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Test 1835: John Deere 7920 IVT Diesel

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NEBRASKA OECD TRACTOR TEST 1835—SUMMARY 427

JOHN DEERE 7920 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—1077 rpm)					
171.26 (127.71)	2100	10.43 (39.50)	0.428 (0.260)	16.41 (3.23)	
Standard Power Take-off Speed (1000 rpm)					
185.59 (138.39)	1951	10.58 (40.06)	0.400 (0.244)	17.54 (3.45)	
Maximum Power (2 hours)					
192.77 (143.75)	1750	10.57 (40.03)	0.385 (0.234)	18.23 (3.59)	

VARYING POWER AND FUEL CONSUMPTION

171.26 (127.71)	2100	10.43 (39.50)	0.428 (0.260)	16.41 (3.23)	Air temperature
153.30 (114.31)	2212	10.00 (37.85)	0.458 (0.279)	15.33 (3.02)	76°F (25°C)
115.33 (86.00)	2220	8.37 (31.70)	0.510 (0.310)	13.77 (2.71)	Relative humidity
77.19 (57.56)	2227	6.67 (25.23)	0.606 (0.369)	11.58 (2.28)	34%
38.76 (28.91)	2236	4.74 (17.95)	0.859 (0.523)	8.17 (1.61)	Barometer
1.09 (0.82)	2244	2.99 (11.32)	19.182 (11.668)	0.37 (0.07)	28.90" Hg (98.37 kPa)

Maximum Torque - 654 lb.-ft. (886 Nm) at 1148 rpm
 Maximum Torque Rise -52.4%
 Torque rise at 1703 engine rpm -38%

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. °C cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—5.1 mph (8.2 km/h)-Manual Mode									
146.06 (108.91)	11678 (51.94)	4.69 (7.55)	2098	3.49	0.478 (0.291)	14.68 (2.89)	190 (88)	59 (15)	28.87 (97.77)
75% of Pull at Maximum Power—5.1 mph (8.2 km/h)-Manual Mode									
117.12 (87.34)	8748 (38.91)	5.02 (8.08)	2217	2.37	0.539 (0.328)	13.02 (2.57)	184 (85)	48 (9)	29.03 (98.31)
50% of Pull at Maximum Power—5.1 mph (8.2 km/h)-Manual Mode									
79.19 (59.05)	5832 (25.94)	5.09 (8.19)	2225	1.45	0.629 (0.382)	11.17 (2.20)	176 (80)	48 (9)	29.03 (98.31)
75% of Pull at Reduced Engine Speed—5.1 mph (8.2 km/h)-Auto Mode									
116.59 (86.94)	8748 (38.91)	5.00 (8.04)	1690	2.37	0.435 (0.264)	16.15 (3.18)	184 (84)	48 (9)	29.03 (98.31)
50% of Pull at Reduced Engine Speed—5.1 mph (8.2 km/h)-Auto Mode									
79.52 (59.30)	5827 (25.92)	5.12 (8.24)	1352	1.45	0.456 (0.277)	15.40 (3.03)	179 (82)	48 (9)	29.03 (98.31)

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

Dates of Test: April 1-22, 2004

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 7.021 lbs/gal (0.841 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: 30.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *RG6081H233741* **Crankshaft** lengthwise **Rated engine speed** 2100 **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 prestrainer **Fuel cooler** radiator for pump inlet fuel **Muffler** vertical **Cooling medium temperature control** 2 thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 72.3-79.8 lb/h (32.8 -36.2 kg/h) **High idle:** 2215 -2265 rpm **Turbo boost:** nominal 17.4-20.3 psi (120-140 kPa) as measured 18.8 psi (130 kPa)

CHASSIS: Type front wheel assist **Serial No.** *RW7920D010730* **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** 17965 lb (8149 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)									
115.86 (86.40)	17373 (77.28)	2.50 (4.02)	2226	11.44	0.600 (0.365)	11.71 (2.31)	184 (85)	49 (9)	28.87 (97.77)
3.7 mph (6.0 km/h)									
140.90 (105.07)	15832 (70.42)	3.34 (5.37)	2096	6.04	0.503 (0.306)	13.96 (2.75)	185 (85)	46 (8)	29.01 (98.24)
4.3 mph (7.0 km/h)									
146.04 (108.90)	13848 (61.60)	3.95 (6.36)	2097	4.59	0.483 (0.294)	14.53 (2.86)	186 (85)	47 (8)	29.01 (98.24)
5.1 mph (8.2 km/h)									
146.06 (108.91)	11678 (51.94)	4.69 (7.55)	2098	3.49	0.478 (0.291)	14.68 (2.89)	190 (88)	59 (15)	28.87 (97.77)
5.6 mph (9.0 km/h)									
146.61 (109.32)	10623 (47.25)	5.18 (8.33)	2103	2.93	0.474 (0.288)	14.81 (2.92)	188 (87)	56 (13)	28.89 (97.83)
6.2 mph (10.0 km/h)									
146.67 (109.37)	9533 (42.40)	5.77 (9.29)	2098	2.68	0.474 (0.288)	14.82 (2.92)	188 (87)	60 (16)	28.85 (97.70)
6.8 mph (11.0 km/h)									
146.13 (108.97)	8611 (38.30)	6.36 (10.24)	2100	2.28	0.483 (0.294)	14.52 (2.86)	193 (90)	62 (17)	28.84 (97.66)
7.5 mph (12.0 km/h)									
144.25 (107.57)	7784 (34.63)	6.95 (11.18)	2096	1.96	0.486 (0.296)	14.44 (2.84)	193 (90)	63 (17)	28.82 (97.60)
8.1 mph (13.0 km/h)									
143.14 (106.74)	7088 (31.53)	7.57 (12.19)	2098	1.67	0.489 (0.297)	14.36 (2.83)	194 (90)	65 (18)	28.81 (97.56)
8.7 mph (14.0 km/h)									
140.27 (104.60)	6457 (28.72)	8.15 (13.11)	2095	1.63	0.503 (0.306)	13.94 (2.75)	186 (86)	48 (9)	28.87 (97.77)

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. For the maximum power tests the fuel temperature at the injection pump inlet was maintained at 96°F (36°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. **1835**, Nebraska Summary 427, July 19, 2004.

Leonard L. Bashford
 Director

M.F. Kocher
 V.I. Adamchuk
 W.P. Campbell
 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)	66.7
Transport speed - no load	74.1
Bystander	85.6

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)	1830 lb (830 kg)	None
- Cast Iron (total)	2295 lb (1041 kg)	None
Front Tires - No., size, ply & psi (kPa)	Two 420/90R30;***;17(115)	Two 420/90R30;***;12(85)
Ballast - Liquid (total)	None	None
- Cast Iron (total)	1120 lb (508 kg)	None
Height of Drawbar	21.5 in (545 mm)	21.5 in (545 mm)
Static Weight with operator - Rear	15145 lb (6870 kg)	11500 lb (5216 kg)
- Front	8240 lb (3737 kg)	6640 lb (3012 kg)
- Total	23385 lb (10607 kg)	18140 lb (8228 kg)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - 1750 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)				
116.09 (86.57)	17423 (77.50)	2.50 (4.02)	2229	10.81	0.599 (0.364)	11.72 (2.31)	185 (85)	49 (9)	28.87 (97.77)
					3.7 mph (6.0 km/h)				
141.62 (105.61)	16090 (71.57)	3.30 (5.31)	2083	6.49	0.501 (0.305)	14.01 (2.76)	185 (85)	46 (8)	29.01 (98.24)
					4.3 mph (7.0 km/h)				
154.05 (114.88)	15588 (69.34)	3.71 (5.96)	1987	5.88	0.470 (0.286)	14.93 (2.94)	190 (88)	54 (12)	28.58 (96.78)
					5.1 mph (8.2 km/h)				
163.37 (121.82)	15081 (67.08)	4.06 (6.54)	1848	5.49	0.451 (0.274)	15.58 (3.07)	195 (90)	57 (14)	28.60 (96.85)
					5.6 mph (9.0 km/h)				
164.80 (122.89)	14630 (65.08)	4.22 (6.80)	1749	5.18	0.437 (0.266)	16.05 (3.16)	194 (90)	58 (14)	28.87 (97.77)
					6.2 mph (10.0 km/h)				
164.95 (123.00)	13074 (58.16)	4.73 (7.61)	1746	4.47	0.440 (0.267)	15.97 (3.15)	194 (90)	61 (16)	28.84 (97.66)
					6.8 mph (11.0 km/h)				
165.44 (123.37)	11841 (52.67)	5.24 (8.43)	1748	3.75	0.440 (0.268)	15.95 (3.14)	194 (90)	63 (17)	28.83 (97.63)
					7.5 mph (12.0 km/h)				
165.58 (123.47)	10767 (47.89)	5.77 (9.28)	1749	3.18	0.436 (0.265)	16.11 (3.17)	194 (90)	64 (18)	28.81 (97.56)
					8.1 mph (13.0 km/h)				
165.07 (123.09)	9900 (44.04)	6.25 (10.06)	1746	2.77	0.442 (0.269)	15.88 (3.13)	194 (90)	66 (19)	28.80 (97.53)
					8.7 mph (14.0 km/h)				
165.89 (123.70)	9222 (41.02)	6.75 (10.86)	1750	2.61	0.434 (0.264)	16.16 (3.18)	194 (90)	47 (8)	28.87 (97.77)
					9.3 mph (15.0 km/h)				
164.04 (122.33)	8532 (37.95)	7.21 (11.60)	1754	2.59	0.437 (0.266)	16.06 (3.16)	193 (90)	47 (8)	28.87 (97.77)
					10.3 mph (16.6 km/h)				
144.16 (107.50)	6704 (29.82)	8.06 (12.98)	1746	1.77	0.497 (0.302)	14.12 (2.78)	196 (91)	46 (8)	28.87 (97.77)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED (Auto mode)
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)	Hp.hr/gal (kW.h/l)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
2.8 mph (4.5 km/h)									
119.67 (89.24)	17266 (76.80)	2.60 (4.18)	1989	10.58	0.512 (0.311)	13.73 (2.70)	185 (85)	48 (9)	28.87 (97.77)
3.7 mph (6.0 km/h)									
147.96 (110.33)	15823 (70.38)	3.51 (5.64)	1999	5.87	0.476 (0.289)	14.76 (2.91)	191 (88)	52 (11)	28.58 (96.78)
4.3 mph (7.0 km/h)									
153.72 (114.63)	13841 (61.57)	4.16 (6.70)	2000	4.58	0.457 (0.278)	15.37 (3.03)	191 (88)	55 (13)	28.59 (96.82)
5.1 mph (8.2 km/h)									
153.25 (114.28)	11662 (51.87)	4.93 (7.93)	1997	3.49	0.457 (0.278)	15.36 (3.03)	190 (88)	57 (14)	28.60 (96.85)
5.6 mph (9.0 km/h)									
153.78 (114.68)	10634 (47.30)	5.42 (8.73)	2001	2.95	0.457 (0.278)	15.38 (3.03)	192 (89)	57 (14)	28.89 (97.83)
6.2 mph (10.0 km/h)									
154.05 (114.88)	9538 (42.43)	6.06 (9.75)	1998	2.64	0.459 (0.279)	15.28 (3.01)	195 (90)	61 (16)	28.85 (97.70)
6.8 mph (11.0 km/h)									
152.45 (113.68)	8579 (38.16)	6.66 (10.72)	1998	2.27	0.464 (0.283)	15.12 (2.98)	194 (90)	62 (17)	28.83 (97.63)
7.5 mph (12.0 km/h)									
151.03 (112.62)	7770 (34.56)	7.29 (11.73)	1997	1.91	0.467 (0.284)	15.05 (2.96)	192 (89)	64 (18)	28.82 (97.60)
8.1 mph (13.0 km/h)									
149.99 (111.85)	7077 (31.48)	7.95 (12.79)	1993	1.66	0.471 (0.287)	14.91 (2.94)	194 (90)	66 (19)	28.81 (97.56)
8.7 mph (14.0 km/h)									
145.19 (108.27)	6460 (28.74)	8.43 (13.56)	2002	1.61	0.485 (0.295)	14.48 (2.85)	189 (87)	48 (9)	28.87 (97.77)

DRAWBAR PERFORMANCE
BALLASTED - FRONT DRIVE ENGAGED - 1750 RPM
MAXIMUM POWER AT SELECTED TRAVEL SPEEDS

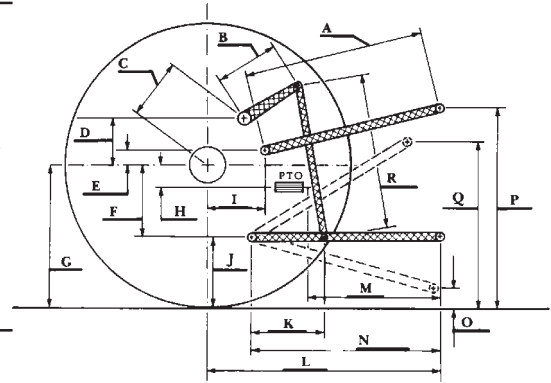
Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Temp. °F (°C) cool- ing med	Barom. inch Hg (kPa)		
120.25 (89.67)	23206 (103.23)	1.94 (3.13)	2087	2.2 mph (3.6 km/h) 9.08	0.594 (0.361)	11.82 (2.33)	190 (88)	57 (14)	28.58 (96.78)
148.57 (110.79)	21778 (96.87)	2.56 (4.12)	1951	3.1 mph (5.0 km/h) 5.99	0.496 (0.301)	14.17 (2.79)	187 (86)	46 (8)	29.04 (98.34)
159.83 (119.19)	20118 (89.49)	2.98 (4.79)	1855	3.7 mph (6.0 km/h) 4.64	0.461 (0.280)	15.24 (3.00)	190 (88)	50 (10)	29.04 (98.34)
166.17 (123.91)	18794 (83.60)	3.32 (5.34)	1748	4.3 mph (7.0 km/h) 3.98	0.437 (0.266)	16.06 (3.16)	191 (88)	51 (11)	29.03 (98.31)
168.73 (125.82)	16129 (71.75)	3.92 (6.31)	1748	5.1 mph (8.2 km/h) 3.18	0.431 (0.262)	16.29 (3.21)	191 (89)	51 (11)	29.02 (98.27)
168.88 (125.94)	14637 (65.11)	4.33 (6.96)	1747	5.6 mph (9.0 km/h) 2.81	0.428 (0.261)	16.36 (3.22)	194 (90)	52 (11)	29.02 (98.27)
169.05 (126.06)	13120 (58.36)	4.83 (7.78)	1747	6.2 mph (10.0 km/h) 2.46	0.424 (0.258)	16.54 (3.26)	194 (90)	53 (12)	29.01 (98.24)
167.87 (125.18)	11830 (52.62)	5.32 (8.56)	1745	6.8 mph (11.0 km/h) 2.15	0.427 (0.260)	16.43 (3.24)	195 (91)	54 (12)	29.00 (98.21)
167.41 (124.84)	10792 (48.00)	5.82 (9.36)	1746	7.5 mph (12.0 km/h) 1.93	0.432 (0.262)	16.27 (3.21)	197 (92)	54 (12)	29.00 (98.21)
165.47 (123.39)	9671 (43.02)	6.42 (10.33)	1745	8.1 mph (13.0 km/h) 1.69	0.437 (0.266)	16.08 (3.17)	199 (93)	54 (12)	29.00 (98.21)
164.34 (122.55)	9051 (40.26)	6.81 (10.96)	1744	8.7 mph (14.0 km/h) 1.55	0.438 (0.266)	16.03 (3.16)	199 (93)	54 (12)	29.00 (98.21)
162.29 (121.02)	8347 (37.13)	7.29 (11.73)	1747	9.3 mph (15.0 km/h) 1.39	0.446 (0.271)	15.74 (3.10)	199 (93)	54 (12)	29.00 (98.21)
142.56 (106.31)	6646 (29.56)	8.04 (12.95)	1748	10.1 mph (16.3 km/h) 1.03	0.513 (0.312)	13.69 (2.70)	201 (94)	54 (12)	29.00 (98.21)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III

Quick Attach: Yes

	<u>lift cylinders</u> 2 x 90 mm	<u>lift cylinders</u> 2 x 100 mm
Maximum Force Exerted Through Whole Range:	10987 lbs (48.9 kN)	15574 lbs (69.3 kN)
i) Opening pressure of relief valve:	NA	NA
Sustained pressure at compensator cutoff:	<u>one outlet set</u> 2905 psi (200 bar)	<u>two outlet sets combined</u> 2910 psi (201 bar)
ii) Pump delivery rate at minimum pressure and rated engine speed:	31.9 GPM (120.7 l/min)	32.0 GPM (121.1 l/min)
iii) Pump delivery rate at maximum hydraulic power:	32.2 GPM (121.9 l/min)	32.2 GPM (122.0 l/min)
Delivery pressure:	2200 psi (152 bar)	2610 psi (180 bar)
Power:	41.3 HP (30.8 kW)	49.0 HP (36.6 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

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)

	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



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