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January 2007

## Test 1895: John Deere 7830 Autoquad-Plus 20-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA OECD TRACTOR TEST 1895—SUMMARY 562

## JOHN DEERE 7830 AUTOQUAD-PLUS DIESEL

### 20 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>Rated Engine Speed—(PTO speed—1075 rpm)</b>					
166.81 (124.39)	2100	9.62 (36.40)	0.404 (0.246)	17.35 (3.42)	
<b>Standard Power Take-off Speed (1000 rpm)</b>					
183.39 (136.75)	1953	10.26 (38.82)	0.392 (0.238)	17.88 (3.52)	
<b>Maximum Power (1 hour)</b>					
189.15 (141.05)	1749	10.51 (39.78)	0.390 (0.237)	18.00 (3.55)	

#### VARYING POWER AND FUEL CONSUMPTION

166.81 (124.39)	2100	9.62 (36.40)	0.404 (0.246)	17.35 (3.42)	Air temperature
145.56 (108.55)	2157	8.74 (33.10)	0.421 (0.256)	16.65 (3.28)	75°F (24°C)
109.06 (81.33)	2166	7.17 (27.16)	0.461 (0.281)	15.20 (2.99)	Relative humidity
73.56 (54.85)	2177	5.72 (21.65)	0.545 (0.332)	12.86 (2.53)	54%
36.50 (27.22)	2189	4.24 (16.04)	0.814 (0.495)	8.62 (1.70)	Barometer
1.12 (0.84)	2197	2.60 (9.83)	16.184 (9.845)	0.43 (0.09)	28.78" Hg (97.46 kPa)

Maximum torque - 608 lb.-ft. (825 Nm) at 1598 rpm

Maximum torque rise - 45.9%

Torque rise at 1703 engine rpm - 38%

Power increase at 1749 engine rpm - 13.4%

#### 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)
<b>Maximum Power—8th (C1) Gear</b>									
148.48 (110.72)	10595 (47.13)	5.26 (8.46)	2099	3.23	0.456 (0.277)	15.37 (3.03)	192 (89)	60 (16)	28.79 (97.49)
<b>75% of Pull at Maximum Power—8th (C1) Gear</b>									
115.99 (86.50)	7958 (35.40)	5.47 (8.80)	2158	2.08	0.493 (0.300)	14.23 (2.80)	193 (89)	69 (21)	28.80 (97.52)
<b>50% of Pull at Maximum Power—8th (C1) Gear</b>									
78.46 (58.51)	5314 (23.64)	5.54 (8.91)	2166	1.19	0.578 (0.352)	12.13 (2.39)	187 (86)	70 (21)	28.80 (97.52)
<b>75% of Pull at Reduced Engine Speed—11th (C3) Gear</b>									
115.52 (86.14)	7975 (35.47)	5.43 (8.74)	1487	2.07	0.435 (0.265)	16.12 (3.18)	184 (84)	71 (22)	28.80 (97.52)
<b>50% of Pull at Reduced Engine Speed—11th (C3) Gear</b>									
78.56 (58.58)	5323 (23.68)	5.53 (8.91)	1502	1.21	0.488 (0.297)	14.38 (2.83)	175 (79)	70 (21)	28.80 (97.52)

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

**Dates of tests:** March 27-April 20, 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) 0.8421 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: 29.5 hours

**ENGINE: Make** John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** \*PE6068L004251\* **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:** 63.9 - 69.4 lb/h (29.0 - 31.5 kg/h) **High idle:** 2175 - 2225 rpm **Turbo boost:** nominal 18.1-21.0 psi (125-145 kPa) as measured 19.5 psi (134 kPa)

**CHASSIS: Type** front wheel assist **Serial No.** \*RW7830A002256\* **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** selective gear fixed ratio with partial (4) range operator controlled power shift **Nominal travel speeds mph (km/h)** first 1.56 (2.51) second 1.88 (3.02) third 2.25 (3.62) fourth 2.75 (4.43) fifth 3.31 (5.32) sixth 3.98 (6.40) seventh 4.77 (7.67) eighth 5.26 (8.46) ninth 5.83 (9.39) tenth 6.33 (10.19) eleventh 7.58 (12.20) twelfth 9.29 (14.95) thirteenth 9.74 (15.67) fourteenth 11.73 (18.87) fifteenth 14.04 (22.60) sixteenth 14.42 (23.21) seventeenth 17.20 (27.68) eighteenth 17.37 (27.95) nineteenth 20.80 (33.47) twentieth 25.48 (41.01) reverse 1.63 (2.62), 1.96 (3.15), 2.35 (3.78), 2.88 (4.63), 3.45 (5.55), 4.15 (6.68), 4.97 (8.00), 5.49 (8.83), 6.09 (9.80), 6.61 (10.63), 7.92 (12.74), 9.69 (15.60), 10.16 (16.35), 12.24 (19.69), 14.65 (23.58), 15.05 (24.22), 17.95 (28.88), 18.12 (29.16), 21.71 (34.93), 26.59 (42.79)

**DRAWBAR PERFORMANCE**  
**UNBALLASTED - FRONT DRIVE ENGAGED-1750 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	Temp.°F (°C) Air dry bulb	Barom. inch Hg (kPa)	
5th(B1)Gear									
136.21 (101.57)	16117 (71.69)	3.17 (5.10)	2149	9.30	0.494 (0.300)	14.19 (2.80)	183 (84)	53 (12)	28.80 (97.53)
6th(B2)Gear									
150.02 (111.87)	15218 (67.69)	3.70 (5.95)	2043	7.54	0.466 (0.284)	15.04 (2.96)	191 (88)	54 (12)	28.80 (97.53)
7th(B3) Gear									
162.65 (121.29)	14189 (63.12)	4.30 (6.92)	1950	5.98	0.448 (0.272)	15.65 (3.08)	200 (93)	58 (14)	28.80 (97.53)
8th(C1)Gear									
166.50 (124.16)	13924 (61.94)	4.48 (7.22)	1842	5.90	0.445 (0.271)	15.75 (3.10)	203 (95)	61 (16)	28.79 (97.49)
9th(B4)Gear									
166.65 (124.27)	13070 (58.14)	4.78 (7.70)	1751	4.90	0.447 (0.272)	15.68 (3.09)	203 (95)	59 (15)	28.79 (97.49)
10th(C2) Gear									
167.56 (124.95)	12031 (53.52)	5.22 (8.41)	1751	4.24	0.446 (0.271)	15.71 (3.10)	203 (95)	63 (17)	28.79 (97.49)
11th(C3)Gear									
169.00 (126.02)	10003 (44.50)	6.34 (10.20)	1751	3.03	0.440 (0.268)	15.94 (3.14)	203 (95)	64 (18)	28.79 (97.49)
12th(C4)Gear									
166.64 (124.26)	7984 (35.51)	7.83 (12.60)	1750	2.16	0.447 (0.272)	15.69 (3.09)	204 (96)	66 (19)	28.79 (97.49)
13th(D1)Gear									
168.49 (125.65)	7677 (34.15)	8.23 (13.25)	1753	1.94	0.439 (0.267)	15.96 (3.14)	204 (95)	71 (22)	28.80 (97.53)

**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** 17720 lb (8038 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. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 135°F (57°C). The pull in 3<sup>rd</sup> (A3) 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. **1895**, Nebraska Summary 562, July 30, 2007.

Roger M. Hoy  
 Director

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

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 7th (B3) gear	68.0	68.0
Transport speed - no load - 20th (E4) gear		71.5
Bystander in 20th (E4) gear		82.3

**TIRES, BALLAST AND WEIGHT**

	With Ballast	Without Ballast
<b>Rear Tires</b> - No., size, ply & psi(kPa)	Four 480/80R46;***;10(60)	Two 480/80R46;***;17(115)
<b>Ballast</b> - Duals (total)	1760 lb (798 kg)	None
- Cast Iron (total)	2360 lb(1070 kg)	None
<b>Front Tires</b> - No., size, ply & psi(kPa)	Two 420/90R30;***;17(115)	Two 420/90R30;***;14(95)
<b>Ballast</b> - Liquid (total)	None	None
- Cast Iron (total)	1320 lb (599 kg)	None
<b>Height of Drawbar</b>	20.0 in (510 mm)	20.5 in (520 mm)
<b>Static Weight with operator</b> - Rear	14875 lb (6747 kg)	11325 lb (5137 kg)
- Front	8460 lb (3837 kg)	6570 lb (2980 kg)
- Total	23335 lb(10584 kg)	17895 lb (8117 kg)

**DRAWBAR PERFORMANCE**  
**BALLASTED - FRONT DRIVE ENGAGED - 1750 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)
3rd(A3)Gear									
124.96 (93.19)	21724 (96.64)	2.16 (3.47)	2154	9.04	0.510 (0.310)	13.76 (2.71)	182 (84)	61 (16)	28.86 (97.73)
4th(A4)Gear									
141.44 (105.47)	20790 (92.48)	2.55 (4.11)	2073	8.72	0.492 (0.299)	14.26 (2.81)	197 (92)	66 (19)	28.86 (97.73)
5th(B1)Gear									
154.61 (115.29)	19381 (86.21)	2.99 (4.81)	1990	7.03	0.472 (0.287)	14.85 (2.93)	201 (94)	71 (22)	28.85 (97.70)
6th(B2)Gear									
167.81 (125.14)	17789 (79.13)	3.54 (5.69)	1890	3.91	0.440 (0.268)	15.94 (3.14)	199 (93)	54 (12)	28.75 (97.36)
7th(B3)Gear									
171.38 (127.80)	16292 (72.47)	3.94 (6.35)	1750	3.32	0.437 (0.266)	16.06 (3.16)	203 (95)	56 (13)	28.74 (97.33)
8th(C1)Gear									
170.65 (127.26)	14615 (65.01)	4.38 (7.05)	1750	2.78	0.441 (0.268)	15.91 (3.13)	203 (95)	59 (15)	28.74 (97.33)
9th(B4)Gear									
169.95 (126.73)	13050 (58.05)	4.88 (7.86)	1750	2.31	0.440 (0.268)	15.93 (3.14)	203 (95)	58 (14)	28.74 (97.33)
10th(C2)Gear									
168.61 (125.73)	11918 (53.01)	5.31 (8.54)	1748	2.06	0.442 (0.269)	15.85 (3.12)	203 (95)	60 (16)	28.73 (97.29)
11th(C3)Gear									
170.05 (126.81)	9986 (44.42)	6.39 (10.28)	1748	1.59	0.439 (0.267)	15.97 (3.15)	203 (95)	61 (16)	28.73 (97.29)
12th(C4)Gear									
165.64 (123.52)	7893 (35.11)	7.87 (12.67)	1751	1.13	0.449 (0.273)	15.61 (3.07)	203 (95)	63 (17)	28.73 (97.29)
13th(D1)Gear									
165.85 (123.68)	7535 (33.52)	8.25 (13.28)	1751	1.09	0.449 (0.273)	15.60 (3.07)	204 (95)	63 (17)	28.73 (97.29)

**DRAWBAR PERFORMANCE**  
**BALLASTED - FRONT DRIVE DISENGAGED**  
**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)
<b>Maximum Power—7th (B3) Gear</b>									
149.02 (111.12)	11752 (52.28)	4.76 (7.65)	2098	2.78	0.457 (0.278)	15.35 (3.02)	188 (87)	56 (13)	28.74 (97.33)
<b>75% of Pull at Maximum Power—7th(B3) Gear</b>									
116.04 (86.53)	8816 (39.21)	4.94 (7.94)	2157	1.81	0.496 (0.302)	14.12 (2.78)	196 (91)	64 (18)	28.73 (97.29)
<b>50% of Pull at Maximum Power—7th (B3) Gear</b>									
78.42 (58.48)	5886 (26.18)	5.00 (8.04)	2167	1.10	0.582 (0.354)	12.04 (2.37)	186 (86)	65 (18)	28.72 (97.26)
<b>75% of Pull at Reduced Engine Speed—10th(C2) Gear</b>									
116.01 (86.51)	8836 (39.30)	4.92 (7.92)	1620	1.88	0.455 (0.277)	15.40 (3.03)	191 (88)	67 (19)	28.72 (97.26)
<b>50% of Pull at Reduced Engine Speed—10th(C2) Gear</b>									
78.32 (58.40)	5871 (26.12)	5.00 (8.05)	1632	1.03	0.510 (0.310)	13.76 (2.71)	176 (80)	66 (19)	28.72 (97.26)
<b>MAXIMUM POWER IN SELECTED GEARS</b>									
4th(A4) Gear									
116.67 (87.00)	17021 (75.71)	2.57 (4.14)	2154	11.40	0.538 (0.327)	13.04 (2.57)	194 (90)	63 (17)	28.86 (97.73)
5th(B1) Gear									
136.21 (101.57)	15925 (70.84)	3.21 (5.16)	2151	7.74	0.490 (0.298)	14.31 (2.82)	198 (92)	68 (20)	28.86 (97.73)
6th(B2) Gear									
147.59 (110.05)	14106 (62.75)	3.92 (6.31)	2098	3.90	0.461 (0.280)	15.21 (3.00)	188 (87)	53 (12)	28.75 (97.36)
7th(B3) Gear									
149.02 (111.12)	11752 (52.28)	4.76 (7.65)	2098	2.78	0.457 (0.278)	15.35 (3.02)	188 (87)	56 (13)	28.74 (97.33)
8th(C1) Gear									
148.21 (110.52)	10554 (46.94)	5.27 (8.48)	2098	2.38	0.460 (0.280)	15.24 (3.00)	195 (91)	59 (15)	28.74 (97.33)
9th(B4) Gear									
145.70 (108.63)	9302 (41.38)	5.87 (9.45)	2100	2.05	0.466 (0.284)	15.03 (2.96)	197 (92)	57 (14)	28.74 (97.33)
10th(C2) Gear									
146.98 (109.60)	8636 (38.41)	6.38 (10.27)	2098	1.82	0.461 (0.281)	15.19 (2.99)	198 (92)	60 (16)	28.73 (97.29)
11th(C3) Gear									
145.72 (108.66)	7116 (31.65)	7.68 (12.36)	2100	1.44	0.465 (0.283)	15.07 (2.97)	198 (92)	61 (16)	28.73 (97.29)
12th(C4) Gear									
144.47 (107.73)	5755 (25.60)	9.41 (15.15)	2094	1.14	0.482 (0.293)	14.55 (2.87)	198 (92)	62 (17)	28.73 (97.29)

### THREE POINT HITCH PERFORMANCE (OECD Static Test)

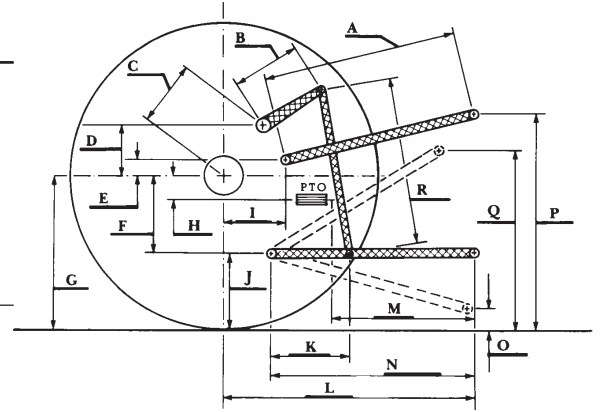
CATEGORY: III

Quick Attach: Yes

Lift cylinders:

	2 x 90 mm	2 x 100 mm
Maximum force exerted through whole range:	10987 lbs (48.9 kN)	15574 lbs (69.3 kN)

	45 cc pump	63 cc pump
i) Sustained pressure at compensator cutoff:	2914 psi (201 bar)	2895 psi (200 bar)
	<b>three outlet sets combined</b>	
ii) Pump delivery rate at minimum pressure and rated engine speed:	32.0 GPM (121.1 l/min)	45.0 GPM (170.3 l/min)
iii) Pump delivery rate at maximum hydraulic power:	31.3 GPM (118.5 l/min)	43.6 GPM (165.0 l/min)
Delivery pressure:	2567 psi (177 bar)	2591 psi (179 bar)
Power:	46.9 HP (35.0 kW)	65.9 HP (49.1 kW)
<b>single outlet set</b>		
ii) Pump delivery rate at minimum pressure and rated engine speed:	31.4 GPM (118.9 l/min)	41.4 GPM (156.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	31.0 GPM (117.3 l/min)	38.4 GPM (145.4 l/min)
Delivery pressure:	2265 psi (156 bar)	1921 psi (132 bar)
Power:	41.0 HP (30.5 kW)	43.0 HP (32.1 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				
<b>SAE Static Test—System pressure 2610 psi (180 Bar)</b>					
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 7830 DIESEL