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## Test 1624: John Deere 8760 Powersync Diesel 12 and 24-Speed

Nebraska Tractor Test Lab

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

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# NEBRASKA OECD TRACTOR TEST 1624—SUMMARY 062

## JOHN DEERE 8760 POWRSYNC DIESEL

### 24 SPEED ALSO 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
<b>MAXIMUM POWER AND FUEL CONSUMPTION</b>					
<b>Rated Engine Speed—(PTO speed—1109 rpm)</b>					
256.94 (191.60)	2100	15.73 (59.53)	0.423 (0.257)	16.34 (3.22)	
<b>Maximum Power (2 Hours)</b>					
277.42 (206.87)	1900	16.07 (60.85)	0.401 (0.244)	17.26 (3.40)	
<b>Standard Power Take-off Speed (1003 rpm)</b>					
277.41 (206.86)	1900	16.08 (60.88)	0.401 (0.244)	17.25 (3.40)	

#### VARYING POWER AND FUEL CONSUMPTION

256.94 (191.60)	2100	15.73 (59.53)	0.423 (0.257)	16.34 (3.22)	Air temperature
227.57 (169.70)	2190	14.71 (55.70)	0.447 (0.272)	15.47 (3.05)	75°F (24°C)
172.72 (128.79)	2214	12.02 (45.51)	0.481 (0.293)	14.37 (2.83)	Relative humidity
116.09 (86.57)	2235	8.94 (33.85)	0.532 (0.324)	12.98 (2.56)	69%
58.75 (43.81)	2259	6.94 (26.29)	0.817 (0.497)	8.46 (1.67)	Barometer
0.57 (0.43)	2281	4.25 (16.10)	51.300 (31.204)	0.13 (0.03)	29.06" Hg (98.42 kPa)

Maximum Torque 904 lb.-ft (1225 Nm) at 1450 rpm

Maximum Torque Rise 40.6%

Torque Rise at 1000 engine rpm 24%

#### 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)
<b>Maximum Power—12th (C3) Gear</b>									
237.21 (176.89)	14748 (65.60)	6.03 (9.71)	2100	1.86	0.462 (0.281)	14.97 (2.95)	186 (86)	67 (19)	28.78 (97.46)
<b>75% of Pull at Maximum Power—12th (C3) Gear</b>									
187.23 (139.62)	11069 (49.24)	6.34 (10.21)	2202	1.59	0.492 (0.299)	14.05 (2.77)	186 (86)	74 (23)	28.60 (96.85)
<b>50% of Pull at Maximum Power—12th (C3) Gear</b>									
126.71 (94.49)	7376 (32.81)	6.44 (10.37)	2224	0.98	0.564 (0.343)	12.26 (2.42)	183 (84)	74 (23)	28.59 (96.82)
<b>75% of Pull at Reduced Engine Speed—15th (B5) Gear</b>									
186.95 (139.41)	11064 (49.21)	6.34 (10.20)	1773	1.68	0.438 (0.267)	15.76 (3.11)	188 (86)	74 (23)	28.60 (96.85)
<b>50% of Pull at Reduced Engine Speed—15th (B5) Gear</b>									
126.91 (94.64)	7378 (32.82)	6.45 (10.38)	1792	0.98	0.488 (0.297)	14.15 (2.79)	181 (83)	76 (24)	28.59 (96.82)

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

**Dates of Test:** May, 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)** 0.8301 **Fuel weight** 6.912 lbs/gal (0.828 kg/l) **Oil SAE 15W40 API service classification** CD/SD **To motor** 6.928 gal (26.226 l) **Drained from motor** 6.698 gal (25.355 l) **Transmission, hydraulic and final drive lubricant** John Deere HyGard fluid **Total time engine was operated** 26.5 hours.

**ENGINE:** Make John Deere Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** \*RG6101H100194\* **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 18.5 psi (128 kPa).

**CHASSIS:** **Type** four wheel drive with duals **Serial No.** \*RW8760H001217\* **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 partial (2) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 2.06 (3.31) second 2.47 (3.98) third 2.65 (4.27) fourth 3.18 (5.12) fifth 3.63 (5.84) sixth 4.35 (7.00) seventh 4.39 (7.06) eighth 4.84 (7.79) ninth 5.26 (8.47) tenth 5.65 (9.10) eleventh 5.80 (9.34) twelfth 6.23 (10.03) thirteenth 6.78 (10.91) fourteenth 7.47 (12.02) fifteenth 7.73 (12.45) sixteenth 8.53 (13.72) seventeenth 9.27 (14.93) eighteenth 10.22 (16.45) nineteenth 10.31 (16.60) twentieth 12.36 (19.90) twenty-first 13.28 (21.37) twenty-second 15.92 (25.63) twenty-third 18.18 (29.25) twenty-fourth 21.78 (35.06) reverse 2.47 (3.98), 2.96 (4.77), 5.26 (8.47), 5.80 (9.34), 6.31 (10.16), 6.96 (11.20) **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** multiple wet disc hydraulically power actuated by foot pedal **Steering** hydrostatic

# **DRAWBAR PERFORMANCE AT 1900 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)
3rd (A3) Gear									
215.92 (161.01)	32766 (145.75)	2.47 (3.98)	2155	7.91	0.502 (0.305)	13.78 (2.71)	185 (85)	57 (14)	28.60 (96.85)
4th (A4) Gear									
230.17 (171.64)	30738 (136.73)	2.81 (4.52)	2010	6.43	0.477 (0.290)	14.50 (2.86)	185 (85)	62 (17)	28.61 (96.88)
5th (A5) Gear									
239.73 (178.77)	28069 (124.85)	3.20 (5.15)	1974	4.90	0.455 (0.277)	15.19 (2.99)	186 (86)	64 (18)	28.62 (96.92)
6th (A6) Gear									
246.51 (183.82)	24773 (110.19)	3.73 (6.01)	1900	3.99	0.448 (0.272)	15.44 (3.04)	190 (88)	70 (21)	28.63 (96.95)
7th (B1) Gear									
249.86 (186.32)	24913 (110.82)	3.76 (6.05)	1897	3.99	0.442 (0.269)	15.64 (3.08)	187 (86)	70 (21)	28.64 (96.99)
8th (C1) Gear									
254.65 (189.89)	22815 (101.48)	4.19 (6.74)	1901	3.23	0.435 (0.264)	15.90 (3.13)	188 (87)	68 (20)	28.80 (97.53)
9th (B2) Gear									
253.85 (189.29)	20826 (92.64)	4.57 (7.36)	1903	2.81	0.436 (0.265)	15.84 (3.12)	189 (87)	68 (20)	28.80 (97.53)
10th (B3) Gear									
255.84 (190.78)	19528 (86.86)	4.91 (7.91)	1901	2.64	0.434 (0.264)	15.93 (3.14)	189 (87)	69 (21)	28.79 (97.49)
11th (C2) Gear									
253.30 (188.88)	18793 (83.59)	5.05 (8.13)	1901	2.46	0.438 (0.267)	15.77 (3.11)	190 (88)	68 (20)	28.78 (97.46)
12th (C3) Gear									
256.26 (191.09)	17664 (78.57)	5.44 (8.76)	1902	2.20	0.434 (0.264)	15.93 (3.14)	189 (87)	67 (19)	28.78 (97.46)
13th (B4) Gear									
252.78 (188.50)	16000 (71.17)	5.92 (9.53)	1901	2.03	0.439 (0.267)	15.73 (3.10)	190 (88)	68 (20)	28.78 (97.46)
14th (C4) Gear									
252.31 (188.15)	14441 (64.24)	6.55 (10.54)	1902	1.77	0.440 (0.268)	15.70 (3.09)	191 (88)	70 (21)	28.79 (97.49)
15th (B5) Gear									
253.18 (188.80)	13999 (62.27)	6.78 (10.92)	1900	1.77	0.437 (0.266)	15.81 (3.12)	190 (88)	70 (21)	28.79 (97.49)
16th (C5) Gear									
253.92 (189.35)	12702 (56.50)	7.50 (12.06)	1902	1.59	0.438 (0.266)	15.78 (3.11)	191 (88)	69 (21)	28.79 (97.49)
17th (B6) Gear									
245.62 (183.16)	11284 (50.19)	8.16 (13.14)	1903	1.42	0.451 (0.274)	15.33 (3.02)	191 (88)	69 (21)	28.80 (97.53)

and articulated **Power take-off** 1000 rpm at 1895 engine rpm **Unladen tractor mass** 32695 lb (14830 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 return was maintained at 146° F (63° 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 3rd gear 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. **1624**, Summary 062, December 22, 1989.

LOUIS I. LEVITICUS

Engineer-in-Charge

K. VON BARGEN

R. D. GRISSO

G. J. HOFFMAN

Board of Tractor Test Engineers

# 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)
3rd (A3) Gear									
216.70 (161.59)	32880 (146.26)	2.47 (3.98)	2153	7.84	0.500 (0.304)	13.81 (2.72)	185 (85)	57 (14)	28.60 (96.85)
4th (A4) Gear									
224.63 (167.51)	28530 (126.91)	2.95 (4.75)	2100	5.79	0.486 (0.296)	14.21 (2.80)	187 (86)	70 (21)	28.62 (96.92)
5th (A5) Gear									
228.64 (170.50)	24999 (111.20)	3.43 (5.52)	2101	4.24	0.476 (0.290)	14.52 (2.86)	187 (86)	70 (21)	28.62 (96.92)
6th (A6) Gear									
230.35 (171.77)	20727 (92.20)	4.17 (6.71)	2101	2.98	0.475 (0.289)	14.56 (2.87)	188 (87)	70 (21)	28.63 (96.95)
7th (B1) Gear									
238.39 (177.77)	21257 (94.56)	4.21 (6.77)	2101	2.98	0.457 (0.278)	15.11 (2.98)	187 (86)	70 (21)	28.64 (96.99)
8th (C1) Gear									
240.25 (179.16)	19365 (86.14)	4.65 (7.49)	2099	2.46	0.454 (0.276)	15.23 (3.00)	188 (87)	68 (20)	28.80 (97.53)
9th (B2) Gear									
236.68 (176.49)	17468 (77.70)	5.08 (8.18)	2103	2.20	0.464 (0.282)	14.91 (2.94)	189 (87)	68 (20)	28.80 (97.53)
10th (B3) Gear									
239.24 (178.40)	16443 (73.14)	5.46 (8.78)	2100	2.03	0.459 (0.279)	15.07 (2.97)	188 (87)	69 (21)	28.78 (97.46)
11th (C2) Gear									
236.14 (176.09)	15777 (70.18)	5.61 (9.03)	2101	1.94	0.466 (0.283)	14.85 (2.92)	187 (86)	67 (19)	28.78 (97.46)
12th (C3) Gear									
237.21 (176.89)	14748 (65.60)	6.03 (9.71)	2100	1.86	0.462 (0.281)	14.97 (2.95)	186 (86)	67 (19)	28.78 (97.46)
13th (B4) Gear									
234.49 (174.86)	13402 (59.61)	6.56 (10.56)	2097	1.77	0.467 (0.284)	14.80 (2.92)	188 (87)	69 (21)	28.78 (97.46)
14th (C4) Gear									
233.24 (173.93)	12062 (53.65)	7.25 (11.67)	2100	1.51	0.468 (0.285)	14.77 (2.91)	188 (87)	70 (21)	28.79 (97.49)
15th (B5) Gear									
234.35 (174.76)	11686 (51.98)	7.52 (12.10)	2100	1.51	0.466 (0.283)	14.83 (2.92)	190 (88)	70 (21)	28.79 (97.49)
16th (C5) Gear									
233.79 (174.34)	10563 (46.99)	8.30 (13.36)	2099	1.33	0.469 (0.285)	14.75 (2.91)	189 (87)	70 (21)	28.79 (97.49)

TRACTOR SOUND LEVEL WITH CAB									dB(A)
Gear closest to 4.7 mph (7.5 km/h)—8th (C1) Gear									76.0
Maximum sound level									76.5
Transport speed—no load—24th (D6) Gear									75.0
Bystander in 24th (D6) Gear									87.0

## LUGGING ABILITY IN 12th (C3) GEAR

Crankshaft Speed rpm	2100	1890	1679	1469	1258	1054
Pull—lbs (kN)	14748 (65.60)	17729 (78.86)	19632 (87.33)	20796 (92.51)	20266 (90.15)	18806 (83.65)
Increase in Pull %	0	20	33	41	37	28
Power—Hp (kW)	237.25 (176.92)	255.30 (190.38)	250.48 (186.78)	231.47 (172.61)	193.37 (144.20)	150.34 (112.11)
Speed—Mph (km/h)	6.03 (9.71)	5.40 (8.69)	4.78 (7.70)	4.17 (6.72)	3.58 (5.76)	3.00 (4.82)
Slip %	1.86	2.29	2.64	2.81	2.81	2.64

## TIRES AND WEIGHT

<b>Rear Tires</b>	—No., size, ply & psi (kPa)
<b>Front Tires</b>	—No., size, ply & psi (kPa)
<b>Height of Drawbar</b>	
<b>Static Weight</b>	—Rear
	—Front
	—Total

## Tested Without Ballast

Four 18.4R42; **, 14 (95)
Four 18.4R42; **, 14 (95)
18 in (455 mm)
14285 lb (6480 kg)
18410 lb (8350 kg)
32695 lb (14830 kg)

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

Observed Maximum Pressure psi. (bar)	2580 (178)				
Location	remote outlet				
Hydraulic oil temperature °F(°C)	153 (67)				
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.	16075	16358	16417	15822	14983
" " " " " (kN)	(71.5)	(72.8)	(73.0)	(70.4)	(66.6)

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

CATEGORY: III

Quick Attach: Yes

Maximum Force Exerted Through Whole Range:

11611 lbs (51.7 kN)

i) Opening pressure of relief valve:

NA

Sustained pressure with pump stalled:

2580 psi (178 Bar)

ii) Pump delivery rate at minimum pressure:

43.9 GPM (166.2 l/min)

iii) Pump delivery rate at maximum

hydraulic power:

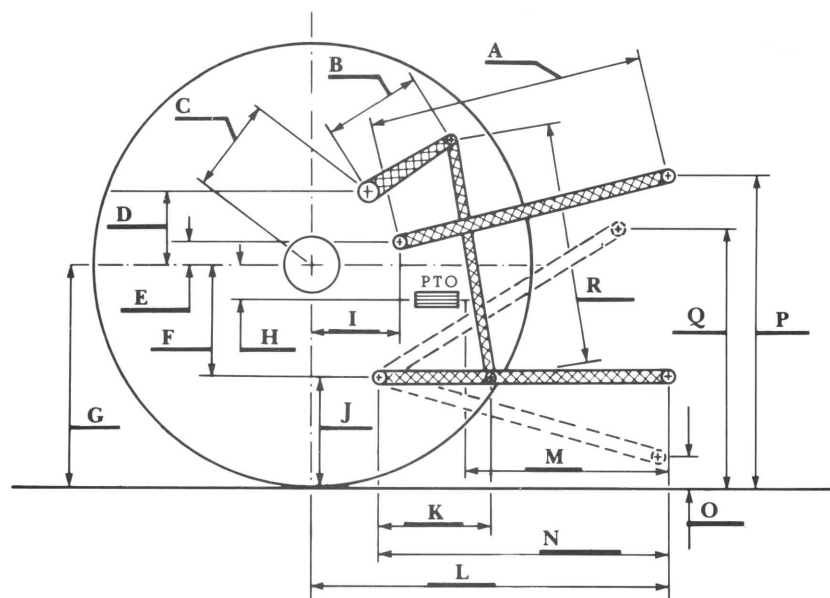
41.6 GPM (157.5 l/min)

Delivery pressure:

1900 psi (131 Bar)

Power:

46.1 Hp (34.4 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 Powrsync Diesel

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