

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

January 2000

Test 1778: John Deere 8410T and 8420T Diesel 16-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Nebraska Tractor Test Lab, "Test 1778: John Deere 8410T and 8420T Diesel 16-Speed" (2000). *Nebraska Tractor Tests*. 2173.

<https://digitalcommons.unl.edu/tractormuseumlit/2173>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA OECD TRACTOR TEST 1778-SUMMARY 313

JOHN DEERE 8410T DIESEL

ALSO JOHN DEERE 8420T 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	1009 rpm)	
236.75 (176.54)	2200	13.66 (51.70)	0.408 (0.248)	17.33 (3.41)	
		Maximum Power (2 hours)			
270.62 (201.80)	2000	14.60 (55.25)	0.381 (0.232)	18.54 (3.65)	
VARYING POWER AND FUEL CONSUMPTION					
236.75 (176.54)	2200	13.66 (51.70)	0.408 (0.248)	17.33 (3.41)	Air temperature
206.22 (153.78)	2254	12.40 (46.92)	0.425 (0.258)	16.64 (3.28)	74°F (24°C)
155.19 (115.73)	2264	9.89 (37.44)	0.450 (0.274)	15.69 (3.09)	Relative humidity
104.46 (77.89)	2275	7.60 (28.76)	0.514 (0.313)	13.75 (2.71)	43%
51.93 (38.72)	2285	5.14 (19.44)	0.699 (0.425)	10.11 (1.99)	Barometer
2.50 (1.87)	2293	3.06 (11.57)	8.627 (5.248)	0.82 (0.16)	28.92" Hg (97.93 kPa)
Maximum Torque - 844 lb.-ft. (1144 Nm) at 1400 rpm					
Maximum Torque Rise - 49.3%					
Torque rise at 1798 engine rpm - 36%					

DRAWBAR PERFORMANCE(Unballasted)

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	10th Gear			
205.84 (153.50)	14723 (65.49)	5.24 (8.44)	2201	2.05	0.471 (0.286)	15.01 (2.96)	198 (92)	56 (13)	29.22 (98.95)
					75% of Pull at Maximum Power	10th Gear			
159.65 (119.05)	11027 (49.05)	5.43 (8.74)	2260	1.27	0.505 (0.307)	14.01 (2.76)	195 (91)	60 (16)	29.16 (98.75)
					50% of Pull at Maximum Power	10th Gear			
107.62 (80.25)	7361 (32.74)	5.48 (8.82)	2271	0.72	0.581 (0.353)	12.16 (2.40)	187 (86)	63 (17)	29.12 (98.61)
					75% of Pull at Reduced Engine Speed	12th Gear			
159.67 (119.07)	11001 (48.93)	5.44 (8.76)	1774	1.12	0.446 (0.272)	15.83 (3.12)	191 (88)	61 (16)	29.15 (98.71)
					50% of Pull at Reduced Engine Speed	12th Gear			
107.62 (80.25)	7353 (32.71)	5.49 (8.83)	1780	0.72	0.498 (0.303)	14.19 (2.79)	187 (86)	63 (17)	29.12 (98.61)

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

Dates of Test: April 7-27, 2000

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) 0.8487 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 Total time engine was operated: 32.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air aftercooler **Serial No.** *RG6081H098907* **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 25.1 psi (173 kPa)

CHASSIS: Type tracklayer-rubber tracked **Serial No.** *RW8410T901086* **Track width** 88.0" (2235 mm) to 119.5 (3035 mm) **Length of track on ground** 89.0" (2261 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 1.16 (1.87) second 1.49 (2.39) third 1.89 (3.04) fourth 2.41 (3.88) fifth 2.92 (4.70) sixth 3.30 (5.31) seventh 3.73 (6.01) eighth 4.21 (6.78) ninth 4.75 (7.65) tenth 5.36 (8.63) eleventh 6.07 (9.77) twelfth 6.85 (11.02) thirteenth 8.71 (14.02) fourteenth 11.13 (17.91) fifteenth 14.17 (22.80) sixteenth 18.10 (29.13) reverse 1.01 (1.63), 2.55 (4.10), 2.88 (4.63), 5.53 (8.90) @ 1600 engine rpm **Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated foot pedal **Steering** electro-hydraulic differential steering controlled by steering wheel **Power take-off** 1000 rpm at 2179 engine rpm **Unladen tractor mass** 26380 lb (11965 kg)

DRAWBAR PERFORMANCE (Unballasted)

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									
117.32 (87.48)	27233 (121.14)	1.62 (2.60)	2200	14.29	0.586 (0.356)	12.06 (2.38)	181 (83)	48 (9)	28.95 (98.04)
4th Gear									
133.29 (99.39)	23421 (104.18)	2.13 (3.43)	2135	8.64	0.528 (0.321)	13.40 (2.64)	183 (84)	50 (10)	29.30 (99.22)
5th Gear									
159.89 (119.23)	23124 (102.86)	2.59 (4.17)	2126	8.04	0.500 (0.304)	14.13 (2.78)	185 (85)	51 (11)	29.29 (99.19)
6th Gear									
180.16 (134.34)	22981 (102.22)	2.94 (4.73)	2126	7.56	0.487 (0.296)	14.52 (2.86)	190 (88)	52 (11)	29.28 (99.15)
7th Gear									
206.85 (154.25)	23133 (102.90)	3.35 (5.40)	2147	7.84	0.483 (0.294)	14.64 (2.88)	195 (91)	52 (11)	29.27 (99.12)
8th Gear									
221.77 (163.38)	23039 (102.48)	3.61 (5.81)	2046	7.77	0.467 (0.284)	15.14 (2.98)	201 (94)	53 (12)	29.26 (99.09)
9th Gear									
229.71 (171.29)	21167 (94.15)	4.07 (6.55)	2001	5.61	0.452 (0.275)	15.64 (3.08)	207 (97)	54 (12)	29.25 (99.05)
10th Gear									
232.61 (173.45)	18651 (82.96)	4.68 (7.53)	2000	3.71	0.445 (0.271)	15.89 (3.13)	201 (94)	55 (13)	29.23 (98.98)
11th Gear									
231.96 (172.98)	16228 (72.19)	5.36 (8.63)	1999	2.51	0.445 (0.271)	15.87 (3.13)	204 (95)	57 (14)	29.21 (98.92)
12th Gear									
231.18 (172.39)	14238 (63.33)	6.09 (9.80)	1999	1.90	0.446 (0.272)	15.83 (3.12)	199 (93)	58 (14)	29.19 (98.85)
13th Gear									
229.19 (170.91)	10980 (48.84)	7.83 (12.60)	2004	1.20	0.447 (0.272)	15.80 (3.11)	207 (97)	58 (14)	29.18 (98.82)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE: The 8410T engine has an electronic control system which provides a vehicle protection system to avoid overloading the drive train. This system provides four different engine power levels. The engine produces up to 165 PTO hp when the transmission is in forward gears 1 through 4 and the PTO is not engaged. The engine produces up to 185 PTO hp when the transmission is in 5th forward gear and the PTO is not engaged. The engine produces up to 205 PTO hp when the transmission is in 6th forward gear and the PTO is not engaged. The engine produces up to 235 PTO Hp in all other applications.

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 126°F(52°C). The performance figures on this summary were taken from a test conducted under the OECD Code II test code procedure.

Note: Report reprinted. Supplemental permit for John Deere 8420T Diesel, July 2002.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1778**, Nebraska Summary 313, July 23, 2002.

Brent T. Sampson
Test Engineer

L.L. Bashford
G.J. Hoffman
V.I. Adamchuk
Board of Tractor Test Engineers

TIRES, BALLAST AND WEIGHT

	With Ballast	Without Ballast
Track width	30.0 in (760 mm)	30.0 in (760 mm)
Ballast - Cast iron(front)	2250 lb (1021 kg)	None
Height of Drawbar	18.5 in (470 mm)	18.5 in (470 mm)
Static Weight with operator	28795 lb(13061 kg)	26545 lb(12040 kg)

DRAWBAR PERFORMANCE
(Ballasted at 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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2nd Gear									
105.93 (78.99)	30541 (135.85)	1.30 (2.09)	2253	14.44	0.619 (0.376)	11.43 (2.25)	178 (81)	45 (7)	29.10 (98.54)
3rd Gear									
133.02 (99.19)	30091 (133.85)	1.66 (2.67)	2149	10.25	0.530 (0.322)	13.34 (2.63)	181 (83)	41 (5)	29.06 (98.41)
4th Gear									
147.43 (109.94)	27038 (120.27)	2.04 (3.29)	2002	6.89	0.483 (0.294)	14.62 (2.88)	183 (84)	41 (5)	29.06 (98.41)
5th Gear									
175.00 (130.50)	26326 (117.10)	2.49 (4.01)	2000	6.19	0.457 (0.278)	15.45 (3.04)	185 (85)	44 (7)	29.05 (98.37)
6th Gear									
197.29 (147.12)	26400 (117.43)	2.80 (4.51)	2001	6.47	0.453 (0.276)	15.60 (3.07)	187 (86)	44 (7)	29.05 (98.37)
7th Gear									
225.15 (167.90)	26878 (119.56)	3.14 (5.06)	2000	7.44	0.457 (0.278)	15.47 (3.05)	199 (93)	47 (8)	29.04 (98.34)
8th Gear									
231.93 (172.95)	23961 (106.58)	3.63 (5.84)	1998	5.12	0.442 (0.269)	15.99 (3.15)	203 (95)	49 (9)	29.03 (98.31)
9th Gear									
235.13 (175.34)	21175 (94.19)	4.16 (6.70)	2000	3.57	0.435 (0.264)	16.25 (3.20)	206 (96)	51 (11)	29.02 (98.27)
10th Gear									
235.55 (175.65)	18602 (82.75)	4.75 (7.64)	2002	2.59	0.435 (0.265)	16.23 (3.20)	197 (92)	52 (11)	29.01 (98.24)
11th Gear									
234.80 (175.09)	16253 (72.30)	5.42 (8.72)	2003	1.98	0.437 (0.266)	16.16 (3.18)	209 (98)	55 (13)	28.97 (98.10)
12th Gear									
232.28 (173.21)	14199 (63.16)	6.13 (9.87)	2002	1.44	0.439 (0.267)	16.09 (3.17)	199 (93)	56 (13)	28.96 (98.07)
13th Gear									
227.68 (169.78)	10874 (48.37)	7.85 (12.64)	2002	1.04	0.450 (0.274)	15.71 (3.10)	209 (98)	57 (14)	28.94 (98.00)

TRACTOR SOUND LEVEL WITH CAB

dB(A)

At no load in 9th gear	75.7
Transport speed-no load-16th gear	79.1
Bystander in 16th Gear	89.7

DRAWBAR PERFORMANCE
(Ballasted at 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)	Consumption Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2nd Gear									
103.98 (77.54)	30086 (133.83)	1.30 (2.09)	2253	14.73	0.623 (0.379)	11.34 (2.23)	179 (82)	50 (10)	29.10 (98.54)
3rd Gear									
128.82 (96.06)	27359 (121.70)	1.77 (2.84)	2200	6.54	0.530 (0.322)	13.34 (2.63)	181 (83)	41 (5)	29.07 (98.44)
4th Gear									
132.05 (98.47)	21208 (94.34)	2.33 (3.76)	2201	3.35	0.514 (0.313)	13.74 (2.71)	181 (83)	42 (6)	29.06 (98.40)
5th Gear									
158.53 (118.22)	21016 (93.48)	2.83 (4.55)	2200	3.20	0.484 (0.295)	14.59 (2.87)	184 (84)	44 (7)	29.06 (98.40)
6th Gear									
178.69 (133.25)	21009 (93.45)	3.19 (5.13)	2201	3.27	0.473 (0.288)	14.94 (2.94)	183 (84)	45 (7)	29.05 (98.37)
7th Gear									
206.78 (154.19)	21529 (95.77)	3.60 (5.80)	2199	3.42	0.464 (0.282)	15.25 (3.00)	188 (87)	46 (8)	29.05 (98.37)
8th Gear									
207.28 (154.57)	18961 (84.34)	4.10 (6.60)	2202	2.82	0.466 (0.283)	15.17 (2.99)	198 (92)	51 (11)	29.03 (98.31)
9th Gear									
206.61 (154.07)	16644 (74.03)	4.66 (7.49)	2201	2.06	0.468 (0.284)	15.12 (2.98)	194 (90)	51 (11)	29.02 (98.27)
10th Gear									
205.79 (153.46)	14621 (65.04)	5.28 (8.49)	2201	1.51	0.466 (0.283)	15.17 (2.99)	193 (89)	53 (12)	29.00 (98.21)
11th Gear									
202.13 (150.73)	12640 (56.23)	6.00 (9.65)	2201	1.28	0.473 (0.288)	14.94 (2.94)	197 (91)	54 (12)	28.99 (98.17)
12th Gear									
200.37 (149.42)	11069 (49.24)	6.79 (10.93)	2200	0.97	0.478 (0.291)	14.80 (2.91)	197 (91)	56 (13)	28.96 (98.07)
13th Gear									
194.16 (144.79)	8418 (37.45)	8.65 (13.92)	2201	0.89	0.494 (0.300)	14.31 (2.82)	198 (92)	57 (14)	28.94 (98.00)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: yes

Maximum Force Exerted Through Whole Range: 16520 lbs (73.5 kN)

i) Opening pressure of relief valve: NA

Sustained pressure at compensator cutoff: 2900 psi (200 bar) High flow option
2930 psi (202 bar)
two outlet sets combined

ii) Pump delivery rate at minimum pressure and rated engine speed: 34.7 GPM (131.4 l/min) 43.3 GPM (163.9 l/min)

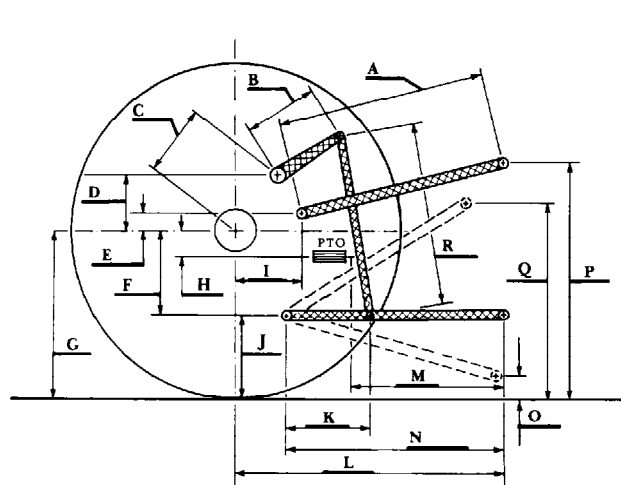
iii) Pump delivery rate at maximum hydraulic power: 32.8 GPM (124.2 l/min) 41.0 GPM (155.2 l/min)
Delivery pressure: 2540 psi (175 bar) 2370 psi (163 bar)
Power: 48.6 HP (36.2 kW) 56.7 HP (42.3 kW)

single outlet set

ii) Pump delivery rate at minimum pressure and rated engine speed: 31.4 GPM (118.9 l/min) 32.2 GPM (121.9 l/min)

iii) Pump delivery rate at maximum hydraulic power: 29.9 GPM (124.2 l/min) 27.7 GPM (104.9 l/min)
Delivery pressure: 2200 psi (152 bar) 2250 psi (155 bar)
Power: 38.4 HP (28.6 kW) 36.4 HP (27.1 kW)

HITCH DIMENSIONS AS TESTED NO LOAD



	inch	mm
A	29.5	750
B	20.5	520
C	22.9	582
D	22.2	565
E	10.2	260
F	11.0	280
G	33.5	851
H	3.1	79
I	15.6	395
J	22.5	571
K	28.9	733
L	49.9	1268
*L'	53.4	1357
M	25.5	647
N	42.6	1082
O	9.0	230
P	40.8	1037
Q	38.7	983
R	45.1	1146

*L' to Quick Attach ends



JOHN DEERE 8420T DIESEL

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska Lincoln
Darrell Nelson, Dean and Director