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Test 1671: John Deere 8770 Powersync Diesel 12 and 24 Speeds

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1671—SUMMARY 139

JOHN DEERE 8770 POWRSYNC DIESEL

24 SPEED ALSO 12 SPEED

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

Dates of Test: October 19 to November 16, 1993

Manufacturer: John Deere Tractor Works, P.O.
Box 270, Waterloo, Iowa 50704

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—1108 rpm)					
259.31 (193.36)	2100	15.53 (58.77)	0.419 (0.255)	16.70 (3.29)	
Maximum Power (2 Hours)					
286.31 (213.50)	1900	16.04 (60.73)	0.392 (0.238)	17.85 (3.52)	
Standard Power Take-off Speed (1003 rpm)					
286.31 (213.50)	1900	16.04 (60.73)	0.392 (0.238)	17.85 (3.52)	

VARYING POWER AND FUEL CONSUMPTION

259.31 (193.36)	2100	15.53 (58.77)	0.419 (0.255)	16.70 (3.29)	Air temperature
227.66 (169.77)	2168	14.33 (54.23)	0.440 (0.268)	15.89 (3.13)	75°F (24°C)
173.08 (129.06)	2194	11.41 (43.19)	0.461 (0.280)	15.17 (2.99)	Relative humidity
116.55 (86.91)	2219	8.84 (33.45)	0.530 (0.323)	13.19 (2.60)	49%
58.84 (43.88)	2241	5.62 (21.27)	0.668 (0.406)	10.47 (2.06)	Barometer
1.14 (0.85)	2261	3.77 (14.29)	23.231 (14.131)	0.30 (0.06)	29.04" Hg (98.33 kPa)

Maximum Torque 962 lb.-ft. (1304 Nm) at 1402 rpm
Maximum Torque Rise 48.2%
Torque rise at 999 engine rpm 47%

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—8th (C1) Gear									
242.52 (180.85)	19392 (86.26)	4.69 (7.55)	2099	2.72	0.454 (0.276)	15.39 (3.03)	181 (83)	54 (12)	28.61 (96.88)
75% of Pull at Maximum Power—8th (C1) Gear									
189.96 (141.65)	14531 (64.64)	4.90 (7.89)	2181	1.93	0.477 (0.290)	14.67 (2.89)	181 (83)	64 (18)	28.60 (96.85)
50% of Pull at Maximum Power—8th (C1) Gear									
129.54 (96.60)	9712 (43.20)	5.00 (8.05)	2210	1.49	0.534 (0.325)	13.09 (2.58)	175 (79)	64 (18)	28.60 (96.85)
75% of Pull at Reduced Engine Speed—13th (B4) Gear									
189.27 (141.14)	14540 (64.68)	4.88 (7.86)	1553	2.02	0.407 (0.248)	17.18 (3.38)	182 (83)	64 (18)	28.60 (96.85)
50% of Pull at Reduced Engine Speed—13th (B4) Gear									
129.10 (96.27)	9700 (43.15)	4.99 (8.03)	1578	1.45	0.435 (0.264)	16.09 (3.17)	178 (81)	64 (18)	28.60 (96.85)

FUEL OIL and TIME: Fuel No. 2 Diesel Cetane No. 53.9 Specific gravity converted to 60°/60° F (15°/15°C) 0.8400 Fuel weight 6.994 lbs/gal (0.838 kg/l) Oil SAE 15W-40 API service classification SG/CE To motor 7.605 gal (28.786 l) Drained from motor 7.204 gal (27.271 l) Transmission and hydraulic lubricant and final drive lubricant John Deere Hy-Gard fluid Total time engine was operated 32.5 hours.

ENGINE: Make John Deere Diesel Type six cylinder vertical with turbocharger and air to air intercooler Serial No. *6101HRW11-500963* Crankshaft lengthwise Rated engine speed 2100 Bore and stroke (as specified) 5.12" × 5.00" (130.0 mm × 127.0 mm) Compression ratio 15.75 to 1 Displacement 619 cu in (10144 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 two paper cartridges Muffler vertical Cooling medium temperature control two thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 106.9-113.5 lb/h (48.5-51.5 kg/h) High idle: 2210-2310 rpm Turbo boost nominal 20.6-23.5 psi (142-162 kPa) as measured 22.5 psi (155 kPa)

CHASSIS: Type four wheel drive with duals Serial No. *RW8770H001228* Tread width rear 60.0" (1524 mm) to 131.8" (3348 mm) front 60.0" (1524 mm) to 131.8" (3348 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 2.01 (3.23) second 2.41 (3.88) third 2.58 (4.16) fourth 3.10 (4.99) fifth 3.54 (5.69) sixth 4.24 (6.83) seventh 4.28 (6.89) eighth 4.72 (7.59) ninth 5.13 (8.26) tenth 5.51 (8.87) eleventh 5.65 (9.10) twelfth 6.07 (9.77) thirteenth 6.61 (10.63) fourteenth 7.28 (11.72) fifteenth 7.54 (12.13) sixteenth 8.31 (13.38) seventeenth 9.04 (14.55) eighteenth 9.97 (16.04) nineteenth 10.05 (16.18) twentieth 12.05 (19.40) twenty-first 12.94 (20.83) twenty-second 15.52 (24.98) twenty-third 17.72 (28.51) twenty-fourth 21.24 (34.18) reverse 2.41 (3.88), 2.89 (4.65), 5.13 (8.26), 5.65 (9.10), 6.15 (9.90), 6.79 (10.92) Clutch multiple wet disc hydraulically actuated by foot pedal Brakes wet multiple disc hydraulically actuated by foot pedal Steering hydrostatic and articulated Power take-off 1000 rpm at 1895 engine rpm Unladen tractor mass 32960 lb (14950 kg)

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)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3rd (A3) Gear									
220.05 (164.09)	33464 (148.86)	2.47 (3.97)	2156	9.03	0.496 (0.302)	14.09 (2.78)	177 (80)	47 (8)	28.55 (96.68)
4th (A4) Gear									
230.77 (172.08)	28988 (128.95)	2.99 (4.80)	2095	5.58	0.475 (0.289)	14.73 (2.90)	179 (82)	62 (17)	28.71 (97.22)
5th (A5) Gear									
235.55 (175.65)	25550 (113.65)	3.46 (5.56)	2100	4.34	0.465 (0.283)	15.04 (2.96)	182 (83)	63 (17)	28.67 (97.09)
6th (A6) Gear									
235.17 (175.36)	21025 (93.52)	4.19 (6.75)	2101	3.41	0.465 (0.283)	15.03 (2.96)	181 (83)	64 (18)	28.65 (97.02)
7th (B1) Gear									
241.81 (180.32)	21370 (95.06)	4.24 (6.83)	2102	3.06	0.456 (0.277)	15.34 (3.02)	180 (82)	54 (12)	28.62 (96.92)
8th (C1) Gear									
242.52 (180.85)	19392 (86.26)	4.69 (7.55)	2099	2.72	0.454 (0.276)	15.39 (3.03)	181 (83)	54 (12)	28.61 (96.88)
9th (B2) Gear									
240.44 (179.30)	17642 (78.48)	5.11 (8.23)	2098	2.37	0.456 (0.277)	15.35 (3.02)	180 (82)	54 (12)	28.61 (96.88)
10th (B3) Gear									
242.07 (180.51)	16508 (73.43)	5.50 (8.85)	2098	2.28	0.452 (0.275)	15.47 (3.05)	181 (83)	54 (12)	28.61 (96.88)
11th (C2) Gear									
238.39 (177.77)	15828 (70.41)	5.65 (9.09)	2096	2.20	0.460 (0.280)	15.19 (2.99)	182 (83)	51 (11)	28.66 (97.05)
12th (C3) Gear									
240.40 (179.26)	14810 (65.88)	6.09 (9.80)	2101	2.02	0.457 (0.278)	15.30 (3.01)	182 (83)	54 (12)	28.63 (96.95)
13th (B4) Gear									
236.43 (176.31)	13373 (59.48)	6.63 (10.67)	2101	1.85	0.465 (0.283)	15.04 (2.96)	181 (83)	54 (12)	28.63 (96.95)
14th (C4) Gear									
235.87 (175.89)	12088 (53.77)	7.32 (11.78)	2100	1.67	0.465 (0.283)	15.03 (2.96)	182 (83)	53 (12)	28.63 (96.95)
15th (B5) Gear									
237.18 (176.87)	11733 (52.19)	7.58 (12.20)	2099	1.67	0.464 (0.282)	15.07 (2.97)	181 (83)	53 (12)	28.64 (96.99)
16th (C5) Gear									
235.65 (175.72)	10574 (47.04)	8.36 (13.45)	2096	1.49	0.464 (0.282)	15.06 (2.97)	182 (83)	52 (11)	28.65 (97.02)

LUGGING ABILITY IN 10th (B3) Gear

Crankshaft Speed rpm	2098	1889	1688	1472	1264	1057
Pull—lbs (kN)	16508 (73.43)	19786 (88.01)	21821 (97.06)	23348 (103.86)	24174 (107.53)	24398 (108.53)
Increase in Pull %	0	20	32	41	46	48
Power—Hp (kW)	242.07 (180.52)	258.91 (193.07)	253.42 (188.98)	235.94 (175.94)	209.39 (156.14)	176.50 (131.61)
Speed—Mph (km/h)	5.50 (8.85)	4.91 (7.90)	4.36 (7.01)	3.79 (6.10)	3.25 (5.23)	2.71 (4.37)
Slip %	2.29	2.89	3.58	3.75	3.92	4.08

TRACTOR SOUND LEVEL WITH CAB

At 75% load in 8th (C1) Gear	dB(A) 73.5
Bystander in 24th (D6) Gear	85.0

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 163° F (73°C). The pull in 3rd (A3) gear was limited to avoid tractor bouncing. The performance results on this summary were taken from OECD tests conducted under the Code II Restricted Standard Test Code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1671**, Summary 139, Jan. 5, 1994.

LOUIS I. LEVITICUS
Engineer-in-Charge

L.L. BASHFORD
R.D. GRISSO
K. VON BARGEN
Board of Tractor Test Engineers

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									
221.67 (165.30)	33240 (147.86)	2.50 (4.02)	2157	7.88	0.491 (0.299)	14.25 (2.81)	176 (80)	47 (8)	28.55 (96.68)
4th (A4) Gear									
237.49 (177.10)	31833 (141.60)	2.80 (4.50)	2011	7.80	0.471 (0.286)	14.85 (2.93)	178 (81)	63 (17)	28.69 (97.16)
5th (A5) Gear									
250.87 (187.08)	30357 (135.03)	3.10 (4.99)	1921	6.30	0.446 (0.271)	15.68 (3.09)	180 (82)	63 (17)	28.66 (97.05)
6th (A6) Gear									
253.85 (189.30)	25356 (112.79)	3.75 (6.04)	1901	4.42	0.440 (0.267)	15.91 (3.13)	182 (83)	64 (18)	28.64 (96.99)
7th (B1) Gear									
260.24 (194.06)	25768 (114.62)	3.79 (6.09)	1896	4.25	0.432 (0.263)	16.20 (3.19)	181 (83)	54 (12)	28.62 (96.92)
8th (C1) Gear									
262.25 (195.56)	23383 (104.01)	4.21 (6.77)	1897	3.58	0.428 (0.261)	16.32 (3.22)	181 (83)	54 (12)	28.62 (96.92)
9th (B2) Gear									
260.66 (194.37)	21253 (94.54)	4.60 (7.40)	1900	3.06	0.429 (0.261)	16.28 (3.21)	182 (83)	54 (12)	28.62 (96.92)
10th (B3) Gear									
262.75 (195.93)	19894 (88.49)	4.95 (7.97)	1901	2.72	0.425 (0.259)	16.46 (3.24)	180 (82)	54 (12)	28.61 (96.88)
11th (C2) Gear									
259.13 (193.23)	19082 (84.88)	5.09 (8.20)	1900	2.72	0.432 (0.263)	16.20 (3.19)	183 (84)	51 (11)	28.67 (97.09)
12th (C3) Gear									
262.36 (195.64)	17988 (80.01)	5.47 (8.80)	1897	2.55	0.428 (0.260)	16.33 (3.22)	182 (83)	54 (12)	28.63 (96.95)
13th (B4) Gear									
260.11 (193.96)	16387 (72.89)	5.95 (9.58)	1894	2.37	0.430 (0.262)	16.26 (3.20)	183 (84)	54 (12)	28.63 (96.95)
14th (C4) Gear									
258.25 (192.58)	14680 (65.30)	6.60 (10.62)	1899	2.02	0.432 (0.263)	16.20 (3.19)	182 (83)	53 (12)	28.63 (96.95)
15th (B5) Gear									
261.11 (194.71)	14366 (63.90)	6.82 (10.97)	1893	2.02	0.427 (0.260)	16.37 (3.22)	182 (83)	52 (11)	28.64 (96.99)
16th (C5) Gear									
260.01 (193.89)	12880 (57.29)	7.57 (12.18)	1904	1.85	0.430 (0.262)	16.25 (3.20)	183 (84)	52 (11)	28.65 (97.02)
17th (B6) Gear									
255.04 (190.19)	11630 (51.73)	8.22 (13.23)	1899	1.67	0.438 (0.266)	15.99 (3.15)	182 (83)	51 (11)	28.66 (97.05)

TIRES, BALLAST AND WEIGHT

Rear Tires—No., size, ply & psi (kPa)

Front Tires—No., size, ply & psi (kPa)

Height of Drawbar

Static Weight with Operator—Rear
—Front
—Total

Tested Without Ballast

Four 18.4R42; **, 15 (105)

Four 18.4R42; **, 15 (105)

18.5 in (470 mm)

14740 lb (6686 kg)

18384 lb (8339 kg)

33124 lb (15025 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

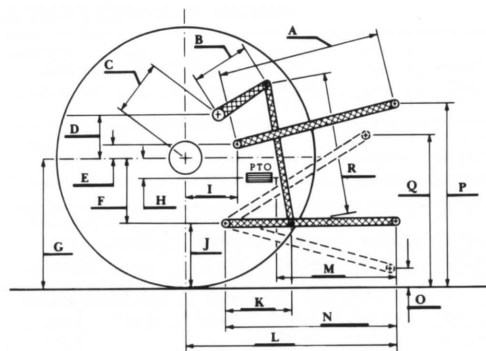
CATEGORY: III

Quick Attach: yes

Maximum Force Exerted Through Whole Range:	14040 lbs	(62.5 kN)
i) Opening pressure of relief valve:	NA	
Sustained pressure with pump stalled:	2550 psi	(176 bar)
ii) Pump delivery rate at minimum pressure:	44.1 GPM	(167 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	42.7 GPM	(162 l/min)
Delivery pressure:	1850 psi	(127 bar)
Power:	46.1 HP	(34.4 kW)

THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. (bar)	2540 (175)				
Location	remote outlet				
Hydraulic oil temperature °F (°C)	137 (58)				
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)



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 8770 POWRSYNC DIESEL

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