

Tractor Test and Power Museum, The Lester F. Larsen

UNL Larsen Tractor Museum Archives

University of Nebraska - Lincoln

Year 2007

Test 1897: John Deere 7930 IVT Diesel

Tractor Museum

University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA OECD TRACTOR TEST 1897—SUMMARY 564

JOHN DEERE 7930 IVT DIESEL INFINITELY VARIABLE TRANSMISSION

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—1075 rpm)					
182.94 (136.42)	2100	10.74 (40.65)	0.412 (0.250)	17.04 (3.36)	
Standard Power Take-off Speed (1000 rpm)					
198.72 (148.19)	1953	11.38 (43.07)	0.401 (0.244)	17.47 (3.44)	
Maximum Power (1 hour)					
202.13 (150.72)	1900	11.51 (43.55)	0.399 (0.243)	17.57 (3.46)	

VARYING POWER AND FUEL CONSUMPTION

182.94 (136.42)	2100	10.74 (40.65)	0.412 (0.250)	17.04 (3.36)	Air temperature
159.81 (119.17)	2157	9.87 (37.36)	0.433 (0.263)	16.19 (3.19)	74°F (24°C)
120.62 (89.95)	2165	8.13 (30.78)	0.473 (0.287)	14.84 (2.92)	Relative humidity
80.44 (59.98)	2176	6.30 (23.86)	0.549 (0.334)	12.76 (2.51)	65%
40.66 (30.32)	2188	4.31 (16.31)	0.743 (0.452)	9.44 (1.86)	Barometer
1.23 (0.92)	2196	2.95 (11.18)	16.822 (10.232)	0.42 (0.08)	28.85" Hg (97.70 kPa)

Maximum torque - 645 lb.-ft. (874 Nm) at 1602 rpm
 Maximum torque rise - 40.9%
 Torque rise at 1702 engine rpm - 34%
 Power increase at 1900 engine rpm - 10.5%

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—5.0 mph (8.0 km/h)-Manual Mode									
159.10 (118.64)	12771 (56.81)	4.67 (7.52)	2103	4.21	0.461 (0.280)	15.22 (3.00)	197 (92)	43 (6)	28.87 (97.77)
75% of Pull at Maximum Power—5.0 mph (8.0 km/h)-Manual Mode									
124.67 (92.97)	9610 (42.75)	4.87 (7.83)	2157	2.76	0.505 (0.307)	13.87 (2.73)	197 (92)	45 (7)	28.88 (97.80)
50% of Pull at Maximum Power—5.0 mph (8.0 km/h)-Manual Mode									
84.43 (62.96)	6406 (28.49)	4.94 (7.95)	2167	1.66	0.569 (0.346)	12.32 (2.43)	182 (83)	45 (7)	28.88 (97.80)
75% of Pull at Reduced Engine Speed—5.0 mph (8.0 km/h)-Auto Mode									
124.76 (93.04)	9638 (42.87)	4.85 (7.81)	1683	2.71	0.452 (0.275)	15.51 (3.05)	178 (81)	46 (8)	28.88 (97.80)
50% of Pull at Reduced Engine Speed—5.0 mph (8.0 km/h)-Auto Mode									
84.32 (62.88)	6452 (28.70)	4.90 (7.89)	1399	1.68	0.464 (0.282)	15.12 (2.98)	173 (78)	45 (7)	28.88 (97.80)

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

Dates of tests: March 29 to April 17, 2007

Manufacturer: John Deere Tractor Works, 3500 East Donald Street, 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) 0.8432 Fuel weight 7.011 lbs/gal (0.840 kg/l) Oil SAE 15W-40 API service classification CF-4 Transmission and hydraulic lubricant John Deere Hy-Gard fluid Front axle lubricant John Deere Hy-Gard fluid Total time engine was operated: 28.5 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *PE6068L004033* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.19 x 5.00" (106.5 mm x 127.0 mm) **Compression ratio** 17.0 to 1 **Displacement** 414 cu in (6788 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: 68.6 - 75.8 lb/h (31.1 - 34.4 kg/h) **High idle:** 2175 - 2225 rpm **Turbo boost:** nominal 20.3-23.2 psi (140-160 kPa) as measured 22.3 psi (154 kPa)

CHASSIS: Type front wheel assist **Serial No.** *RW7930D002169* **Tread width** rear 60.0" (1524 mm) to 117.5" (2984 mm) front 60.0" (1524 mm) to 88.0" (2235 mm) **Wheelbase** 112.5" (2860 mm) **Hydraulic control system** direct engine drive **Transmission** Infinitely variable with two mechanical ranges and automatic shifting between ranges. **Nominal travel speeds mph (km/h)** forward - 0-25.0 mph, (0-40 km/h) reverse - 0-25.0 mph (0-40 km/h) **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** 540 rpm at 1950 engine rpm or 1000 rpm at 1950 engine rpm **Unladen tractor mass** 18275 lb (8289 kg)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED-2100 RPM
MAXIMUM POWER AT SELECTED TRAVEL SPEEDS

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	Barom. inch Hg (kPa)		
2.8 mph (4.5 km/h)									
113.81 (84.87)	17073 (75.95)	2.50 (4.02)	2156	11.16	0.580 (0.353)	12.09 (2.38)	190 (88)	44 (7)	28.52 (96.58)
3.9 mph (6.2 km/h)									
149.80 (111.70)	16281 (72.42)	3.45 (5.55)	2101	8.64	0.493 (0.300)	14.23 (2.80)	193 (89)	45 (7)	28.50 (96.51)
4.3 mph (7.0 km/h)									
157.60 (117.52)	14656 (65.19)	4.03 (6.49)	2100	5.42	0.466 (0.284)	15.04 (2.96)	195 (90)	43 (6)	28.86 (97.73)
5.0 mph (8.0 km/h)									
159.10 (118.64)	12771 (56.81)	4.67 (7.52)	2103	4.21	0.461 (0.280)	15.22 (3.00)	197 (92)	43 (6)	28.87 (97.77)
5.6 mph (9.0 km/h)									
159.88 (119.22)	11318 (50.34)	5.30 (8.53)	2100	3.41	0.459 (0.279)	15.28 (3.01)	198 (92)	44 (7)	28.87 (97.77)
6.2 mph (10.0 km/h)									
158.15 (117.93)	10005 (44.50)	5.93 (9.54)	2102	2.81	0.463 (0.282)	15.14 (2.98)	197 (92)	40 (4)	28.86 (97.73)
6.8 mph (11.0 km/h)									
157.27 (117.28)	9035 (40.19)	6.53 (10.50)	2098	2.49	0.467 (0.284)	15.01 (2.96)	198 (92)	40 (4)	28.86 (97.73)
7.5 mph (12.0 km/h)									
155.17 (115.71)	8129 (36.16)	7.16 (11.52)	2101	2.17	0.473 (0.288)	14.83 (2.92)	197 (92)	41 (5)	28.86 (97.73)
8.1 mph (13.0 km/h)									
155.29 (115.80)	7493 (33.33)	7.77 (12.51)	2103	1.95	0.482 (0.293)	14.56 (2.87)	198 (92)	48 (9)	28.88 (97.80)
8.7 mph (14.0 km/h)									
150.78 (112.44)	6754 (30.04)	8.37 (13.47)	2098	1.72	0.496 (0.302)	14.14 (2.79)	198 (92)	48 (9)	28.88 (97.80)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE: Manual mode was selected by placing the AutoPowr(IVT) selector in the OFF position. Auto mode was selected by placing the Autopowr (IVT) selector in position 3.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor did not meet the manufacturer's initial advertised claims of 43% torque rise nor 13% power bulge. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 136°F (58°C). The maximum drawbar pull 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. **1897**, Nebraska Summary 564, July 2, 2007.

Roger M. Hoy
 Director

M.F. Kocher
 V.I. Adamchuk
 J.A. Smith
 Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	Auto Mode dB(A)
At no load at 4.6 mph (7.5 km/h) (engine -1200 rpm)	64.4
Transport speed - no load	70.0
Bystander	82.0

TIRES, BALLAST AND WEIGHT	With Ballast	Without Ballast
Rear Tires - No., size, ply & psi (kPa)	Four 480/80R46;***;11(75)	Two 480/80R46;***;17(115)
Ballast - Duals (total)	1760 lb (798 kg)	None
- Cast Iron (total)	3565 lb (1617 kg)	None
Front Tires - No., size, ply & psi (kPa)	Two 420/90R30;***;20(140)	Two 420/90R30;***;14(95)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	1920 lb (871 kg)	None
Height of Drawbar	21.0 in (535 mm)	20.5 in (520 mm)
Static Weight with operator - Rear	16265 lb (7378 kg)	11810 lb (5357 kg)
- Front	9430 lb (4277 kg)	6640 lb (3012 kg)
- Total	25695 lb (11655 kg)	18450 lb (8369 kg)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - 1900 RPM
MAXIMUM POWER AT SELECTED TRAVEL SPEEDS

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	
					2.8 mph (4.5 km/h)				
113.77 (84.84)	17097 (76.05)	2.50 (4.02)	2156	11.32	0.575 (0.349)	12.20 (2.40)	189 (87)	44 (7)	28.52 (96.58)
					3.9 mph (6.2 km/h)				
149.27 (111.31)	16315 (72.57)	3.43 (5.52)	2098	9.06	0.493 (0.300)	14.23 (2.80)	197 (92)	45 (7)	28.49 (96.48)
					4.3 mph (7.0 km/h)				
160.36 (119.58)	15421 (68.60)	3.90 (6.28)	2062	6.82	0.466 (0.284)	15.04 (2.96)	198 (92)	43 (6)	28.87 (97.78)
					5.0 mph (8.0 km/h)				
170.53 (127.17)	14689 (65.34)	4.35 (7.01)	1997	6.01	0.463 (0.281)	15.15 (2.99)	200 (93)	44 (7)	28.87 (97.78)
					5.6 mph (9.0 km/h)				
176.88 (131.90)	14076 (62.61)	4.71 (7.58)	1906	5.28	0.453 (0.276)	15.47 (3.05)	203 (95)	44 (7)	28.88 (97.80)
					6.2 mph (10.0 km/h)				
176.85 (131.88)	12497 (55.59)	5.31 (8.54)	1903	3.93	0.453 (0.276)	15.46 (3.05)	203 (95)	40 (4)	28.86 (97.73)
					6.8 mph (11.0 km/h)				
177.21 (132.14)	11338 (50.43)	5.86 (9.43)	1900	3.33	0.451 (0.274)	15.56 (3.06)	202 (95)	41 (5)	28.86 (97.73)
					7.5 mph (12.0 km/h)				
176.83 (131.86)	10313 (45.87)	6.43 (10.35)	1902	2.86	0.451 (0.275)	15.53 (3.06)	203 (95)	41 (5)	28.86 (97.73)
					8.1 mph (13.0 km/h)				
175.78 (131.08)	9425 (41.93)	6.99 (11.25)	1905	2.56	0.456 (0.278)	15.37 (3.03)	203 (95)	48 (9)	28.88 (97.80)
					8.7 mph (14.0 km/h)				
174.66 (130.24)	8651 (38.48)	7.57 (12.18)	1908	2.29	0.458 (0.279)	15.31 (3.02)	203 (95)	49 (9)	28.88 (97.80)
					9.3 mph (15.0 km/h)				
158.01 (117.83)	7278 (32.38)	8.14 (13.10)	1901	1.83	0.512 (0.312)	13.68 (2.70)	203 (95)	50 (10)	28.88 (97.80)

DRAWBAR PERFORMANCE
BALLASTED - FRONT DRIVE ENGAGED - 1900 RPM
MAXIMUM POWER AT SELECTED TRAVEL SPEEDS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed	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)
125.39 (93.50)	23923 (106.41)	1.97 (3.16)	2104	10.23	0.582 (0.354)	12.05 (2.37)	193 (89)	41 (5)	28.85 (97.70)
156.33 (116.58)	22080 (98.22)	2.66 (4.27)	1962	6.43	0.505 (0.307)	13.89 (2.74)	201 (94)	41 (5)	28.85 (97.70)
169.23 (126.19)	20174 (89.74)	3.15 (5.06)	1900	4.55	0.474 (0.289)	14.78 (2.91)	203 (95)	41 (5)	28.85 (97.70)
178.08 (132.79)	17987 (80.01)	3.71 (5.97)	1901	3.43	0.449 (0.273)	15.61 (3.07)	203 (95)	42 (6)	28.84 (97.66)
179.32 (133.72)	15752 (70.07)	4.27 (6.87)	1899	2.75	0.445 (0.271)	15.74 (3.10)	202 (95)	42 (6)	28.84 (97.66)
179.74 (134.03)	13902 (61.84)	4.85 (7.80)	1907	2.28	0.446 (0.271)	15.72 (3.10)	202 (95)	42 (6)	28.84 (97.66)
179.66 (133.97)	12523 (55.71)	5.38 (8.66)	1899	2.03	0.448 (0.272)	15.66 (3.09)	201 (94)	42 (6)	28.84 (97.66)
178.13 (132.84)	11260 (50.09)	5.93 (9.55)	1899	1.74	0.449 (0.273)	15.62 (3.08)	202 (95)	43 (6)	28.84 (97.66)
176.91 (131.92)	10229 (45.50)	6.49 (10.44)	1901	1.56	0.452 (0.275)	15.53 (3.06)	201 (94)	43 (6)	28.83 (97.63)
174.66 (130.24)	9306 (41.40)	7.04 (11.33)	1900	1.38	0.462 (0.281)	15.17 (2.99)	203 (95)	44 (7)	28.82 (97.60)
171.68 (128.02)	8473 (37.69)	7.60 (12.23)	1902	1.24	0.473 (0.288)	14.83 (2.92)	203 (95)	44 (7)	28.82 (97.60)
154.06 (114.88)	7057 (31.39)	8.19 (13.17)	1901	1.02	0.525 (0.319)	13.35 (2.63)	203 (95)	44 (7)	28.81 (97.56)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

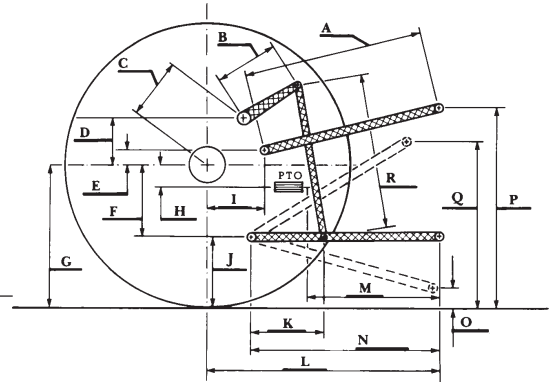
Quick Attach: Yes

Lift cylinders:

Maximum force exerted through whole range: $2 \times 90 \text{ mm}$ $2 \times 100 \text{ mm}$
 10987 lbs (48.9 kN) 15574 lbs (69.3 kN)

45 cc pump 63 cc pump
 2914 psi (201 bar) 2884 psi (199 bar)

	three outlet sets combined	
i) Sustained pressure at compensator cutoff:	2914 psi (201 bar)	2884 psi (199 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	32.0 GPM (121.1 l/min)	45.6 GPM (172.6 l/min)
iii) Pump delivery rate at maximum hydraulic power:	31.3 GPM (118.5 l/min)	44.4 GPM (168.1 l/min)
Delivery pressure:	2567 psi (177 bar)	2542 psi (175 bar)
Power:	46.9 HP (35.0 kW)	65.8 HP (49.1 kW)
	single outlet set	
ii) Pump delivery rate at minimum pressure and rated engine speed:	31.4 GPM (118.9 l/min)	42.1 GPM (159.4 l/min)
iii) Pump delivery rate at maximum hydraulic power:	31.0 GPM (117.3 l/min)	38.1 GPM (144.2 l/min)
Delivery pressure:	2265 psi (156 bar)	1919 psi (132 bar)
Power:	41.0 HP (30.5 kW)	42.6 HP (31.8 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	OECD test		SAE test	
	inch	mm	inch	mm
A	29.6	752	26.4	670
B	16.7	425	16.7	425
C	25.6	650	25.6	650
D	23.9	608	23.9	608
E	11.1	283	7.5	190
F	12.7	323	12.7	323
G	35.6	905	35.6	905
H	4.7	120	4.7	120
I	20.9	530	20.6	523
J	22.9	582	22.9	582
K	28.1	713	27.8	706
L	51.2	1300	47.4	1204
*L'	--	--	50.9	1293
M	24.7	628	20.9	532
N	44.1	1120	40.3	1024
O	9.0	230	8.0	203
P	50.2	1275	45.2	1149
Q	40.4	1025	37.6	954
R	38.4	975	39.8	1010

*L' to Quick Attach ends

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi. (bar)	2910 (201)				
Location:	lift cylinders				
Hydraulic oil temperature: °F (°C)	144 (62)				
Location:	hydraulic sump				
Category:	III				
Quick attach:	Yes				

SAE Static Test—System pressure 2610 psi (180 Bar)
 with lift cylinders 2 x 90 mm

Hitch point distance to ground level in. (mm)	7.9 (201)	16.0 (406)	23.9 (607)	31.8 (807)	40.0 (1015)
Lift force on frame lb	13290	13349	13110	12120	10573
" " " " " " (kN)	(59.1)	(59.4)	(58.3)	(53.9)	(47.0)

with lift cylinders 2 x 100 mm

Hitch point distance to ground level in. (mm)	7.9 (201)	16.1 (409)	24.0 (609)	31.9 (810)	40.0 (1017)
Lift force on frame lb	18660	18544	17958	16558	14432
" " " " " " (kN)	(83.0)	(82.5)	(79.9)	(73.7)	(64.2)



JOHN DEERE 7930 IVT DIESEL

Institute of Agriculture and Natural Resources
 University of Nebraska-Lincoln