (87)	59 (15)	28.70 (97.19)

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	Temp. °C Air dry bulb	Barom. inch Hg (kPa)
4th Gear									
131.17 (97.81)	19272 (85.72)	2.55 (4.11)	2203	13.24	0.517 (0.314)	13.67 (2.69)	193 (89)	63 (17)	28.61 (96.88)
5th Gear									
151.84 (113.22)	18528 (82.42)	3.07 (4.95)	2090	8.99	0.460 (0.280)	15.38 (3.03)	195 (90)	61 (16)	28.62 (96.92)
6th Gear									
161.15 (120.17)	18011 (80.12)	3.36 (5.40)	1998	7.94	0.439 (0.267)	16.11 (3.17)	200 (93)	60 (16)	28.63 (96.95)
7th Gear									
164.41 (122.60)	15838 (70.45)	3.89 (6.27)	1997	5.49	0.431 (0.262)	16.38 (3.23)	201 (94)	60 (16)	28.63 (96.95)
8th Gear									
165.00 (123.04)	13922 (61.93)	4.44 (7.15)	1998	4.52	0.430 (0.261)	16.45 (3.24)	204 (95)	59 (15)	28.65 (97.02)
9th Gear									
163.90 (122.22)	12168 (54.12)	5.05 (8.13)	1999	3.99	0.433 (0.263)	16.33 (3.22)	204 (95)	59 (15)	28.66 (97.05)
10th Gear									
164.31 (122.53)	10732 (47.74)	5.74 (9.24)	2002	3.27	0.430 (0.261)	16.44 (3.24)	202 (94)	58 (14)	28.68 (97.12)
11th Gear									
162.17 (120.93)	9330 (41.50)	6.52 (10.49)	1998	2.90	0.437 (0.266)	16.16 (3.18)	203 (95)	58 (14)	28.69 (97.16)
12th Gear									
160.76 (119.88)	8155 (36.28)	7.39 (11.90)	2000	2.44	0.439 (0.267)	16.08 (3.17)	205 (96)	60 (16)	28.69 (97.16)
13th Gear									
157.42 (117.39)	6241 (27.76)	9.46 (15.22)	2001	1.98	0.451 (0.274)	15.69 (3.09)	205 (96)	60 (16)	28.69 (97.16)

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 111°F(44°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. **1772**, Nebraska Summary 307, 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 7th gear	72.1	72.4
Transport speed-no load- 16th gear		74.5
Bystander in 16th Gear		88.7

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi(kPa)	Four 18.4R46;**;11(75)	Two 18.4R46;**;18(125)
Ballast - Duals (total)	1760 lb (798 kg)	None
- Cast Iron (total)	1285 lb (582 kg)	None
Front Tires - No., size, ply & psi(kPa)	Two 14.9R34;***;28(195)	Two 14.9R34;***;24(165)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	555 lb (252 kg)	None
Height of Drawbar	22.0 in (560 mm)	21.0 in(535 mm)
Static Weight with operator - Rear	14430 lb (6545 kg)	11545 lb(5237 kg)
- Front	8680 lb (3937 kg)	7965 lb(3613 kg)
- Total	23110 lb(10482 kg)	19510 lb(8850 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)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
3rd Gear									
128.43 (95.77)	23838 (106.03)	2.02 (3.25)	2252	13.52	0.527 (0.320)	13.42 (2.64)	192 (89)	63 (17)	28.78 (97.46)
4th Gear									
151.24 (112.78)	22646 (100.73)	2.50 (4.03)	2068	8.57	0.465 (0.283)	15.19 (2.99)	195 (91)	64 (18)	28.78 (97.46)
5th Gear									
163.62 (122.01)	20236 (90.01)	3.03 (4.88)	1999	5.66	0.434 (0.264)	16.27 (3.20)	200 (93)	65 (18)	28.78 (97.46)
6th Gear									
164.27 (122.49)	17780 (79.09)	3.46 (5.58)	1998	4.27	0.432 (0.263)	16.36 (3.22)	199 (93)	66 (19)	28.79 (97.49)
7th Gear									
164.89 (122.96)	15640 (69.57)	3.95 (6.36)	2000	3.83	0.429 (0.261)	16.47 (3.24)	201 (94)	67 (19)	28.79 (97.49)
8th Gear									
164.95 (123.00)	13777 (61.28)	4.49 (7.23)	2001	3.11	0.430 (0.261)	16.45 (3.24)	203 (95)	68 (20)	28.79 (97.49)
9th Gear									
164.36 (122.56)	12127 (53.94)	5.08 (8.18)	2000	2.65	0.433 (0.263)	16.33 (3.22)	204 (96)	68 (20)	28.79 (97.49)
10th Gear									
163.24 (121.73)	10611 (47.20)	5.77 (9.28)	2005	2.29	0.433 (0.263)	16.32 (3.22)	201 (94)	69 (21)	28.78 (97.46)
11th Gear									
161.10 (120.13)	9243 (41.11)	6.54 (10.52)	2000	2.01	0.439 (0.267)	16.09 (3.17)	203 (95)	69 (21)	28.78 (97.46)
12th Gear									
160.27 (119.51)	8128 (36.16)	7.39 (11.90)	2000	1.75	0.438 (0.267)	16.12 (3.17)	201 (94)	71 (22)	28.78 (97.46)
13th Gear									
156.77 (116.91)	6218 (27.66)	9.46 (15.22)	2002	1.36	0.452 (0.275)	15.63 (3.08)	201 (94)	71 (22)	28.78 (97.46)

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 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									
127.60 (95.15)	23813 (105.93)	2.01 (3.23)	2252	14.03	0.528 (0.321)	13.38 (2.64)	192 (89)	63 (17)	28.78 (97.46)
4th Gear									
142.15 (106.00)	19232 (85.55)	2.77 (4.46)	2198	4.89	0.477 (0.290)	14.83 (2.92)	197 (92)	64 (18)	28.78 (97.46)
5th Gear									
145.29 (108.34)	15993 (71.14)	3.41 (5.48)	2202	3.56	0.464 (0.282)	15.22 (3.00)	198 (92)	66 (19)	28.79 (97.49)
6th Gear									
145.34 (108.38)	14115 (62.79)	3.86 (6.21)	2200	3.11	0.464 (0.282)	15.22 (3.00)	199 (93)	66 (19)	28.79 (97.49)
7th Gear									
144.38 (107.66)	12324 (54.82)	4.39 (7.07)	2202	2.74	0.468 (0.284)	15.12 (2.98)	200 (93)	68 (20)	28.80 (97.53)
8th Gear									
144.83 (108.00)	10924 (48.59)	4.97 (8.00)	2201	2.38	0.466 (0.283)	15.17 (2.99)	200 (93)	68 (20)	28.80 (97.53)
9th Gear									
142.69 (106.41)	9506 (42.28)	5.63 (9.06)	2202	2.19	0.473 (0.288)	14.95 (2.94)	198 (92)	68 (20)	28.79 (97.49)
10th Gear									
142.16 (106.01)	8376 (37.26)	6.36 (10.24)	2201	2.01	0.473 (0.288)	14.95 (2.94)	198 (92)	69 (21)	28.78 (97.46)
11th Gear									
138.09 (102.98)	7162 (31.86)	7.23 (11.64)	2203	1.64	0.489 (0.298)	14.44 (2.85)	199 (93)	70 (21)	28.78 (97.46)
12th Gear									
137.42 (102.48)	6320 (28.11)	8.15 (13.12)	2198	1.45	0.495 (0.301)	14.28 (2.81)	198 (92)	70 (21)	28.78 (97.46)

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

1x80 mm&1x90 mm

9617 lb (42.8 kN)

NA

2920 psi (201 bar)

two outlet sets combined

35.1 GPM(132.9 l/min)

44.3 GPM(167.7 l/min)

33.2 GPM(125.7 l/min)

41.2 GPM(156.0 l/min)

2550 psi (176 bar)

2420 psi (167 bar)

49.4 HP (36.8 kW)

58.2 HP (43.4 kW)

single outlet set

31.8 GPM(120.4 l/min)

30.6 GPM(115.8 l/min)

30.4 GPM(115.1 l/min)

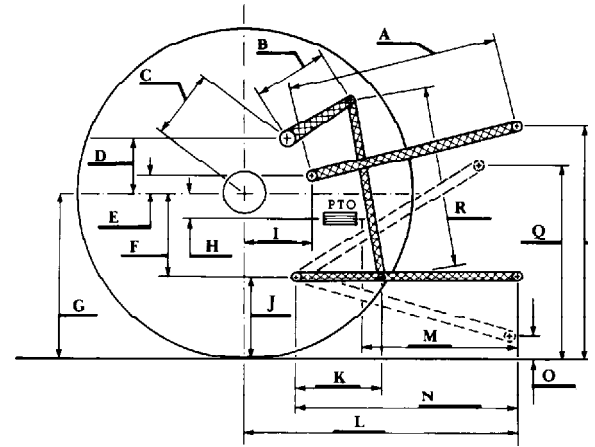
28.5 GPM(107.9 l/min)

2250 psi (155 bar)

2150 psi (148 bar)

39.9 HP (29.8 kW)

35.7 HP (26.7 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 (1) 80 mm and (1) 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

10967

10611

10647

10440

9599

" " " " " " (kN)

(48.8)

(47.2)

(47.4)

(46.4)

(42.7)

with lift cylinders (1) 90 mm and (1) 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

15413

14990

14990

14621

13689

" " " " " " (kN)

(68.6)

(66.7)

(66.7)

(63.0)

(60.9)

ASAE Static Test System pressure 2900 psi (200 Bar)
with lift cylinders (1) 80 mm and (1) 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

12020

11694

11733

11474

10518

" " " " " " (kN)

(53.5)

(52.0)

(52.2)

(51.0)

(46.8)

with lift cylinders (1) 90 mm and (1) 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

16922

16458

16458

16132

15011

" " " " " " (kN)

(75.3)

(73.2)

(73.2)

(71.8)

(66.8)

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 8110 DIESEL

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