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January 1995

Test 1691: John Deere 8400 Diesel 16-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1691—SUMMARY 177

JOHN DEERE 8400 DIESEL

16 SPEED

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

Dates of Test: April 12 to May 9, 1995

Manufacturer: John Deere Tractor Works, P.O.
Box 270, Waterloo, Iowa 50704

FUEL OIL and TIME: **Fuel** No. 2 Diesel **Cetane No.** 50.6 **Specific gravity converted to 60°/60° F (15°/15°C)** 0.8374 **Fuel weight** 6.972 lbs/gal (0.836 kg/l) **Oil** SAE 15W-40 **API service classification** CD, CE, CF-4 **To motor** 6.351 gal (24.055 l) **Drained from motor** 5.987 gal (22.663 l) **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant **Total time engine was operated** 25.0 hours.

ENGINE: **Make** John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *RG6081H000468* **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** (as specified) 4.56" × 5.06" (115.8 mm × 128.5 mm) **Compression ratio** 15.8 to 1 **Displacement** 495 cu in (8120 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 return fuel **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: **Fuel rate:** 85.1-93.9 lb/h (38.6-42.6 kg/h) **High idle:** 2275-2325 rpm **Turbo boost** nominal 19.7-24.1 psi (136-166 kPa) as measured 21.9 psi (151 kPa)

CHASSIS: **Type** front wheel assist **Serial No.** *RW8400P 001301* **Tread width** rear 60.0" (1524 mm) to 108.3" (2752 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheel base** 116.1"(2950 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **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 (16.36) fourteenth 12.99 (20.91) fifteenth 16.53 (26.61) sixteenth 21.13 (34.01) reverse 1.18 (1.90), 2.98(4.79), 3.36 (5.40), 6.45 (10.38) — 1600 engine rpm **Clutch** multiple wet disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 1000 rpm at 2180 engine rpm **Unladen tractor mass** 19190 lb (8705 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)					
228.29 (170.24)	2200	12.60 (47.68)	0.385 (0.234)	18.12 (3.57)	
Maximum Power (2 hours)					
252.21 (188.07)	1999	13.15 (49.79)	0.364 (0.221)	19.18 (3.78)	

VARYING POWER AND FUEL CONSUMPTION

228.29 (170.24)	2200	12.60 (47.68)	0.385 (0.234)	18.12 (3.57)	Air temperature
198.51 (148.03)	2262	11.27 (42.68)	0.396 (0.241)	17.61 (3.47)	76°F (24°C)
147.83 (110.24)	2273	8.99 (34.04)	0.424 (0.258)	16.44 (3.24)	Relative humidity
100.16 (74.69)	2282	6.84 (25.90)	0.476 (0.290)	14.64 (2.88)	37%
50.00 (37.28)	2291	4.65 (17.59)	0.648 (0.394)	10.76 (2.12)	Barometer
1.00 (0.75)	2299	2.58 (9.77)	17.936 (10.910)	0.39 (0.08)	28.89"Hg (97.83 kPa)

Maximum Torque 777 lb.-ft. (1054 Nm) at 1401 rpm
Maximum Torque Rise 42.6%
Torque rise at 1801 engine rpm 30%

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									
202.28 (150.84)	15928 (70.85)	4.76 (7.66)	2199	5.04	0.433 (0.263)	16.12 (3.17)	196 (91)	55 (13)	28.87 (97.77)
75% of Pull at Maximum Power—8th Gear									
158.87 (118.47)	11928 (53.06)	4.99 (8.04)	2260	3.12	0.450 (0.274)	15.50 (3.05)	194 (90)	61 (16)	28.86 (97.73)
50% of Pull at Maximum Power—8th Gear									
108.03 (80.56)	7958 (35.40)	5.09 (8.19)	2277	2.03	0.503 (0.306)	13.87 (2.73)	185 (85)	61 (16)	28.86 (97.73)
75% of Pull at Reduced Engine Speed—10th Gear									
158.43 (118.14)	11925 (53.05)	4.98 (8.02)	1771	3.12	0.405 (0.246)	17.21 (3.39)	194 (90)	61 (16)	28.86 (97.73)
50% of Pull at Reduced Engine Speed—10th Gear									
107.71 (80.32)	7955 (35.39)	5.08 (8.17)	1784	2.21	0.441 (0.268)	15.83 (3.12)	185 (85)	61 (16)	28.86 (97.73)

DRAWBAR PERFORMANCE AT 2000 RPM
(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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
6th Gear									
176.85 (131.87)	19130 (85.09)	3.47 (5.58)	2258	14.05	0.488 (0.297)	14.30 (2.82)	193 (89)	54 (12)	28.87 (97.77)
7th Gear									
197.64 (147.38)	18677 (83.08)	3.97 (6.39)	2154	9.46	0.447 (0.272)	15.58 (3.07)	196 (91)	54 (12)	28.87 (97.77)
8th Gear									
209.50 (156.22)	18261 (81.23)	4.30 (6.92)	2070	8.75	0.435 (0.264)	16.03 (3.16)	198 (92)	55 (13)	28.87 (97.77)
9th Gear									
218.15 (162.67)	16978 (75.52)	4.82 (7.75)	2001	6.39	0.419 (0.255)	16.65 (3.28)	200 (93)	56 (13)	28.87 (97.77)
10th Gear									
221.68 (165.31)	14946 (66.48)	5.56 (8.95)	2006	4.52	0.411 (0.250)	16.98 (3.34)	203 (95)	56 (13)	28.87 (97.77)
11th Gear									
221.77 (165.37)	13142 (58.46)	6.33 (10.18)	1996	3.65	0.407 (0.247)	17.14 (3.38)	201 (94)	57 (14)	28.87 (97.77)
12th Gear									
221.32 (165.04)	11525 (51.26)	7.20 (11.59)	2001	3.12	0.409 (0.249)	17.05 (3.36)	196 (91)	59 (15)	28.87 (97.77)
13th Gear									
220.03 (164.08)	8941 (39.77)	9.23 (14.85)	1999	2.21	0.410 (0.249)	17.02 (3.35)	204 (95)	60 (16)	28.87 (97.77)

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum sound level in 11th gear	76.0
Transport speed -- no load -- 16th gear	77.5
Bystander in 16th gear	89.5

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Rear Tires -- No., size, ply & psi (kPa)	Four 20.8R42; **, 12 (85)	Two 20.8R42; **, 13 (90)
Ballast -- Duals (total)	1972 lb (895 kg)	None
-- Cast Iron (total)	6140 lb (2785 kg)	None
Front Tires -- No., size, ply & psi (kPa)	Two 16.9R30; **, 23 (160)	Two 16.9R30; **, 22 (150)
Ballast -- Liquid (total)	None	None
-- Cast Iron (total)	2094 lb (950 kg)	None
Height of Drawbar	20.5 in (520 mm)	20.0 in (510 mm)
Static Weight with Operator -- Rear	18830 lb (8541 kg)	11620 lb (5271 kg)
-- Front	10732 lb (4868 kg)	7736 lb (3509 kg)
-- Total	29562 lb (13409 kg)	19356 lb (8780 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. The pull in 3rd gear (ballasted tractor) was limited to avoid excessive tractor bouncing. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 167°F (75°C). The performance results on this summary were taken from OECD tests conducted under the Code II Restricted Standard Test Code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1691**, Summary 177, July 12, 1995.

LOUIS I. LEVITICUS
Engineer-in-Charge

L.L. BASHFORD
R.D. GRISSO
M. F. KOCHER
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE AT 2000 RPM
(Ballasted—Front Drive Engaged)
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kV)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kWh)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd Gear									
163.18 (121.69)	29240 (130.07)	2.09 (3.37)	2263	9.33	0.473 (0.288)	14.73 (2.90)	187 (86)	53 (12)	29.14 (98.68)
4th Gear									
193.91 (144.60)	28306 (125.91)	2.57 (4.13)	2160	8.70	0.455 (0.277)	15.33 (3.02)	195 (90)	57 (14)	29.14 (98.68)
5th Gear									
212.46 (158.43)	27421 (121.97)	2.91 (4.68)	2000	7.90	0.425 (0.259)	16.39 (3.23)	198 (92)	60 (16)	29.11 (98.58)
6th Gear									
219.69 (163.82)	24431 (108.67)	3.37 (5.43)	1999	5.25	0.409 (0.249)	17.03 (3.36)	200 (93)	60 (16)	29.10 (98.54)
7th Gear									
222.01 (165.55)	21542 (95.82)	3.86 (6.22)	1998	4.05	0.403 (0.245)	17.28 (3.40)	200 (93)	61 (16)	29.08 (98.48)
8th Gear									
222.03 (165.57)	18950 (84.29)	4.39 (7.07)	1998	3.43	0.405 (0.247)	17.20 (3.39)	199 (93)	61 (16)	29.09 (98.51)
9th Gear									
221.15 (164.91)	16613 (73.90)	4.99 (8.03)	2001	2.90	0.406 (0.247)	17.15 (3.38)	201 (94)	62 (16)	29.08 (98.48)
10th Gear									
221.04 (164.83)	14662 (65.22)	5.65 (9.10)	2000	2.45	0.406 (0.247)	17.15 (3.38)	200 (93)	62 (16)	29.07 (98.44)
11th Gear									
220.22 (164.22)	12850 (57.16)	6.43 (10.34)	2002	2.09	0.407 (0.247)	17.14 (3.38)	202 (94)	63 (17)	29.06 (98.41)
12th Gear									
218.72 (163.10)	111310 (50.31)	7.25 (11.67)	1996	1.81	0.410 (0.249)	17.02 (3.35)	202 (94)	63 (17)	29.06 (98.41)
13th Gear									
216.00 (161.07)	8756 (38.95)	9.25 (14.89)	1992	1.26	0.412 (0.250)	16.94 (3.34)	203 (95)	63 (17)	29.06 (98.41)

DRAWBAR PERFORMANCE AT 2200 RPM
(Ballasted—Front Drive Engaged)
MAXIMUM POWER IN SELECTED GEARS

3rd Gear									
162.51 (121.19)	29123 (129.54)	2.09 (3.37)	2263	9.40	0.474 (0.288)	14.71 (2.90)	189 (87)	53 (12)	29.14 (98.68)
4th Gear									
191.61 (142.89)	27036 (120.26)	2.66 (4.28)	2199	7.25	0.455 (0.277)	15.33 (3.02)	193 (89)	60 (16)	29.13 (98.65)
5th Gear									
202.31 (150.86)	22899 (101.86)	3.31 (5.33)	2198	4.57	0.431 (0.262)	16.19 (3.19)	194 (90)	60 (16)	29.12 (98.61)
6th Gear									
202.86 (151.28)	20208 (89.89)	3.76 (6.06)	2194	3.70	0.427 (0.260)	16.32 (3.21)	197 (91)	60 (16)	29.10 (98.54)
7th Gear									
203.60 (151.82)	17761 (79.00)	4.30 (6.92)	2199	2.99	0.425 (0.258)	16.41 (3.23)	199 (93)	61 (16)	29.08 (98.48)
8th Gear									
201.27 (150.09)	15486 (68.88)	4.87 (7.84)	2199	2.63	0.428 (0.261)	16.28 (3.21)	196 (91)	62 (17)	29.09 (98.51)
9th Gear									
201.24 (150.07)	13688 (60.89)	5.51 (8.87)	2198	2.36	0.428 (0.260)	16.28 (3.21)	200 (93)	62 (17)	29.09 (98.51)
10th Gear									
198.20 (147.80)	11889 (52.88)	6.25 (10.06)	2201	2.00	0.433 (0.263)	16.10 (3.17)	197 (92)	62 (17)	29.07 (98.44)
11th Gear									
197.57 (147.32)	10448 (46.48)	7.09 (11.41)	2199	1.63	0.434 (0.264)	16.07 (3.16)	199 (93)	63 (17)	29.06 (98.41)
12th Gear									
195.43 (145.74)	9158 (40.73)	8.00 (12.88)	2195	1.54	0.439 (0.267)	15.88 (3.13)	199 (93)	63 (17)	29.06 (98.41)

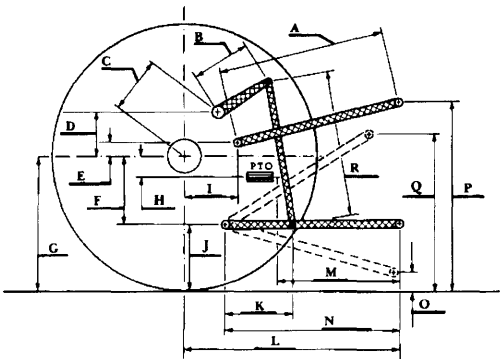
THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III			
Quick Attach: yes			
Maximum Force Exerted Through Whole Range:			
	10827 lbs	(48.2 kN)	
	15147 lbs	(67.4 kN)	(with lift cylinders (2) 100 mm)
i) Opening pressure of relief valve:	NA		
Sustained pressure with pump stalled:	2890 psi	(199 bar)	
ii) Pump delivery rate at minimum pressure:	30.5 GPM	(115.5 l/min)	
iii) Pump delivery rate at maximum			
hydraulic power:	28.3 GPM	(107.1 l/min)	
Delivery pressure:	2650 psi	(183 bar)	
Power:	43.8 HP	(32.6 kW)	

THREE POINT LIFT 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

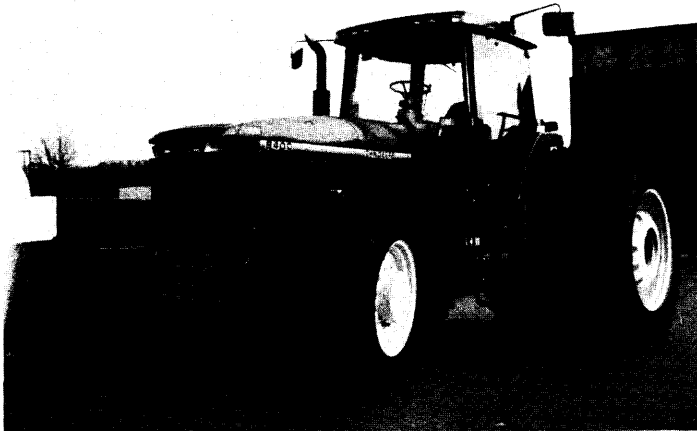
As per current SAE test procedures					
with lift cylinders (2) 90 mm					
Hitch point distance					
to ground level in. (mm)	8.0 (203)	16.0 (406)	24.0 (610)	32.0 (813)	40.0 (1016)
Lift force on frame lb.	11637	12371	11957	11642	10755
" " " " (kN)	(51.8)	(55.0)	(53.2)	(51.8)	(47.8)
with lift cylinders (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)
As per current ASAE test procedures					
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 end of Quick Attach



JOHN DEERE 8400 DIESEL