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Test 1670: John Deere 8570 Powersync Diesel 12 and 24 Speeds

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 1670—SUMMARY 138

JOHN DEERE 8570 POWRSYNC DIESEL

24 SPEED ALSO 12 SPEED

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

Dates of Test: October 21 to December 1, 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—1109 rpm)					
208.21 (155.26)	2100	11.93 (45.14)	0.401 (0.244)	17.46 (3.44)	
Maximum Power (2 Hours)					
230.84 (172.14)	1900	12.46 (47.18)	0.378 (0.230)	18.52 (3.65)	
Standard Power Take-off Speed (1003 rpm)					
230.84 (172.14)	1900	12.46 (47.18)	0.378 (0.230)	18.52 (3.65)	

VARYING POWER AND FUEL CONSUMPTION

208.21 (155.26)	2100	11.93 (45.14)	0.401 (0.244)	17.46 (3.44)	Air temperature
181.90 (135.64)	2158	10.68 (40.43)	0.411 (0.250)	17.03 (3.35)	78°F (25°C)
138.57 (103.33)	2188	8.62 (32.64)	0.435 (0.265)	16.07 (3.17)	Relative humidity
93.28 (69.56)	2216	6.56 (24.84)	0.492 (0.299)	14.21 (2.80)	33%
46.97 (35.02)	2239	4.38 (16.56)	0.652 (0.396)	10.74 (2.11)	Barometer
1.42 (1.06)	2260	2.83 (10.72)	13.950 (8.486)	0.50 (0.10)	29.23" Hg (98.98 kPa)

Maximum Torque 768 lb.-ft. (1041 Nm) at 1399 rpm
Maximum Torque Rise 47.3%
Torque rise at 1000 engine rpm 33%

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									
191.59 (142.87)	15225 (67.72)	4.72 (7.59)	2099	1.95	0.432 (0.263)	16.20 (3.19)	180 (82)	58 (14)	29.14 (98.68)
75% of Pull at Maximum Power—8th (C1) Gear									
149.53 (111.51)	11426 (50.82)	4.91 (7.90)	2172	1.51	0.459 (0.279)	15.23 (3.00)	180 (82)	61 (16)	29.10 (98.54)
50% of Pull at Maximum Power—8th (C1) Gear									
101.71 (75.85)	7623 (33.91)	5.00 (8.05)	2204	0.88	0.525 (0.319)	13.33 (2.63)	176 (80)	61 (16)	29.10 (98.54)
75% of Pull at Reduced Engine Speed—13th (B4) Gear									
149.87 (111.76)	11434 (50.86)	4.92 (7.91)	1554	1.51	0.419 (0.255)	16.69 (3.29)	182 (83)	61 (16)	29.10 (98.54)
50% of Pull at Reduced Engine Speed—13th (B4) Gear									
101.47 (75.67)	7626 (33.92)	4.99 (8.03)	1570	1.06	0.457 (0.278)	15.30 (3.01)	176 (80)	61 (16)	29.10 (98.54)

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/CET motor 6.069 gal/(22.973 l)
Drained from motor 5.459 gal (20.664 l)
Transmission and hydraulic lubricant and
final drive lubricant John Deere Hy-Gard fluid
Total time engine was operated 24.5 hours.

ENGINE: Make John Deere Diesel Type six
cylinder vertical with turbocharger and air to air
intercooler Serial No. *6076HRW32-516489*
Crankshaft lengthwise Rated engine speed 2100
Bore and stroke (as specified) 4.56" x 4.75" (115.8
mm x 120.7 mm) Compression ratio 15.5 to 1
Displacement 466 cu in (7627 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: 81.6-89.1 lb/h (37.0-40.4 kg/h) High idle:
2210-2310 rpm Turbo boost nominal 18.4-21.3 psi
(127-147 kPa) as measured 20.0 psi (138 kPa)

CHASSIS: Type four wheel drive with duals Serial
No. *RW8570H001103* 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 32100 lb (14560 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)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
1st (A1) Gear									
162.89 (121.46)	31924 (142.00)	1.91 (3.08)	2154	9.04	0.471 (0.286)	14.86 (2.93)	172 (78)	49 (9)	29.17 (98.78)
2nd (A2) Gear									
182.81 (136.32)	29654 (131.91)	2.31 (3.72)	2102	6.07	0.455 (0.277)	15.38 (3.03)	173 (78)	50 (10)	29.15 (98.71)
3rd (A3) Gear									
187.46 (139.79)*	28075 (124.88)	2.50 (4.03)	2100	5.09	0.444 (0.270)	15.77 (3.11)	174 (79)	51 (11)	29.11 (98.58)
4th (A4) Gear									
187.24 (139.63)	23008 (102.34)	3.05 (4.91)	2099	3.67	0.442 (0.269)	15.81 (3.11)	178 (81)	52 (11)	29.07 (98.44)
5th (A5) Gear									
190.78 (142.26)	20438 (90.91)	3.50 (5.63)	2098	2.99	0.436 (0.265)	16.04 (3.16)	180 (82)	53 (12)	29.03 (98.31)
6th (A6) Gear									
185.70 (138.48)	16467 (73.25)	4.23 (6.81)	2099	2.38	0.448 (0.273)	15.59 (3.07)	182 (83)	54 (12)	28.99 (98.17)
7th (B1) Gear									
191.36 (142.70)	16808 (74.76)	4.27 (6.87)	2099	2.21	0.434 (0.264)	16.13 (3.18)	182 (83)	60 (16)	29.13 (98.65)
8th (C1) Gear									
191.59 (142.87)	15225 (67.72)	4.72 (7.59)	2099	1.95	0.432 (0.263)	16.20 (3.19)	180 (82)	58 (14)	29.14 (98.68)
9th (B2) Gear									
188.22 (140.36)	13711 (60.99)	5.15 (8.29)	2102	1.68	0.440 (0.268)	15.88 (3.13)	183 (84)	56 (13)	29.14 (98.68)
10th (B3) Gear									
188.53 (140.59)	12787 (56.88)	5.53 (8.90)	2099	1.59	0.440 (0.268)	15.90 (3.13)	183 (84)	54 (12)	29.15 (98.71)
11th (C2) Gear									
187.39 (139.74)	12386 (55.10)	5.67 (9.13)	2098	1.59	0.440 (0.267)	15.91 (3.13)	183 (84)	61 (16)	29.13 (98.65)
12th (C3) Gear									
188.99 (140.93)	11623 (51.70)	6.10 (9.81)	2097	1.51	0.440 (0.267)	15.91 (3.13)	183 (84)	61 (16)	29.12 (98.61)
13th (B4) Gear									
183.32 (136.70)	10317 (45.89)	6.66 (10.72)	2103	1.42	0.449 (0.273)	15.57 (3.07)	180 (82)	62 (17)	29.12 (98.61)
14th (C4) Gear									
183.44 (136.79)	9364 (41.65)	7.35 (11.82)	2101	1.24	0.450 (0.274)	15.53 (3.06)	185 (85)	62 (17)	29.11 (98.58)
15th (B5) Gear									
184.87 (137.86)	9120 (40.57)	7.60 (12.23)	2098	1.24	0.445 (0.271)	15.71 (3.10)	184 (84)	61 (16)	29.10 (98.54)
16th (C5) Gear									
184.10 (137.29)	8216 (36.55)	8.40 (13.52)	2101	1.06	0.451 (0.274)	15.52 (3.06)	184 (84)	60 (16)	29.09 (98.51)

LUGGING ABILITY IN 10th (B3) Gear

Crankshaft Speed rpm	2099	1889	1673	1471	1260	1051
Pull—lbs (kN)	12787 (56.88)	16000 (71.17)	17673 (78.61)	18838 (83.80)	18588 (82.68)	17871 (79.49)
Increase in Pull %	0	25	38	47	45	40
Power—Hp (kW)	188.53 (140.59)	211.26 (157.54)	206.08 (153.67)	192.61 (143.63)	162.77 (121.38)	130.66 (97.43)
Speed—Mph (km/h)	5.53 (8.90)	4.95 (7.97)	4.37 (7.04)	3.83 (6.17)	3.28 (5.28)	2.74 (4.41)
Slip %	1.59	2.12	2.47	2.64	2.64	2.47

TRACTOR SOUND LEVEL WITH CAB

At 75% load in 8th (C1) Gear	dB(A) 74.0
Bystander in 24th (D6) Gear	85.5

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 170° F (77°C). The pull in 1st (A1) 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. **1670**, Summary 138, Jan. 5, 1994.

LOUIS I. LEVITICUS
Engineer-in-Charge

L.L. BASHFORD
R.D. GRISSE
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)
1st (A1) Gear									
161.57 (120.49)	31709 (141.05)	1.91 (3.08)	2154	9.11	0.476 (0.289)	14.70 (2.90)	167 (75)	49 (9)	29.17 (98.78)
2nd (A2) Gear									
183.61 (136.92)	30219 (134.42)	2.28 (3.67)	2084	6.71	0.454 (0.276)	15.40 (3.03)	174 (79)	50 (10)	29.13 (98.65)
3rd (A3) Gear									
192.41 (143.48)	30264 (134.62)	2.38 (3.84)	2031	6.55	0.442 (0.269)	15.84 (3.12)	174 (79)	51 (11)	29.09 (98.51)
4th (A4) Gear									
203.79 (151.96)	27884 (124.03)	2.74 (4.41)	1913	4.85	0.426 (0.259)	16.42 (3.23)	180 (82)	52 (11)	29.05 (98.37)
5th (A5) Gear									
208.48 (155.47)	24901 (110.77)	3.14 (5.05)	1901	4.01	0.417 (0.254)	16.75 (3.30)	180 (82)	53 (12)	29.01 (98.24)
6th (A6) Gear									
206.12 (153.71)	20325 (90.41)	3.80 (6.12)	1901	2.99	0.422 (0.257)	16.58 (3.27)	183 (84)	55 (13)	28.97 (98.10)
7th (B1) Gear									
208.93 (155.80)	20401 (90.75)	3.84 (6.18)	1901	2.90	0.415 (0.253)	16.84 (3.32)	182 (83)	59 (15)	29.13 (98.65)
8th (C1) Gear									
209.40 (156.15)	18524 (82.40)	4.24 (6.82)	1896	2.47	0.416 (0.253)	16.82 (3.31)	182 (83)	59 (15)	29.14 (98.68)
9th (B2) Gear									
208.32 (155.35)	16872 (75.05)	4.63 (7.45)	1899	2.21	0.417 (0.253)	16.79 (3.31)	183 (84)	57 (14)	29.14 (98.68)
10th (B3) Gear									
210.36 (156.87)	15821 (70.38)	4.99 (8.02)	1900	2.03	0.412 (0.250)	16.99 (3.35)	183 (84)	55 (13)	29.15 (98.71)
11th (C2) Gear									
207.50 (154.73)	15203 (67.62)	5.12 (8.24)	1900	1.95	0.417 (0.254)	16.78 (3.31)	183 (84)	61 (16)	29.13 (98.65)
12th (C3) Gear									
209.30 (156.07)	14245 (63.36)	5.51 (8.87)	1902	1.86	0.411 (0.250)	17.00 (3.35)	182 (83)	61 (16)	29.12 (98.61)
13th (B4) Gear									
204.83 (152.74)	12791 (56.89)	6.01 (9.66)	1902	1.68	0.420 (0.255)	16.67 (3.28)	184 (84)	62 (17)	29.12 (98.61)
14th (C4) Gear									
205.12 (152.96)	11609 (51.64)	6.63 (10.66)	1901	1.51	0.421 (0.256)	16.60 (3.27)	183 (84)	62 (17)	29.11 (98.58)
15th (B5) Gear									
206.19 (153.75)	11265 (50.11)	6.86 (11.05)	1900	1.42	0.418 (0.254)	16.72 (3.29)	185 (85)	61 (16)	29.10 (98.54)
16th (C5) Gear									
205.05 (152.90)	10157 (45.18)	7.57 (12.18)	1898	1.24	0.421 (0.256)	16.61 (3.27)	184 (84)	60 (16)	29.09 (98.51)
17th (B6) Gear									
200.10 (149.22)	9102 (40.49)	8.24 (13.27)	1898	1.15	0.433 (0.263)	16.16 (3.18)	185 (85)	60 (16)	29.09 (98.51)

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; **, 13 (90)

Four 18.4R42; **, 13 (90)

18.5 in (470 mm)

14895 lb (6756 kg)

17370 lb (7879 kg)

32265 lb (14635 kg)

THREE POINT HITCH PERFORMANCE (OECD Static Test)

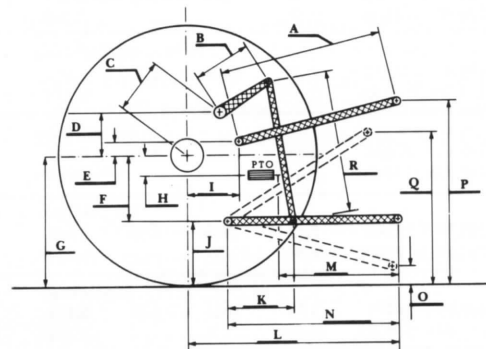
CATEGORY: III

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:	2540 psi	(175 bar)
ii) Pump delivery rate at minimum pressure:	44.0 GPM	(167 l/min)
iii) Pump delivery rate at maximum		
hydraulic power:	41.6 GPM	(157 l/min)
Delivery pressure:	1860 psi	(128 bar)
Power:	45.1 HP	(33.7 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 8570 POWRSYNC DIESEL

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