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1989

Test 1631: John Deere 8760 Powershift Diesel 12-Speed

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1631—SUMMARY 069

JOHN DEERE 8760 POWERSHIFT DIESEL

12 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—1109 rpm)					
260.94 (194.58)	2100	16.35 (61.88)	0.433 (0.263)	15.96 (3.14)	
Maximum Power (2 Hours)					
276.95 (206.52)	1749	15.62 (59.14)	0.390 (0.237)	17.73 (3.49)	
Standard Power Take-off Speed (1003 rpm)					
276.09 (205.88)	1895	16.17 (61.22)	0.405 (0.246)	17.07 (3.36)	

VARYING POWER AND FUEL CONSUMPTION

260.94 (194.58)	2100	16.35 (61.88)	0.433 (0.263)	15.96 (3.14)	Air temperature
229.26 (170.96)	2172	14.80 (56.04)	0.446 (0.271)	15.49 (3.05)	75°F (24°C)
174.57 (130.17)	2202	12.07 (45.69)	0.478 (0.291)	14.46 (2.85)	Relative humidity
117.72 (87.79)	2232	9.46 (35.83)	0.556 (0.338)	12.44 (2.45)	49%
59.70 (44.52)	2265	6.95 (26.30)	0.804 (0.489)	8.59 (1.69)	Barometer
0.86 (0.64)	2289	4.38 (16.60)	35.130 (21.369)	0.20 (0.04)	29.14" Hg (98.69 kPa)

Maximum Torque 909 lb.-ft (1233 Nm) at 1501 rpm

Maximum Torque Rise 39.3%

Torque Rise at 1000 engine rpm 12%

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 Gear									
239.49 (178.59)	13046 (58.03)	6.88 (11.08)	2096	1.44	0.474 (0.288)	14.59 (2.87)	189 (87)	60 (16)	29.00 (98.21)
75% of Pull at Maximum Power—7th Gear									
187.68 (139.95)	9791 (43.55)	7.19 (11.57)	2184	1.21	0.502 (0.305)	13.78 (2.71)	183 (84)	58 (14)	29.07 (98.44)
50% of Pull at Maximum Power—7th Gear									
127.34 (94.95)	6521 (29.00)	7.32 (11.79)	2218	0.85	0.577 (0.351)	11.98 (2.36)	180 (82)	59 (15)	29.08 (98.48)
75% of Pull at Reduced Engine Speed—9th Gear									
188.31 (140.42)	9798 (43.58)	7.21 (11.60)	1668	1.21	0.439 (0.267)	15.76 (3.10)	185 (85)	58 (14)	29.07 (98.44)
50% of Pull at Reduced Engine Speed—9th Gear									
127.45 (95.04)	6531 (29.05)	7.32 (11.78)	1688	0.94	0.488 (0.297)	14.16 (2.79)	180 (82)	61 (16)	29.08 (98.48)

Location of Test: Center for Agricultural Equipment, Lincoln Nebraska 68583-0832, U.S.A.

Dates of Test: September-October, 1989

Manufacturer: John Deere Waterloo Works, P.O. Box 3500, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel Cetane No. 51.1 Specific gravity converted to 60°/60°F (15°/15°C) 0.8300 Fuel weight 6.910 lbs/gal (0.828 kg/l) Oil SAE 15W40 API service classification CD/SD To motor 6.717 gal (25.425 l) Drained from motor 6.417 gal (24.290 l) Transmission, hydraulic and final drive lubricant John Deere HyGard fluid Total time engine was operated 22.0 hours.

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger and air to air intercooler Serial No. *RG6101H100402* Crankshaft lengthwise Rated engine speed 2100 Bore and stroke (as specified) 5.12" × 5.00" (130.0 mm × 127.0 mm) Compression ratio 15.2 to 1 Displacement 619 cu in (10144 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and aspirator Oil filter two full flow cartridges Oil cooler engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil Fuel filter one paper cartridge Muffler vertical Cooling medium temperature control 3 thermostats and variable speed fan.

ENGINE OPERATING PARAMETERS: Fuel rate 106.1-115.9 lb/hr (48.1-52.6 kg/hr) High idle 2225-2325 rpm Turbo boost nominal 18-22 psi (124-152 kPa) as measured 20.0 psi (138 kPa).

CHASSIS: Type four wheel drive with duals Serial No. *RW8760P001410* Tread width rear 73.7" (1871 mm) to 132.0" (3352 mm) front 73.7" (1871 mm) to 132.0" (3352 mm) Wheel base 133.9" (3400 mm) Hydraulic control system direct engine drive Transmission selective gear fixed ratio with full range operator controlled powershift Nominal travel speeds mph (km/h) first 2.28 (3.67) second 3.02 (4.86) third 3.97 (6.39) fourth 4.65 (7.48) fifth 5.36 (8.63) sixth 6.16 (9.92) seventh 7.10 (11.43) eighth 8.09 (13.02) ninth 9.32 (15.00) tenth 10.92 (17.59) eleventh 14.48 (23.32) twelfth 19.00 (30.60) reverse 2.82 (4.54), 5.74 (9.25) Clutch multiple wet disc hydraulically power actuated by foot pedal Brakes multiple wet disc hydraulically power actuated by foot pedal Steering hydrostatic and articulated Power take-off 1000 rpm at 1895 engine rpm Unladen tractor mass 32095 lb (14558 kg).

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 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)	Air dry bulb	Barom. inch Hg (kPa)	
2nd Gear									
231.76 (172.82)	31671 (140.88)	2.74 (4.42)	2060	5.99	0.488 (0.297)	14.17 (2.79)	186 (85)	66 (19)	28.77 (97.43)
3rd Gear									
246.69 (183.96)	27575 (122.66)	3.35 (5.40)	1883	4.12	0.450 (0.274)	15.35 (3.02)	189 (87)	68 (20)	28.78 (97.46)
4th Gear									
247.97 (184.91)	25214 (112.16)	3.69 (5.94)	1749	3.45	0.437 (0.266)	15.83 (3.12)	190 (88)	66 (19)	28.89 (97.83)
5th Gear									
250.51 (186.81)	21908 (97.45)	4.29 (6.90)	1752	2.68	0.433 (0.263)	15.96 (3.14)	190 (88)	66 (19)	28.92 (97.93)
6th Gear									
252.89 (188.58)	19175 (85.29)	4.95 (7.96)	1749	1.99	0.429 (0.261)	16.13 (3.18)	190 (88)	59 (15)	29.01 (98.24)
7th Gear									
255.34 (190.40)	16751 (74.51)	5.72 (9.20)	1748	1.91	0.422 (0.257)	16.38 (3.23)	191 (88)	61 (16)	28.99 (98.17)
8th Gear									
251.73 (187.71)	14446 (64.26)	6.53 (10.52)	1750	1.56	0.429 (0.261)	16.11 (3.17)	191 (88)	63 (17)	28.97 (98.10)
9th Gear									
252.04 (187.95)	12490 (55.56)	7.57 (12.18)	1754	1.29	0.431 (0.262)	16.02 (3.16)	192 (89)	65 (18)	28.95 (98.04)
10th Gear									
251.35 (187.43)	10619 (47.23)	8.88 (14.29)	1752	1.21	0.434 (0.264)	15.90 (3.13)	192 (89)	66 (19)	28.94 (98.00)

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/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
1st Gear									
186.24 (138.88)	32360 (143.94)	2.16 (3.47)	2181	7.64	0.521 (0.317)	13.26 (2.61)	184 (84)	66 (19)	28.78 (97.46)
2nd Gear									
231.58 (172.69)	30737 (136.72)	2.83 (4.55)	2100	5.10	0.488 (0.297)	14.15 (2.79)	185 (85)	65 (18)	28.77 (97.43)
3rd Gear									
236.81 (176.59)	23522 (104.63)	3.78 (6.08)	2099	3.19	0.477 (0.290)	14.48 (2.85)	187 (86)	69 (21)	28.78 (97.46)
4th Gear									
236.83 (176.61)	19850 (88.30)	4.47 (7.20)	2100	2.25	0.476 (0.289)	14.52 (2.86)	189 (87)	66 (19)	28.91 (97.90)
5th Gear									
241.82 (180.32)	17503 (77.86)	5.18 (8.34)	2101	1.99	0.466 (0.283)	14.83 (2.92)	189 (87)	66 (19)	28.93 (97.97)
6th Gear									
237.30 (176.95)	14909 (66.32)	5.97 (9.61)	2100	1.56	0.477 (0.290)	14.49 (2.85)	188 (87)	58 (14)	29.02 (98.27)
7th Gear									
239.49 (178.59)	13046 (58.03)	6.88 (11.08)	2096	1.44	0.474 (0.288)	14.59 (2.87)	189 (87)	60 (16)	29.00 (98.21)
8th Gear									
234.55 (174.91)	11180 (49.73)	7.87 (12.66)	2099	1.29	0.480 (0.292)	14.40 (2.84)	189 (87)	62 (17)	28.98 (98.14)
9th Gear									
235.19 (175.38)	9719 (43.23)	9.07 (14.60)	2097	1.12	0.483 (0.294)	14.31 (2.82)	189 (87)	64 (18)	28.96 (98.07)

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 153° F (67° C). This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures. The pull in 1st and 2nd gears was limited to avoid tractor bouncing. The performance figures on this summary were taken from a test conducted under the OECD restricted standard test code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1631**, Summary 069, December 22, 1989.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
R. D. GRISSO
G. J. HOFFMAN
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB		dB(A)
Gear closest to 4.7 mph (7.5 km/h)—4th Gear		77.5
Maximum sound level		78.5
Transport speed—no load—12th Gear		78.0
Bystander in 12th Gear		90.0

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2096	1892	1683	1471	1261	1048
Pull—lbs (kN)	13046 (58.03)	15354 (68.30)	17407 (77.43)	18117 (80.59)	16681 (74.20)	14932 (66.42)
Increase in Pull %	0	18	33	39	28	14
Power—Hp (kW)	239.49 (178.59)	253.70 (189.18)	255.14 (190.25)	231.83 (172.88)	183.34 (136.72)	136.69 (101.93)
Speed—Mph (km/h)	6.88 (11.08)	6.20 (9.97)	5.50 (8.85)	4.80 (7.72)	4.12 (6.63)	3.43 (5.52)
Slip %	1.47	1.91	2.08	2.25	2.08	1.73

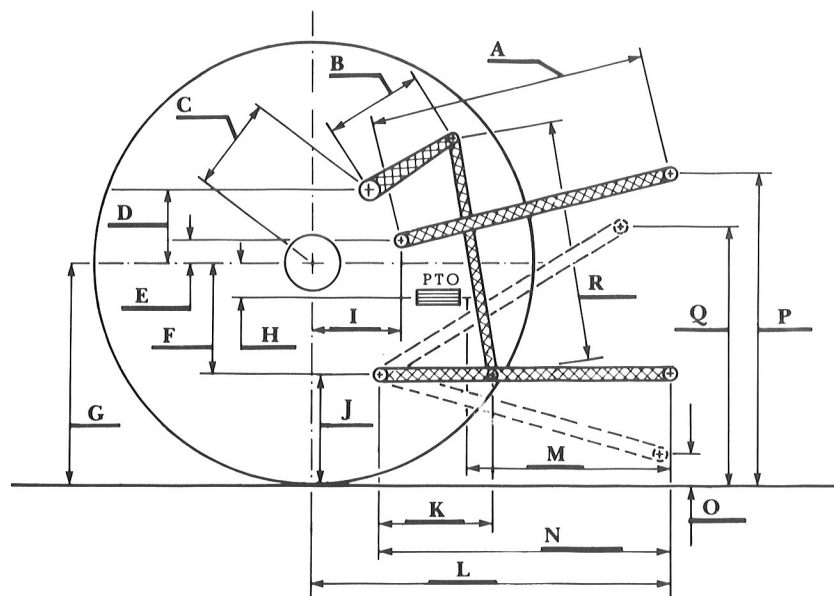
THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. (bar)	2500 (172)				
Location	remote outlet				
Hydraulic oil temperature °F(°C)	148 (69)				
Location	hydraulic sump				
Category	III				
Quick attach	Yes				
Hitch point distance to ground level in. (mm)	8.9 (226)	16.2 (411)	26.4 (671)	34.4 (874)	40.2 (1021)
Lift force on frame lb. " " " " " " (kN)	16075 (71.5)	16358 (72.8)	16417 (73.0)	15822 (70.4)	14983 (66.6)

TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 18.4R42; **, 14 (95)
Front Tires	—No., size, ply & psi (kPa)	Four 18.4R42; **, 14 (95)
Height of Drawbar		17.5 in (445 mm)
Static Weight	—Rear	14335 lb (6502 kg)
	—Front	17760 lb (8056 kg)
	—Total	32095 lb (14558 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III	
Quick Attach: Yes	
Maximum Force Exerted Through Whole Range:	11000 lbs (48.9 kN)
i) Opening pressure of relief valve:	NA
Sustained pressure with pump stalled:	2500 psi (172 Bar)
ii) Pump delivery rate at minimum pressure:	46.1 GPM (174.5 l/min)
iii) Pump delivery rate at maximum	
hydraulic power:	43.5 GPM (164.7 l/min)
Delivery pressure:	1800 psi (124 Bar)
Power:	45.7 Hp (34.1 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	31.5	800
B	18.6	472
C	26.2	666
D	24.4	620
E	11.3	288
F	13.8	350
G	35.1	892
H	4.8	122
I	22.7	577
J	21.3	542
K	28.8	731
L	55.3	1405
L'	61.8	1570
M	25.4	645
N	44.0	1117
O	7.9	201
P	48.3	1228
Q	40.3	1024
R	44.8	1137

L' to end of Quick attach



John Deere 8760 Powershift Diesel