

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.
Larsen

January 1997

Test 1730: John Deere 9100 Powrsync Diesel 12 and 24-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 1730: John Deere 9100 Powrsync Diesel 12 and 24-Speed" (1997).
Nebraska Tractor Tests. 2038.

<https://digitalcommons.unl.edu/tractormuseumlit/2038>

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 1730—SUMMARY 230

JOHN DEERE 9100 POWRSYNC DIESEL

24 SPEED ALSO 12 SPEED

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

Dates of Test: April 21 to May 1, 1997

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

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—1108 rpm)					
219.61 (163.76)	2100	12.72 (48.14)	0.407 (0.247)	17.27 (3.40)	
Standard Power Take-off Speed (1000 rpm)					
248.23 (185.11)	1894	13.31 (50.37)	0.376 (0.229)	18.66 (3.67)	
Maximum Power (2 Hours)					
249.38 (185.96)	1850	13.22 (50.03)	0.372 (0.226)	18.87 (3.72)	

VARYING POWER AND FUEL CONSUMPTION

219.61 (163.76)	2100	12.72 (48.14)	0.407 (0.247)	17.27 (3.40)	Air temperature
191.76 (143.00)	2158	11.49 (43.50)	0.421 (0.256)	16.69 (3.29)	76°F (25°C)
144.27 (107.58)	2169	9.31 (35.25)	0.453 (0.276)	15.49 (3.05)	Relative humidity
97.06 (72.38)	2181	7.26 (27.49)	0.535 (0.320)	13.37 (2.63)	44%
48.51 (36.17)	2193	5.04 (19.08)	0.730 (0.444)	9.62 (1.90)	Barometer
1.11 (0.83)	2203	3.20 (12.13)	20.322 (12.361)	0.35 (0.07)	28.69" Hg (97.16 kPa)

Maximum Torque 799 lb.-ft. (1083 Nm) at 1499 rpm
Maximum Torque Rise 45.3%
Torque rise at 1700 engine rpm 37%

DRAWBAR PERFORMANCE 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 (B1Lo) Gear									
199.67 (148.90)	16898 (75.17)	4.43 (7.13)	2099	1.74	0.439 (0.267)	15.98 (3.15)	185 (85)	62 (17)	28.94 (98.00)
75% of Pull at Maximum Power—7th (B1Lo) Gear									
154.98 (115.57)	12673 (56.37)	4.59 (7.38)	2164	1.46	0.473 (0.288)	14.84 (2.92)	181 (83)	60 (16)	29.19 (98.85)
50% of Pull at Maximum Power—7th (B1Lo) Gear									
104.31 (77.78)	8444 (37.56)	4.63 (7.46)	2178	1.10	0.542 (0.330)	12.96 (2.55)	177 (80)	62 (17)	29.19 (98.85)
75% of Pull at Reduced Engine Speed—12th (C2Lo) Gear									
155.37 (115.86)	12667 (56.34)	4.60 (7.40)	1529	1.46	0.414 (0.252)	16.95 (3.34)	179 (82)	61 (16)	29.19 (98.85)
50% of Pull at Reduced Engine Speed—12th (C2Lo) Gear									
104.69 (78.06)	8440 (37.54)	4.65 (7.49)	1541	1.19	0.455 (0.277)	15.43 (3.04)	175 (79)	63 (17)	29.19 (98.85)

FUEL OIL and TIME: Fuel No. 2 Diesel Cetane No. 50.6 Specific gravity converted to 60°/60° F (15°/15°C) 0.8435 Fuel weight 7.023 lbs/gal (0.842 kg/l) Oil SAE 15W-40 API service classification CD, CE, CF-4 To motor 6.644 gal (25.150 l) Drained from motor 6.473 gal (24.504 l) Transmission and hydraulic and final drive lubricant John Deere Hy-Gard fluid 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. *RG6081H014957* Crankshaft lengthwise Rated engine speed 2100 Bore and stroke (as specified) 4.56" × 5.06" (115.9 mm × 128.5 mm) Compression ratio 16.5 to 1 Displacement 496 cu in (8132 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, separate radiators for hydraulic and transmission oil Fuel filter two paper cartridges Muffler vertical Cooling medium temperature control two thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 88.4-91.9 lb/h (40.1-41.7 kg/h) High idle: 2150-2250 rpm Turbo boost nominal 22.3-26.7 psi (154-184 kPa) as measured 24.7 psi (171 kPa)

CHASSIS: Type four wheel drive with duals Serial No. *RW9100H001061* Tread width rear 60.0" (1524 mm) to 131.8" (3348 mm) front 60.0" (1524 mm) to 131.8" (3348 mm) Wheel base 137.8" (3500 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial (2) range operator controlled powershift Nominal travel speeds mph (km/h) first 2.09 (3.36) second 2.50 (4.03) third 2.69 (4.33) fourth 3.22 (5.19) fifth 3.68 (5.92) sixth 4.41 (7.10) seventh 4.45 (7.16) eighth 4.91 (7.90) ninth 5.34 (8.59) tenth 5.73 (9.22) eleventh 5.88 (9.47) twelfth 6.32 (10.17) thirteenth 6.87 (11.06) fourteenth 7.58 (12.19) fifteenth 7.85 (12.63) sixteenth 8.65 (13.92) seventeenth 9.40 (15.13) eighteenth 10.37 (16.69) nineteenth 10.46 (16.83) twentieth 12.54 (20.18) twenty-first 13.47 (21.67) twenty-second 16.14 (25.98) twenty-third 18.43 (29.66) twenty-fourth 22.10 (35.56) reverse 2.51 (4.03), 3.00 (4.83), 5.34 (8.59), 5.89 (9.47), 6.40 (10.30), 7.06 (11.36) Clutch multiple wet disc hydraulically actuated by foot pedal Brakes wet multiple disc hydraulically actuated by foot pedal Steering hydrostatic and articulated Power take-off 1000 rpm at 1895 engine rpm Unladen tractor mass 33548 lb (15217 kg)

**DRAWBAR PERFORMANCE AT 2100 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/kWh)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
1st (A1Lo) Gear									
179.98 (134.21)	33933 (150.94)	1.99 (3.20)	2155	8.53	0.481 (0.292)	14.61 (2.88)	178 (81)	48 (9)	28.90 (97.87)
2nd (A1Hi) Gear									
193.05 (143.96)	29750 (132.33)	2.43 (3.92)	2097	4.14	0.457 (0.278)	15.38 (3.03)	179 (82)	50 (10)	28.91 (97.90)
3rd (A2Lo) Gear									
198.26 (147.85)	28332 (126.02)	2.62 (4.22)	2098	3.70	0.442 (0.269)	15.88 (3.13)	179 (82)	60 (16)	28.94 (98.00)
4th (A2Hi) Gear									
197.06 (146.95)	23217 (103.27)	3.18 (5.12)	2098	2.55	0.446 (0.271)	15.75 (3.10)	183 (84)	60 (16)	28.94 (98.00)
5th (A3Lo) Gear									
196.98 (146.89)	20250 (90.07)	3.65 (5.87)	2098	2.28	0.445 (0.271)	15.79 (3.11)	182 (83)	59 (15)	28.95 (98.04)
6th (A3Hi) Gear									
193.71 (144.45)	16554 (73.64)	4.39 (7.06)	2097	1.74	0.453 (0.276)	15.49 (3.05)	185 (85)	61 (16)	28.93 (97.97)
7th (B1Lo) Gear									
199.67 (148.90)	16898 (75.17)	4.43 (7.13)	2099	1.74	0.439 (0.267)	15.98 (3.15)	185 (85)	62 (17)	28.94 (98.00)
8th (C1Lo) Gear									
197.12 (146.99)	15119 (67.25)	4.89 (7.87)	2097	1.65	0.445 (0.271)	15.77 (3.11)	185 (85)	62 (17)	28.94 (98.00)
9th (B1Hi) Gear									
195.18 (145.54)	13727 (61.06)	5.33 (8.58)	2100	1.56	0.449 (0.273)	15.66 (3.08)	185 (85)	62 (17)	28.95 (98.04)
10th (B2Lo) Gear									
199.99 (149.14)	13088 (58.22)	5.73 (9.22)	2100	1.47	0.440 (0.268)	15.95 (3.14)	184 (84)	61 (16)	28.94 (98.00)
11th (C1Hi) Gear									
194.17 (144.79)	12399 (55.15)	5.87 (9.45)	2095	1.37	0.454 (0.276)	15.48 (3.05)	186 (85)	59 (15)	28.92 (97.93)
12th (C2Lo) Gear									
196.75 (146.72)	11670 (51.91)	6.32 (10.17)	2099	1.28	0.445 (0.270)	15.80 (3.11)	186 (86)	58 (14)	28.91 (97.90)
13th (B2Hi) Gear									
191.18 (142.57)	10426 (46.37)	6.88 (11.07)	2098	1.19	0.462 (0.281)	15.22 (3.00)	187 (86)	59 (15)	28.91 (97.90)
14th (C2Hi) Gear									
189.50 (141.31)	9371 (41.68)	7.58 (12.20)	2096	1.19	0.463 (0.281)	15.18 (2.99)	187 (86)	59 (15)	28.91 (97.90)
15th (B3Lo) Gear									
191.30 (142.65)	9122 (40.58)	7.86 (12.66)	2099	1.10	0.458 (0.279)	15.33 (3.02)	186 (86)	59 (15)	28.92 (97.93)
16th (C3Lo) Gear									
188.49 (140.55)	8150 (36.25)	8.67 (13.96)	2098	0.91	0.466 (0.284)	15.06 (2.97)	186 (86)	58 (14)	28.94 (98.00)

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 return was maintained at 155° F (68°C). The pull in 1st (A1Lo) gear was limited to avoid tractor bouncing. 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. **1730**, Summary 230, July 9, 1997.

LOUIS I. LEVITICUS
Engineer-in-Charge

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

TRACTOR SOUND LEVEL WITH CAB

	dB(A)
At 75% load in 9th (B1Hi) Gear	72.8
Bystander in 24th (D3Hi) Gear	88.6

DRAWBAR PERFORMANCE AT 1850 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/kWh)	Temp. ^o F (°C) cool- ing med	Temp. ^o F (°C) Air dry bulb	Barom. inch Hg (kPa)
1st (A1Lo) Gear								
180.91 (134.91)	34025 (151.35)	1.99 (3.21)	2154	8.21	0.480 (0.292)	176 (80)	48 (9)	28.90 (97.87)
2nd (A1Hi) Gear								
200.83 (149.76)	32363 (143.96)	2.33 (3.75)	2035	5.42	0.448 (0.272)	180 (82)	55 (13)	28.92 (97.93)
3rd (A2Lo) Gear								
209.64 (156.33)	32046 (142.55)	2.45 (3.95)	1994	5.42	0.433 (0.263)	181 (83)	60 (16)	28.94 (98.00)
4th (A2Hi) Gear								
219.21 (163.47)	29763 (132.39)	2.76 (4.45)	1852	4.31	0.417 (0.254)	184 (84)	60 (16)	28.94 (98.00)
5th (A3Lo) Gear								
220.70 (164.57)	25929 (115.34)	3.19 (5.14)	1853	3.17	0.417 (0.254)	185 (85)	59 (15)	28.93 (97.97)
6th (A3Hi) Gear								
219.65 (163.79)	21378 (95.09)	3.85 (6.20)	1852	2.37	0.415 (0.252)	186 (85)	60 (16)	28.93 (97.97)
7th (B1Lo) Gear								
224.92 (167.73)	21737 (96.69)	3.88 (6.24)	1849	2.37	0.408 (0.248)	185 (85)	62 (17)	28.94 (98.00)
8th (C1Lo) Gear								
226.49 (168.90)	19757 (87.88)	4.30 (6.92)	1853	2.01	0.405 (0.246)	186 (85)	62 (17)	28.94 (98.00)
9th (B1Hi) Gear								
220.66 (164.55)	17667 (78.59)	4.68 (7.54)	1852	1.92	0.415 (0.252)	187 (86)	62 (17)	28.95 (98.04)
10th (B2Lo) Gear								
224.99 (167.77)	16786 (74.67)	5.03 (8.09)	1849	1.74	0.407 (0.248)	187 (86)	61 (16)	28.94 (98.00)
11th (C1Hi) Gear								
222.73 (166.09)	16192 (72.02)	5.16 (8.30)	1847	1.65	0.411 (0.250)	188 (87)	60 (16)	28.93 (97.97)
12th (C2Lo) Gear								
226.24 (168.71)	15261 (67.88)	5.56 (8.95)	1852	1.65	0.406 (0.247)	184 (84)	58 (14)	28.91 (97.90)
13th (B2Hi) Gear								
222.26 (165.74)	13802 (61.39)	6.04 (9.72)	1847	1.46	0.413 (0.251)	186 (86)	58 (14)	28.91 (97.90)
14th (C2Hi) Gear								
220.35 (164.32)	12381 (55.07)	6.67 (10.74)	1850	1.37	0.416 (0.253)	184 (84)	59 (15)	28.91 (97.90)
15th (B3Lo) Gear								
223.78 (166.88)	12126 (53.94)	6.92 (11.14)	1851	1.37	0.408 (0.248)	182 (83)	60 (16)	28.91 (97.90)
16th (C3Lo) Gear								
220.67 (164.56)	10833 (48.19)	7.64 (12.29)	1852	1.28	0.417 (0.253)	184 (84)	58 (14)	28.94 (98.00)
17th (B3Hi) Gear								
213.53 (159.23)	8649 (42.92)	8.30 (13.36)	1848	1.10	0.429 (0.261)	183 (84)	58 (14)	28.94 (98.00)

TIRES, BALLAST AND WEIGHT

Rear Tires —No., size, ply & psi (kPa)

Front Tires —No., size, ply & psi (kPa)

Height of Drawbar

Static Weight with Operator—Rear

—Front

—Total

Tested Without Ballast

Four 20.8R42; **, 8 (55)

Four 20.8R42; **, 10 (70)

18.0 in (455 mm)

15716 lb (7128 kg)

17998 lb (8164 kg)

33714 lb (15292 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: yes

Maximum Force Exerted Through Whole Range:	13104 lbs	(58.3 kN)
i) Opening pressure of relief valve:	NA	
Sustained pressure of the open relief valve:	2970 psi	(205 bar)
ii) Pump delivery rate at minimum pressure:	44.1 GPM	(166.9 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	39.9 GPM	(151.0 l/min)
Delivery pressure:	2500 psi	(172 bar)
Power:	58.2 HP	(43.4 kW)

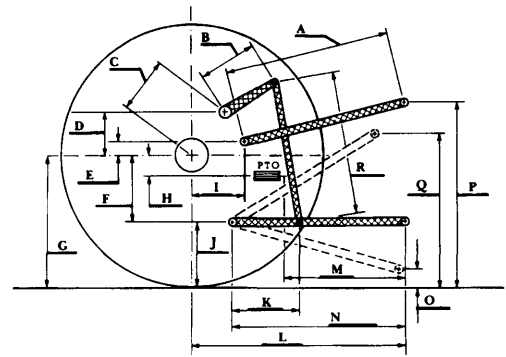
THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. (bar)	2950 (203)
Location	remote outlet
Hydraulic oil temperature °F (°C)	147 (64)
Location	hydraulic sump
Category	III (with 90 mm lift cylinders)
Quick attach	yes

Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (409)	24.0 (610)	32.0 (813)	40.0 (1010)
Lift force on frame lb	14589	14463	14418	13995	12978
Lift force on frame (kN)	(64.9)	(64.3)	(64.1)	(62.3)	(57.7)

As per current ASAE test procedures

Hitch point distance to ground level in. (mm)	8.0 (203)	16.0 (409)	24.0 (610)	32.0 (813)	40.0 (1010)
Lift force on frame lb.	15719	15580	15531	15076	13980
Lift force on frame (kN)	(69.9)	(69.3)	(69.1)	(67.1)	(62.2)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	30.8	780
B	18.6	472
C	26.2	666
D	24.4	620
E	11.3	288
F	13.8	350
G	35.6	905
H	4.8	122
I	22.7	577
J	21.9	555
K	28.8	731
L	55.3	1405
L'	61.8	1570
M	25.4	645
N	44.0	1117
O	8.0	203
P	48.6	1234
Q	39.1	993
R	44.8	1137

L' to end of Quick Attach



JOHN DEERE 9100 POWRSYNC DIESEL

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