OECD APPROVAL # 1510/1 and 2
(Restricted code)
Date of approval: 16 March 1994

NEBRASKA TRACTOR TESTING LABORATORY
DEPARTMENT OF BIOLOGICAL SYSTEMS ENGINEERING
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF NEBRASKA - EAST CAMPUS
LINCOLN, NEBRASKA 68583-0832, USA

REPORT ON TEST IN ACCORDANCE WITH OECD RESTRICTED CODE (CODE II)

FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS

JOHN DEERE 8870 POWRSYNC (4WD)
JOHN DEERE 8870 SYNCRO (4WD)



MANUFACTURED BY: John Deere Waterloo Works
P.O.Box 270
Waterloo, Iowa 50704-0270
NEBRASKA TEST NO. 1672
Test dates: October-November, 1993

This test report provides the results of the tests conducted in accordance with the OECD Standard Test Code for the Official Testing of Agricultural Tractor Performance - C(87)53 Final - Annex II, Restricted Code.

This report has been approved by the OECD Coordinating Centre in Paris (CEMAGREF) on 16 March 1994

John Deere 8870 PowrSync (4WD) - Articulated OECD # 1510/1
John Deere 8870 Syncro (4WD) - Articulated OECD # 1510/2

The transmissions of the 8870 PowrSync and the 8870 Syncro are mechanically similar and thus tests were not repeated. The test results are valid for both models.

No reproduction of this report or any part of it can be made without prior approval by the Tractor Testing Laboratory - University of Nebraska, Lincoln.

Associate Director

Dr. Louis I. Leviticus

Senior Test Engineer

David L. Morgan

Test Engineer

Brent T. Sampson

Chairman, Tractor Test Board

Dr. Robert D. Grisso

Members, Tractor Test Board

Dr. Michael F. Kocher

Dr. Kenneth von Bargen

Date: APR 05 1994

Table of Contents.

	Page
1. SPECIFICATIONS	1
2. TEST CONDITIONS	12
3. COMPULSORY TESTS	
Main Power Take-Off Performance	14
Hydraulic Pump Performance	15
Power Lift Performance	16
Drawbar Performance at Rated Engine Speed	17
4. GRAPHS	18
5. OPTIONAL TESTS	
Drawbar performance at 1900 rpm	20
Power Lift performance - Cat IV	22
Measurement of External Noise Level	23

SPECIFICATIONS OF TRACTOR.

Manufacturers name/address	John Deere Tractor Works P.O. Box 270 Waterloo, Iowa, USA
Location of tractor assembly	Same
Submitted for test by	The manufacturer
Selected for test by	The manufacturer in agreement with the test station.
Place of running in	John Deere Product Eng. Ctr Waterloo, Iowa, USA
Duration of running in	202 hours
Location of Test	Tractor Testing Laboratory Lincoln, Nebraska,USA.

TRACTOR SPECIFICATIONS.

Make	John Deere
Model	8870 PowrSync
Type	Articulated frame, four-wheel drive
Number of driving wheels	8
Serial Number	*RW8870H001299*
1st Serial number	*RW8870H001001*

ENGINE.

Make	John Deere
Model	6101HRW10
Type	Diesel; 4-stroke; turbocharged aftercooled, direct injection,
Serial Number	*6101HRW10-500939*

Cylinders

Number/Disposition	6, in-line, vertical
Bore/stroke	130.0 mm x 127.0 mm
Capacity	10144 ml
Compression Ratio	15.75: 1
Arrangement of valves	Overhead
Cylinder liners	Wet; replaceable

Super charging

Make/Model/Type	Switzer/RE52313/Exh. driven
Pressure	162 - 182 kPa at rated speed

Fuel System

Feed system	Transfer pump integral with injection pump
Make/Type/Model of filters	Stanadyne/paper element; RE57073 secondary filter; RE53729 primary filter
Fuel tank capacity	835 l
Fuel Cooler	None
Make/Model/Type Injection Pump	Bosch/RE42302/in line; also ECU/RE28320; electric shutoff
Pump Serial number	36513581
Production setting of pump Flow Rate (Rated Eng.Spd & Full Load)	57.7 +/- 1.7 kg/h
Make/Model/Type Injectors	Bosch/RE48358/21 mm; electronic
Injection pressure	29 MPa
Timing	17.5 degrees BTDC

Governor

Make/Model/Type	Bosch/RE24/Electronic control
Governed engine speed range	From 900 to 2260 rev/min
Rated engine speed	2100 rev/min
High-idle speed range	2260 +/- 50 rpm

Air Cleaner.

Pre-cleaner Make/Model/type	Donaldson/R116627/Strato-tube precleaner with aspirator
Air intake location	Top of air stack, right front corner of cab
Main Cleaner Make/Model/Type	Donaldson/AR95758/pleated paper
Location	Below pre-cleaner, right front
Secondary cleaner	Donaldson/RE95759/pleated paper
Maintenance indicator	Dash mounted warning light and audio signal

Lubrication system.

Type of feed pump	Full pressure; positive displacement
Type of filters	Full flow, with bypass
Number	One spin-on.
Oil cooler	Heat exchanger with engine coolant

Cooling system.	
Type of coolant	Liquid
Type of pump	Centrifugal, belt driven
Fan specification	Belt driven; Suction type; variable speed
Number of fan blades	8
Fan diameter	762 mm
Coolant system capacity	55 l
Type of temperature control	Two thermostats and variable speed fan
System pressure	103 kPa
Starting system.	
Make/Model/Type of starter	Delco-Remy/RE38633/solenoid engaged
Power Rating	6.9 kW
Cold starting aid	Ether spray in intake manifold
Safety device	Electrical lockout on gearshift
Electrical system.	
Voltage & grounding.	12 Volt DC; negative ground
Generator	
Make/Model/Type	Nippondenso/RE51921/Belt driven
Power rating	120 Amp at rated engine speed
Batteries	
Number & connection	Two; 12 Volt batteries in parallel.
Rating	925 cold cranking amps/battery 175 Ah/battery at 20 h. rating
Exhaust system.	
Muffler Make/Model/Type	Nelson/RE52167/Expansion chamber
Location	Vertical, right front corner of cab
Exhaust stack location	Vertical; right front corner of cab

TRANSMISSION.

Clutch. (travel)

Make/Model/Type	John Deere/Multiple plate/oil cooled
Number of plates	7
Plate diameter	279 mm
Method of operation	Hydraulic; pedal actuated

Gear Box.

Make/Model/Type Arrangement	John Deere/Powrsync/Mechanical Countershaft and Planetary design consisting of one 12 speed gearbox with 4 synchronized ranges and one two-speed planetary gearset with multiple wet disc and brake.
Number of gears (8870 PowrSync)	24 forward and 6 reverse operated by 2 levers
Available options (8870 Syncro)	12 forward, 3 reverse (same arrangement without the two speed planetary gearset.)
Oil cooler	Heat exchanger with air

Rear axle and final drives.

Make/Model/Type	John Deere/Crown wheel and pinion, differential and inboard planetary reduction
Differential Lock (optional)	None

Front Axle and final drives.

Make/Model/Type	John Deere/1150/Crown wheel and pinion, differential and inboard planetary reduction
Differential lock (optional)	None

Gear ratios and travel speeds - PowrSync transmission.

(Tire dynamic radius of 905 mm; ISO 4251/1-1984)

Gear Number	Number of engine revolutions for one revolution of the driving wheels	Nominal travel speed at rated engine speed of 2100 rev/min [km/h]
Forward		
A1	213.20	3.36
A2	177.66	4.03
A3	165.48	4.33
A4	138.07	5.19
A5	120.97	5.92
A6	100.86	7.10
B1	100.00	7.16
C1	90.71	7.90
B2	83.40	8.59
B3	77.69	9.22
C2	75.65	9.47
C3	70.47	10.17
B4	64.79	11.06
C4	58.77	12.19
B5	56.76	12.62
C5	51.48	13.92
B6	47.34	15.13
C6	42.94	16.69
D1	42.56	16.83
D2	35.50	20.18
D3	33.06	21.67
D4	27.57	25.99
D5	24.16	29.66
D6	20.15	35.56
Reverse		
A1	177.66	4.03
A2	148.20	4.83
B1	83.40	8.59
C1	75.65	9.47
B2	69.56	10.30
C2	63.08	11.36

Number of front wheel revolutions
for one rear wheel revolution: 1

Gear ratios and travel speeds - Syncro transmission.

(Tire dynamic radius of 905 mm; ISO 4251/1-1984)

Gear Number	Number of engine revolutions for one revolution of the driving wheels	Nominal travel speed at rated engine speed of 2100 rev/min [km/h]
Forward		
A1	213.20	3.36
A2	165.48	4.33
A3	120.97	5.92
B1	100.00	7.10
C1	90.71	7.90
B2	77.69	9.22
C2	70.47	10.17
B3	56.76	12.62
C3	51.48	13.92
D1	42.56	16.83
D2	33.06	21.67
D3	24.16	29.66
Reverse		
A1	177.66	4.03
B1	83.40	8.59
C1	75.65	9.47

Number of front wheel revolutions for one rear wheel revolution: 1

POWER - TAKE - OFF (Optional).

Main Power-Take-Off.

Type	Independent
Method of engagement	Electro-hydraulically actuated multi-plate wet clutch operated by hand control lever
Number of shafts	One
Method of changing speeds	None

PTO Proportional to engine speed

Standard PTO-1000 rev/min.

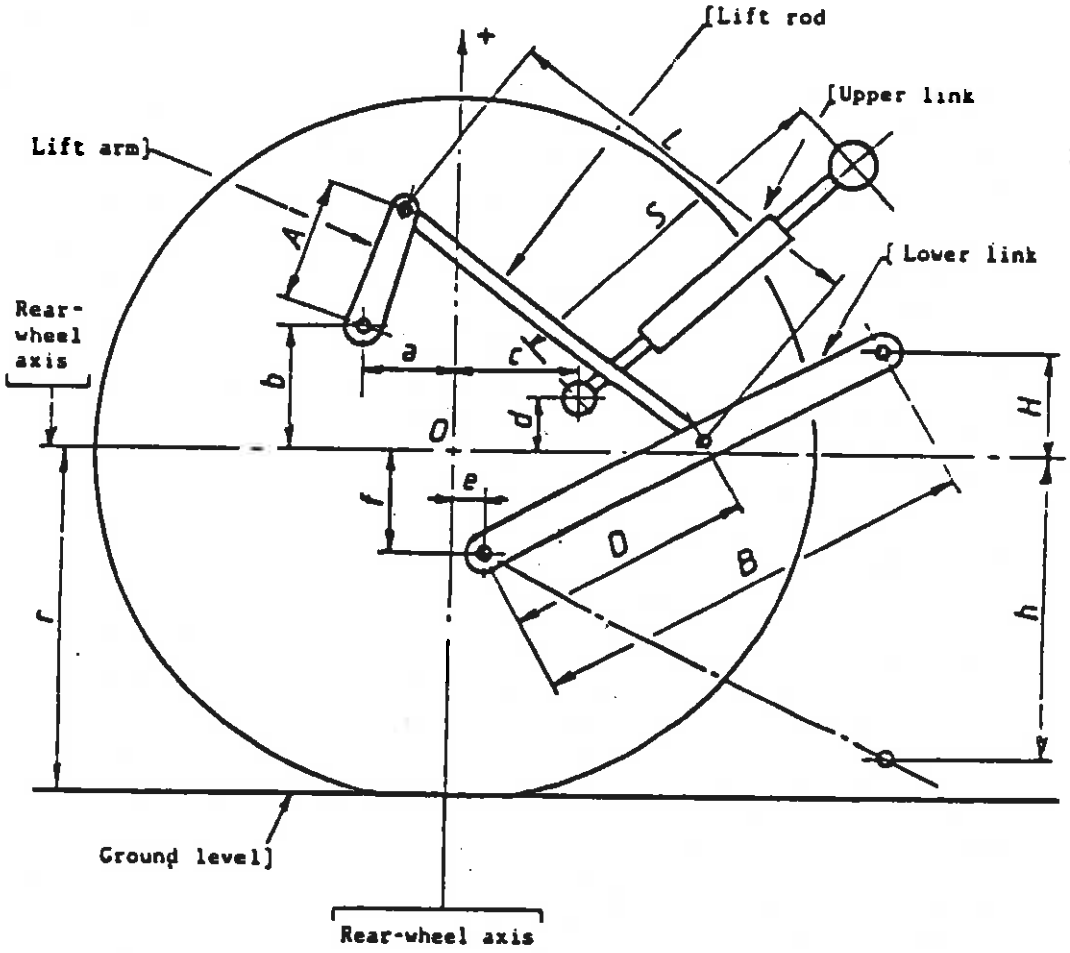
Location	Rear of tractor;center plane
Diameter of shaft	44.5 mm
Number of splines	20; conforms to ISO 500/1979.
Height above ground	799 mm
Distance from median plane of tractor	0 mm
Distance behind rear axle	760 mm
PTO Speed at rated engine spd	1108 rev/min
Engine speed at Std. PTO spd	1895 rev/min
Engine speed/PTO speed ratio	1.895:1
Power restriction	None
Direction of rotation when viewed from shaft end	Clockwise.

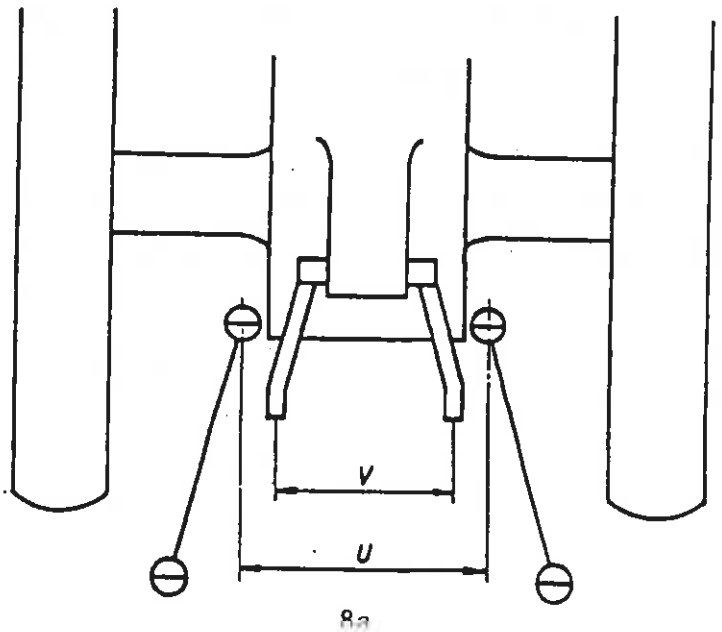
POWER LIFT - Optional.

Make/Model/Type	John Deere/Electronic lower link sensing; variable mix of draft and position control; adjustable rate of drop
Type of hydraulic system	Closed center;pressure and flow compensated
Number/Type of cylinders	Two external, single acting
Type of linkage lock for transport	Hydraulic
Relief valve pressure setting (pump diagnostic port)	172 - 178 bar
Opening pressure of cylinder safety valve	197 - 218 bar
Lift pump type	Radial piston, variable delivery and flow, constant pressure
Power transmission to pump	Direct drive
Type/Number of filters	Spin-on canister/one
Location of oil reservoir	Integral with right side fuel tank
Number/Type/Location of tapping points.	3 pairs of ISO standard couplings at rear of tractor; 4th and 5th coupler optional
Max. oil volume available for external cylinders.	19 liters regular; 32 liters with additional 13 liters allowable overfill

THREE POINT LINKAGE

- Category III in conformity with ISO 730/1-1990
- Category adaptor Quick Attach





THREE POINT LINKAGE.

- Category 3 in conformity with ISO 730/1-1990
- Category adaptor Quick-attach

Linkage geometry dimensions *.
ISO Category III

		Dimension or range [mm]	Settings used [mm]
Lift category		III	III
Rear Tire - Radius Index	(r)	905	918
Front Tire - Radius Index	(r')	905	918
Length of lift arms	(A)	472	same
Length of lower links	(B)	1117	same
Distance of lift arm pivot from: horizontal	(a)	244	same
rear wheel axis: vertical	(b)	620	same
Horizontal distance between the 2 lower link points	(U)	640	same
Horizontal distance between the 2 lift arm end points	(V)	750	same
Length of upper link	(S)	705 to 825	800
Distance of upper link pivot point from rear wheel axis - horizontal	(c)	577	same
- vertical	(d)	288	same
Distance of lower link pivot from: horizontal	(e)	288	same
rear wheel axis: vertical	(f)	350	same
Distance of lower link pivot points to lift rod pivot pts on lower links.	(D)	731	same
Length of lift rods	(L)	1030 to 1150	1121
Height of lower hitch points relative to rear wheel axis In low position	(h)	521 to 724	685
In high position	(H)	89 to 284	120
Height above ground of lower hitch points when locked in transport position.		1005 to 1201	1048

* Tire dynamic index of 918 mm - ISO 4251/1-1984
Note: Category IV available with optional axle and 100 mm lift cylinders

SWINGING DRAWBAR.

Type	Swinging
Height above groundt to top	
- maximum	489 mm
- minimum	464 mm
Adjustments	Invert drawbar; removable clevis
Distance of hitch point from rear wheel axis-horizontal	1118 or 1268 mm
Distance of hitch point from PTO shaft end: Vertical	300 mm
Horizontal	358 or 508 mm
Lateral adjustment-Right side	200 mm
Left side	200 mm
Distance of pivot point from rear wheel axis-horizontal	435 or 585 mm
Diameter of drawbar pin hole	52.5 mm
Maximum vertical static permissible load	20 kN - both positions

STEERING.

Make/Model/Type	John Deere/Hydrostatic
Method of operation	Steering wheel
Pump(s)	Same as main hydraulic pump
Ram(s)	Two external; double acting; with feedback
Working pressure	175 +/- 3 bar

BRAKE SYSTEM.

Service brake.	
Make/Model/Type	John Deere/oil immersed disc
Method of operation	Hydraulic actuated by main system; operated by one pedal
Parking brake.	
Type	Transmission lock.
Method of operation	Gear selector lever
Trailer Brake	None

WHEELS.

Number.	
Front	Four; Driving and steering
Rear	Four; Driving and steering
Wheel base	3400 mm

Track width adjustment

	Minimum [mm]	Maximum [mm]	Adjustment method
Inner wheels	1738	2181	Rack axle, reversing wheels and offset rims
Outer wheels	3212	3655	Same as inner wheels

PROTECTIVE STRUCTURE.

Make/Model/Type	John Deere/SG-041/Sound-Gard body
Manufacturer's name/address	John Deere Tractor Works Waterloo, Iowa, USA
Protective device	Cab; tiltable with tool
OECD approval number	
8870 PowrSync	CSS 0141/14
8870 Syncro	CSS 0141/13

DRIVER'S SEAT.

Make/Model/Type	Sears/FS92-01/Air suspension; Personal posture cushioning
Type of suspension	Air
Type of damping	Air
Range of adjustment	
Longitudinal	150 mm
Vertical	64 mm
Rotation	20 degrees left and right

LIGHTING.

	Height above ground of center [mm]	Size [mm]	Distance from outside edge to median plane of tractor. [mm]
Head lights	2040	100 diam.	483
Rear lights	1996	100 diam.	845
Reflectors			
front	3536	50 x 197	533
rear	3536	50 x 197	554

TEST CONDITIONS.

Overall dimenensions

Length	7266 mm
Width	
minimum	3752 mm
maximum	4190 mm
Height - Top protective structure	3505 mm
- Top of exhaust	4125 mm
Ground clearance	378 mm
Clearance-limiting part	Drawbar rear support

Tractor Mass (with cab,full fuel tank).

		without driver [kg]	with driver [kg]
Unballasted	Front	8774	8811
	Rear	7160	7198
	Total	15934	16009

Tire Specifications.

	Front Wheels	Rear Wheels
Make	Goodyear	Goodyear
Dimensions	20.8R42	20.8R42
Number/Ply rating	2 star	2 star
Type	Radial	Radial
Max.load (tire mfg)	3651 kg/tire	3651 kg/tire
Inflation pressure(tire mfr)-max	165 kPa	165 kPa
- as tested	83 kPa	83 kPa
Dynamic Radius Index	905 mm	905 mm
Chosen track width-inners	2115 mm	2115 mm
-outers	3654 mm	3654 mm

Oils and Lubrication.

Capacity and change interval:

	Capacity liter	Oil change hours	Filter change hours
Engine (w/o filter)	32.0	250	250
Transmission	37.8	1500	1500
Hydraulic system combined with Rear axle, Front axle and Steering system	144.0	1500	1500

Oil and Lubricant specifications:

	Recommended	Used during test
Engine oil		
Type	John Deere, Torq-Gard Supreme Plus 50; SAE 15W-40	same
Viscosity	12.8 cSt at 100°C	
Classification	API CE or CD; CCMD specification D5 or D4	
Transmission		
Type	John Deere Hy-Gard; J20C SAE 10W-30	same
Viscosity	58 cSt at 40°C	
Classification	NA	
Hydraulic fluid	Same as transmission	same
Steering system	Same as transmission	same
Grease	John Deere MOLY HIGH TEMPERATURE EP GREASE	same
Number of lube points	22	

Fuel

Type/grade	Premier; Grade 2-D, in conformity with the national standard
Density (Pto test)	0.838 kg/l at 15° C
(Drawbar test)	same as Pto test.
Cetane number	53.9
Viscosity	2.31 cSt at 37.8° C

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF

Date: 28-Oct-93 Location: UNL Tractor Test Lab, Lincoln, NE, U.S.A.

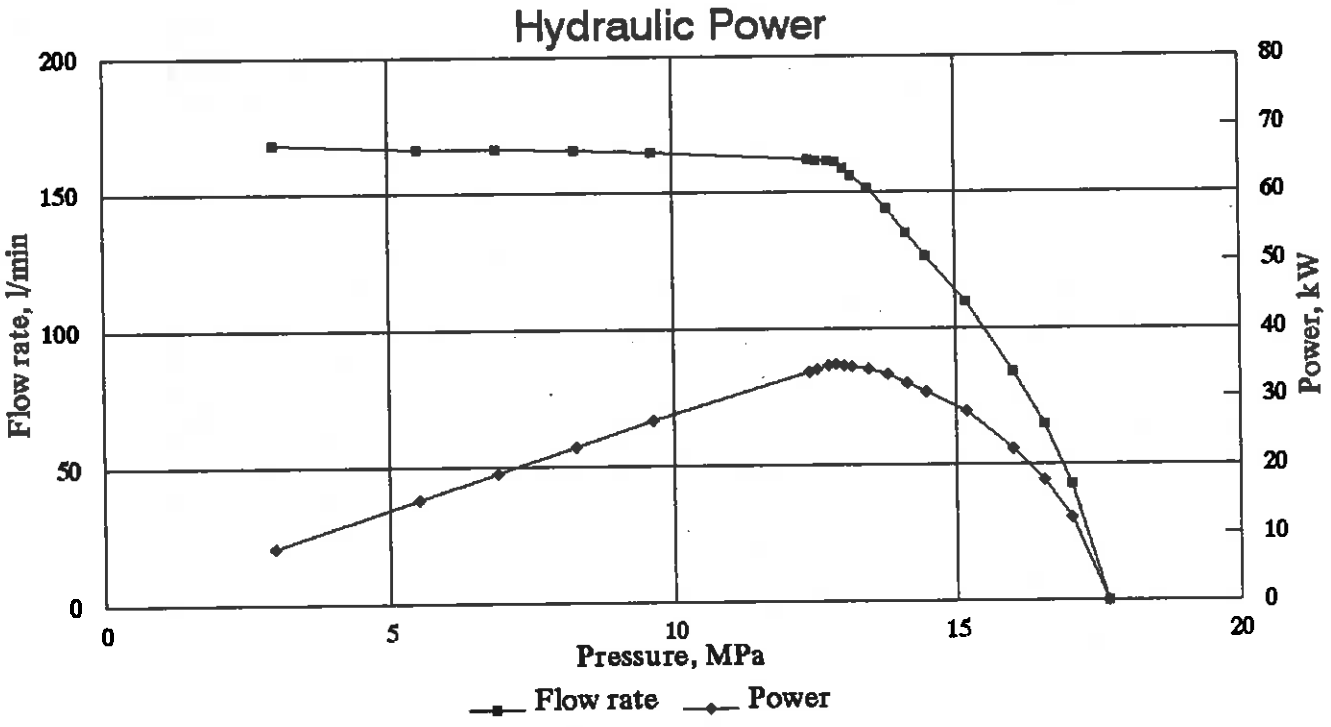
Type of dynamometer: Eddy current, Eaton Fuel density: 6.994 lb/gal

Power kW *hp*	Eng rev/min	PTO rev/min	l/h *gal/h*	kg/h *lb/h*	kg/kW-h *lb/hp-h*	kW-h/l *hp-hr/gal*
1.1 Maximum Power – 2 hours						
250.33	1900	1003	70.61	59.18	0.236	3.55
335.69			*18.65*	*130.46*	*0.389*	*18.00*
1.2 Power at Rated Engine Speed – 1 hour						
225.76	2100	1108	67.35	56.44	0.250	3.35
302.75			*17.79*	*124.43*	*0.411*	*17.02*
1.3 Power at Standard Power Take-Off Speed – 1 hour						
250.33	1900	1003	70.61	59.18	0.236	3.55
335.69			*18.65*	*130.46*	*0.389*	*18.00*
1.4 Part Loads						
1.4.1 Torque at maximum power at rated engine speed						
225.76	2100	1108	67.35	56.44	0.250	3.35
302.75			17.79	124.43	0.411	17.02
1.4.2 85% of torque obtained in 1.4.1						
198.75	2165	1143	60.08	50.35	0.253	3.31
266.52			*15.87*	*111.00*	*0.416*	*16.79*
1.4.3 75% of torque defined in 1.4.2						
150.96	2193	1157	47.57	39.87	0.264	3.17
202.45			*12.57*	*87.90*	*0.434*	*16.11*
1.4.4 50% of torque defined in 1.4.2						
101.89	2220	1172	36.21	30.35	0.298	2.81
136.64			*9.57*	*66.90*	*0.490*	*14.29*
1.4.5 25% of torque defined in 1.4.2						
51.50	2244	1185	25.17	21.09	0.410	2.05
69.07			*6.65*	*46.50*	*0.673*	*10.39*
1.4.6 unloaded						
1.06	2266	1196	14.61	12.25	11.540	0.07
1.42			*3.86*	*27.00*	*18.972*	*0.37*
1.5 Part Loads at Standard Power Take-off Speed						
1.5.1 Torque at maximum power						
250.33	1900	1003	70.61	59.18	0.236	3.55
335.69			*18.65*	*130.46*	*0.389*	*18.00*
1.5.2 85% of torque obtained in 1.5.1						
217.53	1932	1020	61.05	51.17	0.235	3.56
291.71			*16.13*	*112.80*	*0.387*	*18.09*
1.5.3 75% of torque defined in 1.5.2						
166.12	1966	1038	48.06	40.28	0.242	3.46
222.77			*12.70*	*88.80*	*0.399*	*17.55*
1.5.4 50% of torque defined in 1.5.2						
112.58	1996	1054	35.23	29.53	0.262	3.20
150.97			*9.31*	*65.10*	*0.431*	*16.22*
1.5.5 25% of torque defined in 1.5.2						
56.99	2028	1070	23.06	19.32	0.339	2.47
76.42			*6.09*	*42.60*	*0.557*	*12.55*
1.5.6 unloaded						
0.77	2056	1085	11.53	9.66	12.543	0.07
1.03			*3.05*	*21.30*	*20.621*	*0.34*

No load maximum engine speed:	2266 rev/min	
Equivalent torque at rated speed:	1027 N-m	*757 lb-ft*
Equivalent torque at maximum power:	1258 N-m	*928 lb-ft*
(engine speed:	1900 rev/min)	
Maximum equivalent crankshaft torque:	1524 N-m	*1124 lb-ft*
(engine speed:	1399 rev/min)	
Mean Dry bulb:	24 deg C	*76 deg F*
Wet bulb:	15 deg C	*59 deg F*
Relative humidity:	43 %	
Pressure:	96.77 kPa	*28.58 in Hg*
Maximum Coolant:	95 deg C	*203 deg F*
Engine oil:	118 deg C	*244 deg F*
Fuel:	607 deg C	*1124 deg F*
Air intake:	43 deg C	*110 deg F*
Transmission/hydraulic oil:	68 deg C	*154 deg F*
Intake manifold pressure at rated speed:	172 kPa	*25.0 psig*
Intake manifold pressure at maximum power:	193 kPa	*28.0 psig*

Hydraulic Power Test

Date of test: 29-Oct-93					
Location of test–City–State: Tractor Test Lab, Lincoln, NE, USA					
Tapping point used for test: Remote hydraulic outlets					
I. Sustained pressure with pump stalled:					
17.65 MPa					
2560 psi					
II. Pump delivery rate at minimum pressure and rated engine speed:					
168.5 l/min					
44.5 gpm					
III. Flow rate, pressure, power:					
90% of relief valve setting:					
	83.7 l/min		16.00 MPa		22.31 kW
	22.1 gpm		*2320 psi*		*29.91 hp*
Maximum hydraulic power:					
	161.3 l/min		12.89 MPa		34.66 kW
	42.6 gpm		*1870 psi*		*46.48 hp*
IV. Hydraulic fluid temperature at flow meter:					
65 C					
150 F					



2.2 POWER LIFT TEST. Cat III, quick attach, 90 mm cylinders
(for settings see p.9)

Date of test: 17 Nov 1993

		Hitch points	Frame
Lower hitch points above ground - down position:	[mm/in]	233/9.2	233/9.2
Vertical movement: without load:	[mm/in]	819/32.2	895/35.3
Vertical movement: with load:	[mm/in]	802/31.6	873/34.4
Maximum corrected force through full range:	[kN/lb]	52.3/11768	48.4/10890
Corresponding pressure:	[kPa/psi]	15513/2250	
Moment about rear axle:	[kN.m/lb.ft]	82.2/60603	105.6/77864
Maximum mast tilt angle:	[deg]	--	6.7

Lifting height relative to horizontal position of lower links.

	[mm]	-335	-300	-201	-99	3
	[in]	-13.2	-11.8	-7.9	-3.9	0.1
Corrected lift forces						
Hitch point.	[kN]	55.9	52.3	54.3	56.3	57.5
	[lb]	12565	11768	12209	12646	12938
at frame	[kN]	55.4	52.8	53.3	53.5	53.5
	[lb]	12546	11867	11979	12038	12033

Lifting height relative to horizontal position of lower links.

	[mm]	99	201	300	401	467	538
	[in]	3.9	7.9	11.8	15.8	18.4	21.2
Corrected lift forces							
Hitch point	[kN]	58.8	59.9	60.8	61.4	61.6	--
	[lb]	13212	13464	13676	13811	13842	--
at frame	[kN]	53.3	52.6	51.5	--	50.0	48.4
	[lb]	11984	11835	11583	--	11237	10890

OECD Drawbar Data (SI)

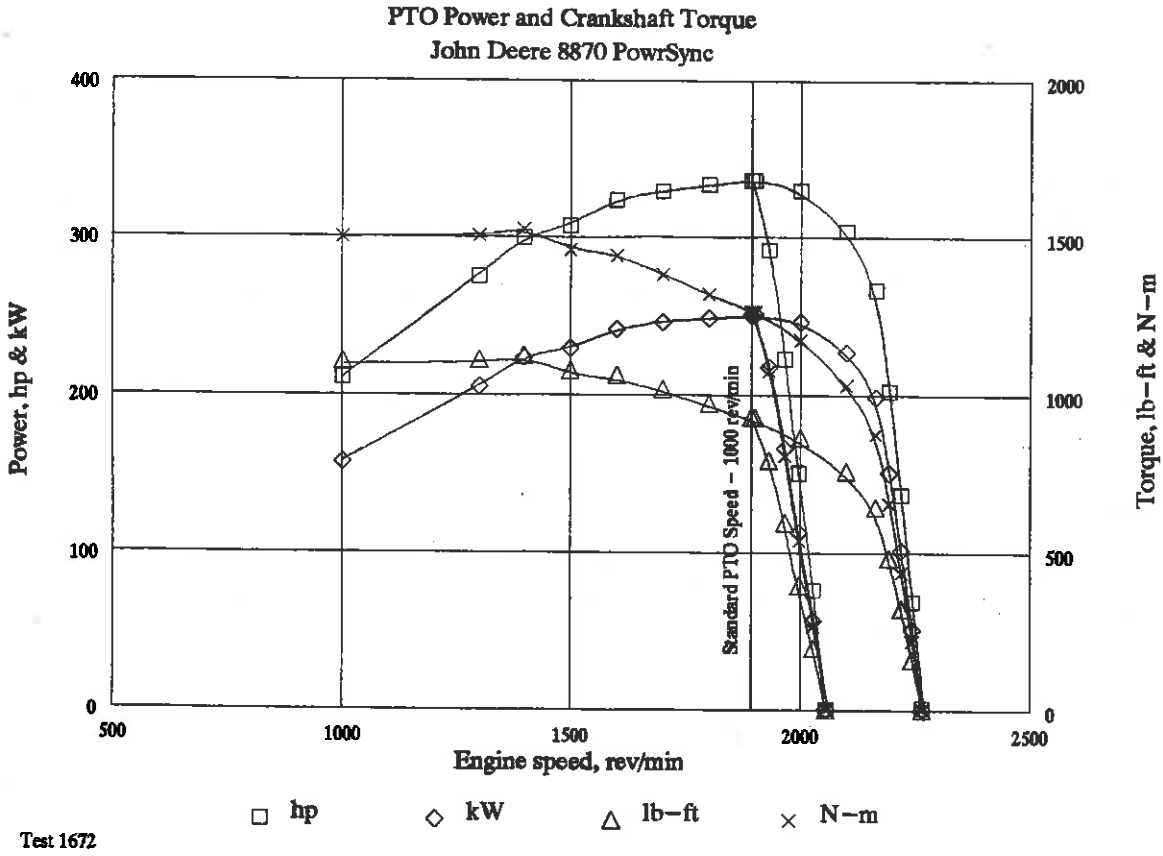
Date of tests: 4,8-NOV-93 Fuel density: 0.838 kg/l
Type of track: Concrete Test number: 1672

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, deg C					Rel humidity	Pressure
	kW	kN	km/h	rev/min		kg/kW.h	kW.h/l	Fuel	Coolant	Oil	Dry	Wet		kPa
I. Maximum Power (unballasted, 4wd at 2100 rev/min) Tire pressure: 83 kPa, rear 83 kPa, front Drawbar height: 495 mm														
* A3	179.48	155.80	4.15	2157	8.55%	0.299	2.80	62	79	96	11	7	56%	98.85
A4	198.16	142.66	5.00	2097	5.51%	0.285	2.94	62	80	98	11	7	56%	98.85
A5	203.66	126.57	5.79	2098	3.96%	0.278	3.01	62	81	101	13	7	41%	98.85
A6	203.36	104.23	7.02	2098	2.81%	0.278	3.01	63	82	102	13	7	41%	98.85
B1	207.80	105.45	7.09	2096	2.63%	0.272	3.08	63	81	102	8	4	51%	97.26
C1	209.05	95.64	7.87	2101	2.45%	0.272	3.08	61	81	101	8	4	51%	97.26
B2	205.30	86.12	8.58	2102	2.09%	0.276	3.04	62	83	104	11	6	46%	96.99
B3	206.16	80.58	9.21	2099	2.00%	0.274	3.06	63	82	103	5	2	58%	97.26
C2	203.88	77.48	9.47	2102	2.09%	0.275	3.05	63	83	101	12	7	48%	98.44
C3	206.56	73.06	10.18	2101	1.91%	0.274	3.06	62	82	102	12	7	48%	98.44
B4	203.10	65.89	11.10	2100	1.54%	0.279	3.01	60	84	104	16	9	38%	96.78
C4	202.46	59.52	12.24	2101	1.36%	0.279	3.00	62	83	103	12	7	48%	98.44
B5	204.22	57.87	12.70	2101	1.36%	0.278	3.02	61	83	103	11	6	46%	96.99
C5	202.83	52.16	14.00	2097	1.26%	0.278	3.01	62	83	104	11	6	46%	96.99
* Pull limited to avoid excessive tractor bounce.														
II. Part loads (unballasted, 4wd)														
II.1 in selected gear at maximum power														
C1	209.05	95.64	7.87	2101	2.45%	0.272	3.08	61	81	101	8	4	51%	97.26
II.1.1 75% of pull at maximum power at rated speed														
C1	162.76	71.55	8.19	2176	1.82%	0.285	2.95	60	81	99	13	8	50%	98.85
II.1.2 50% of pull at maximum power at rated speed														
C1	110.81	47.73	8.36	2206	1.26%	0.315	2.66	56	78	93	14	8	42%	98.44
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
B4	162.67	71.60	8.18	1552	1.91%	0.244	3.44	57	82	99	13	8	50%	98.85
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
B4	110.88	47.73	8.36	1577	1.17%	0.260	3.22	55	80	95	14	8	42%	98.44
II.2 in selected gear nearest to 7.5 km/h														
C1	209.05	95.64	7.87	2101	2.45%	0.272	3.08	61	81	101	8	4	51%	97.26
II.2.1 75% of pull at maximum power at rated speed														
C1	162.76	71.55	8.19	2176	1.82%	0.285	2.95	60	81	99	13	8	50%	98.85
II.2.2 50% of pull at maximum power at rated speed														
C1	110.81	47.73	8.36	2206	1.26%	0.315	2.66	56	78	93	14	8	42%	98.44
II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1														
B4	162.67	71.60	8.18	1552	1.91%	0.244	3.44	57	82	99	13	8	50%	98.85
II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2														
B4	110.88	47.73	8.36	1577	1.17%	0.260	3.22	55	80	95	14	8	42%	98.44

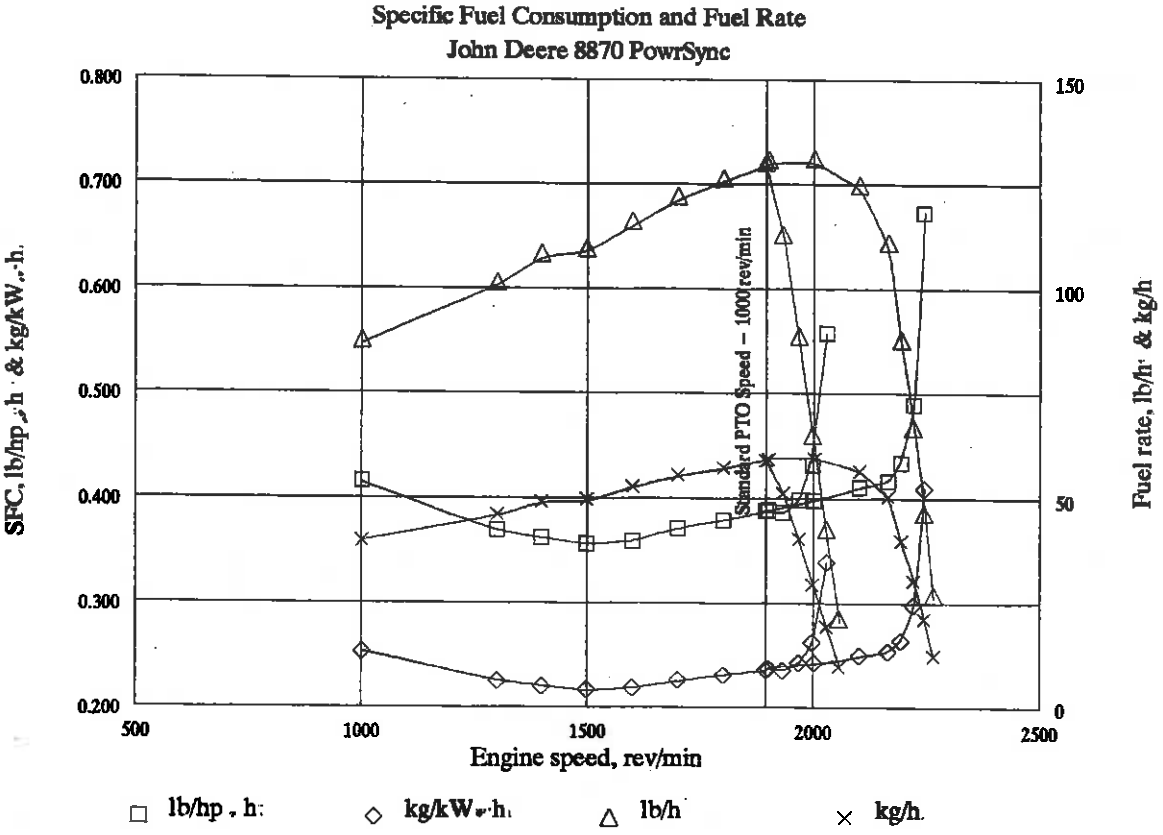
OECD Drawbar Data (US)

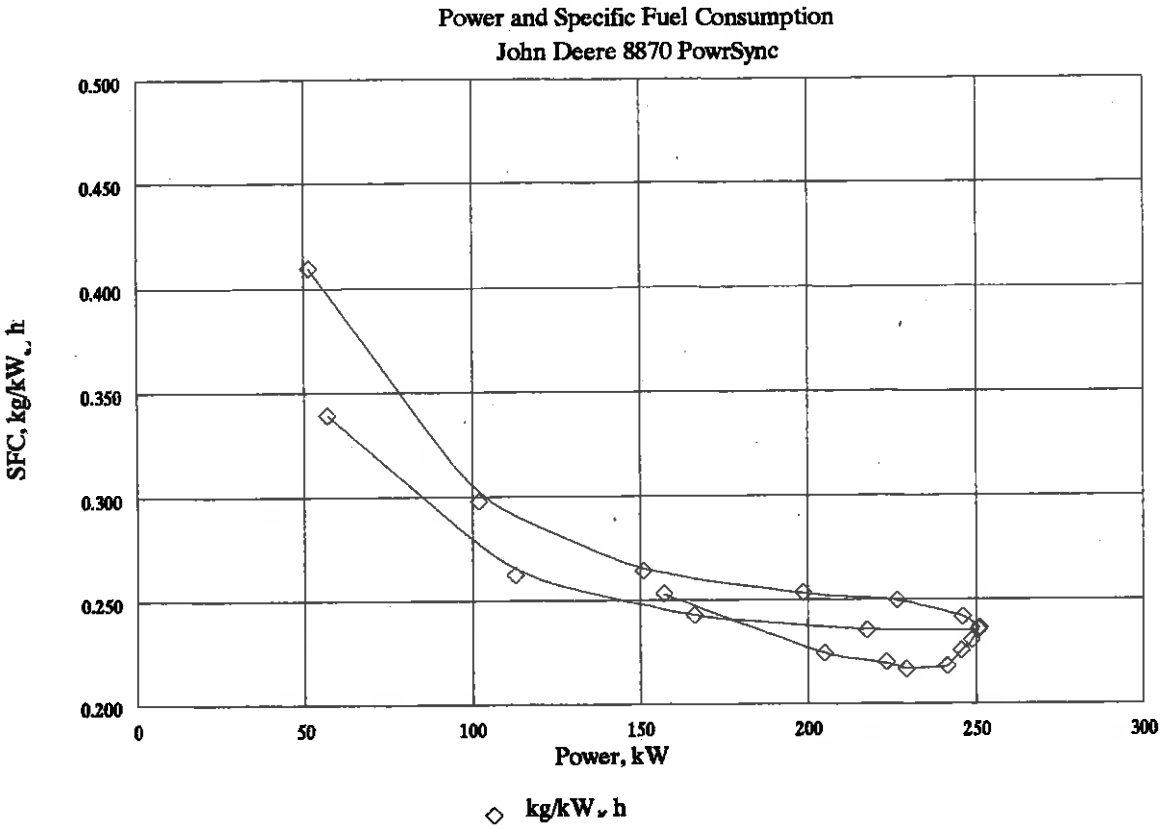
Date of tests: 4,8-NOV-93 Fuel density: 6.994 lb/gal
Type of track: Concrete Test number: 1672

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, deg F					Rel humidity	Pressure
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet		in Hg
I. Maximum Power (unballasted, 4wd at 2100 rev/min) Tire pressure: 12 psig, rear 12 psig, front Drawbar height: 19.5 in														
* A3	240.68	35026	2.58	2157	8.55%	0.492	14.22	143	174	206	52	44	56%	29.19
A4	265.74	32072	3.11	2097	5.51%	0.469	14.91	144	176	208	52	44	56%	29.19
A5	273.11	28455	3.60	2098	3.96%	0.457	15.30	144	178	213	55	45	41%	29.19
A6	272.72	23432	4.36	2098	2.81%	0.457	15.30	146	180	215	55	45	41%	29.19
B1	278.66	23707	4.41	2096	2.63%	0.447	15.65	146	178	216	47	39	51%	28.72
C1	280.34	21500	4.89	2101	2.45%	0.448	15.63	142	179	215	47	39	51%	28.72
B2	275.31	19361	5.33	2102	2.09%	0.453	15.44	144	182	220	52	42	46%	28.64
B3	276.47	18114	5.72	2099	2.00%	0.450	15.53	145	179	217	41	35	58%	28.72
C2	273.41	17419	5.89	2102	2.09%	0.452	15.46	145	182	213	54	45	48%	29.07
C3	277.00	16425	6.32	2101	1.91%	0.450	15.55	144	180	216	54	45	48%	29.07
B4	272.37	14813	6.90	2100	1.54%	0.458	15.25	140	184	220	60	48	38%	28.58
C4	271.50	13382	7.61	2101	1.36%	0.459	15.25	144	182	217	54	45	48%	29.07
B5	273.87	13011	7.89	2101	1.36%	0.457	15.32	142	182	217	52	42	46%	28.64
C5	272.00	11726	8.70	2097	1.26%	0.458	15.28	143	182	219	52	42	46%	28.64
* Pull limited to avoid excessive tractor bounce.														
II. Part loads (unballasted, 4wd)														
II.1 in selected gear at maximum power														
C1	280.34	21500	4.89	2101	2.45%	0.448	15.63	142	179	215	47	39	51%	28.72
II.1.1 75% of pull at maximum power at rated speed														
C1	218.26	16084	5.09	2176	1.82%	0.468	14.95	141	177	210	56	46	50%	29.19
II.1.2 50% of pull at maximum power at rated speed														
C1	148.59	10730	5.19	2206	1.26%	0.519	13.49	133	173	200	57	46	42%	29.07
II.1.3 next higher gear at reduced engine speed, same pull and travel speed as II.1.1														
B4	218.15	16096	5.08	1552	1.91%	0.401	17.44	135	179	210	56	46	50%	29.19
II.1.4 next higher gear at reduced engine speed, same pull and travel speed as II.1.2														
B4	148.70	10730	5.20	1577	1.17%	0.428	16.34	131	177	203	57	46	42%	29.07
II.2 in selected gear nearest to 4.6 mph														
C1	280.34	21500	4.89	2101	2.45%	0.448	15.63	142	179	215	47	39	51%	28.72
II.2.1 75% of pull at maximum power at rated speed														
C1	218.26	16084	5.09	2176	1.82%	0.468	14.95	141	177	210	56	46	50%	29.19
II.2.2 50% of pull at maximum power at rated speed														
C1	148.59	10730	5.19	2206	1.26%	0.519	13.49	133	173	200	57	46	42%	29.07
II.2.3 next higher gear at reduced engine speed, same pull and travel speed as II.2.1														
B4	218.15	16096	5.08	1552	1.91%	0.401	17.44	135	179	210	56	46	50%	29.19
II.2.4 next higher gear at reduced engine speed, same pull and travel speed as II.2.2														
B4	148.70	10730	5.20	1577	1.17%	0.428	16.34	131	177	203	57	46	42%	29.07

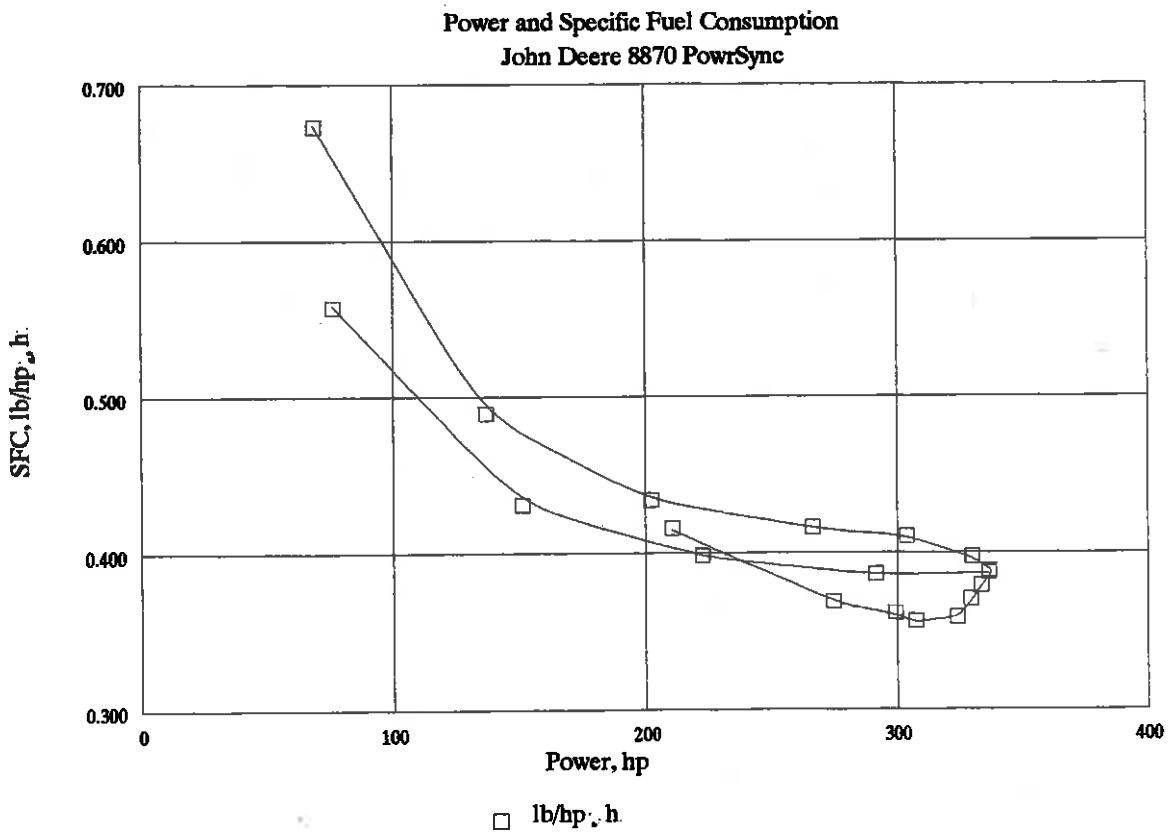

PTO Power and Crankshaft Torque
John Deere 8870 PowrSync
Power, hp & kW
Torque, lb−ft & N−m
Engine speed, rev/min
Standard PTO Speed − 1000 rev/min
400
300
200
100
0
2000
1500
1000
500
0
500
1000
1500
2000
2500
hp
kW
lb−ft
N−m

Test 1672


Specific Fuel Consumption and Fuel Rate
John Deere 8870 PowrSync
SFC, lb/hp·h & kg/kW·h
Fuel rate, lb/h & kg/h
Engine speed, rev/min
Standard PTO Speed − 1000 rev/min
0.800
0.700
0.600
0.500
0.400
0.300
0.200
150
100
50
0
500
1000
1500
2000
2500
lb/hp·h
kg/kW·h
lb/h
kg/h


Power and Specific Fuel Consumption
John Deere 8870 PowrSync
SFC, kg/kW, h
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0
50
100
150
200
250
300
Power, kW
kg/kW, h

Test 1672


Power and Specific Fuel Consumption
John Deere 8870 PowrSync
SFC, lb/hp, h
0.700
0.600
0.500
0.400
0.300
0
100
200
300
400
Power, hp
lb/hp, h

OPTIONAL TESTS - Drawbar Performance at 1900 Engine RPM

OECD Drawbar Data (SI)

Date of tests:	4,8-NOV-93	Fuel density:	0.838 kg/l
Type of track:	Concrete	Test number:	1672

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, deg C					Rel humidity	Pressure
	kW	kN	km/h	rev/min		kg/kW.h	kW.h/l	Fuel	Coolant	Oil	Dry	Wet		kPa
1. Maximum Power (unballasted, 4wd at 1900 rev/min)					Tire pressure:		83 kPa, rear		83 kPa, front		Drawbar height:		495 mm	
A2	165.75	154.31	3.87	2165	8.71%	0.305	2.75	62	79	97	11	7	56%	98.85
A3	178.21	154.83	4.14	2157	8.55%	0.300	2.79	62	79	98	11	7	56%	98.85
A4	201.68	152.83	4.75	2047	7.91%	0.288	2.91	63	81	101	11	7	56%	98.85
A5	217.17	146.04	5.35	1982	6.10%	0.274	3.05	63	82	101	13	7	41%	98.85
A6	222.12	127.15	6.29	1901	4.14%	0.266	3.15	62	83	105	13	7	41%	98.85
B1	226.17	127.77	6.37	1901	3.70%	0.262	3.20	62	85	105	8	4	51%	97.26
C1	229.36	116.95	7.06	1899	3.08%	0.258	3.24	62	84	105	8	4	51%	97.26
B2	228.27	106.76	7.70	1898	2.81%	0.259	3.24	62	85	108	8	4	51%	96.99
B3	228.32	99.00	8.30	1901	2.45%	0.259	3.24	63	84	106	5	2	58%	97.26
C2	225.59	95.17	8.53	1904	2.54%	0.261	3.22	63	86	106	12	7	48%	98.44
C3	227.82	89.58	9.16	1899	2.45%	0.258	3.25	62	86	106	12	7	48%	98.44
B4	226.43	81.76	9.97	1897	2.09%	0.260	3.22	62	85	106	12	7	48%	98.44
C4	224.82	73.23	11.05	1901	1.82%	0.263	3.19	62	88	109	14	7	34%	96.99
B5	227.00	71.36	11.45	1900	1.72%	0.260	3.23	62	88	108	11	6	46%	96.99
C5	226.49	64.45	12.65	1900	1.45%	0.261	3.21	62	87	106	11	6	46%	96.99
B6	223.86	58.65	13.74	1896	1.36%	0.264	3.17	61	87	107	11	6	46%	96.99

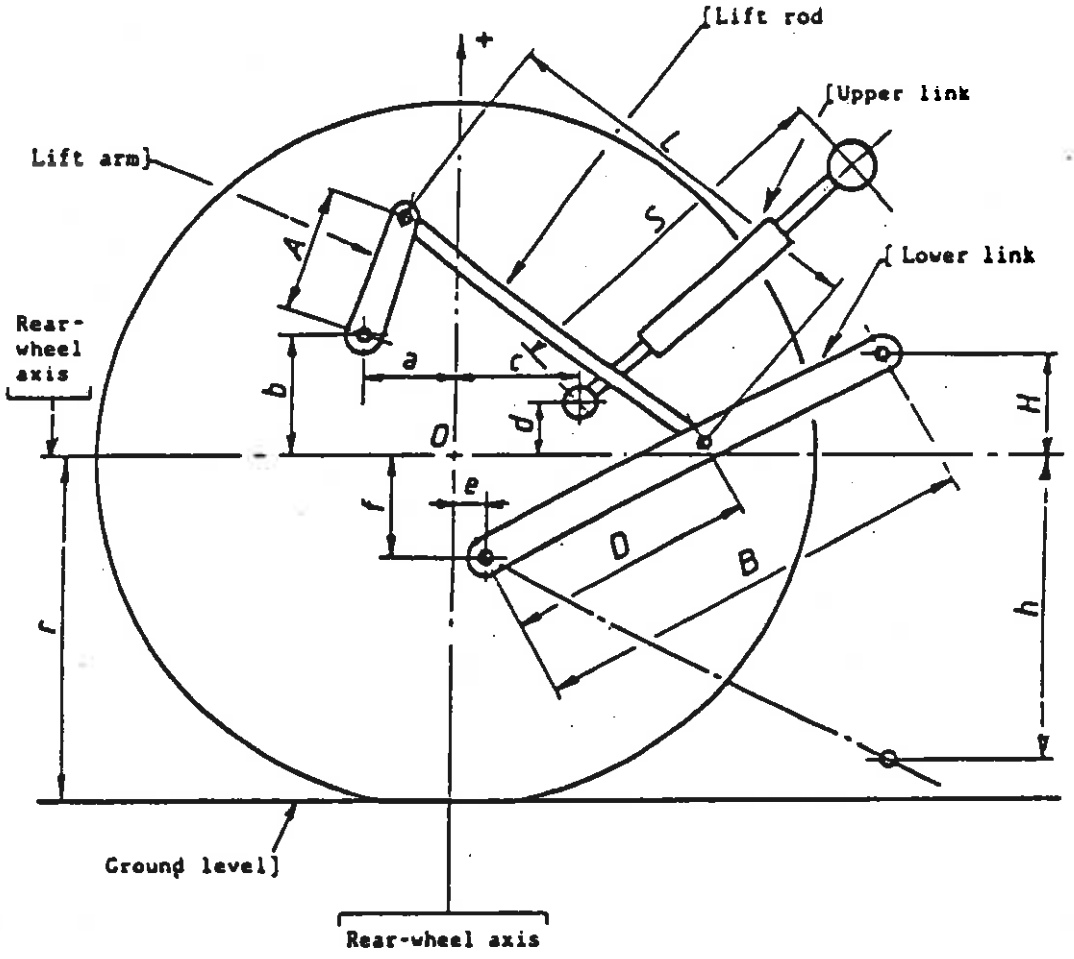
OECD Drawbar Data (US)

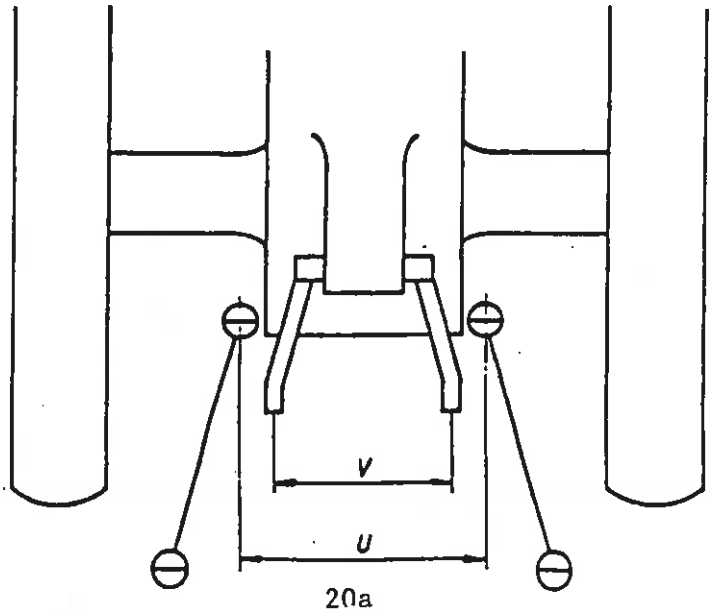
Date of tests:	4,8-NOV-93	Fuel density:	6.994 lb/gal
Type of track:	Concrete	Test number:	1672

Gear	Power	Pull	Speed	Engine speed	Slip	SFC	SFE	Temperature, deg F					Rel humidity	Pressure
	hp	lb	mph	rev/min		lb/hp.h	hp.h/gal	Fuel	Coolant	Oil	Dry	Wet		in Hg
1. Maximum Power (unballasted, 4wd at 1900 rev/min)					Tire pressure:		12 psig, rear		12 psig, front		Drawbar height:		19.5 in	
A2	222.27	34691	2.40	2165	8.71%	0.502	13.94	143	175	207	52	44	56%	29.19
A3	238.99	34808	2.57	2157	8.55%	0.494	14.17	144	175	208	52	44	56%	29.19
A4	270.45	34357	2.95	2047	7.91%	0.473	14.78	146	177	214	52	44	56%	29.19
A5	291.24	32832	3.33	1982	6.10%	0.451	15.50	145	180	214	55	45	41%	29.19
A6	297.86	28584	3.91	1901	4.14%	0.437	16.00	144	182	221	55	45	41%	29.19
B1	303.29	28724	3.96	1901	3.70%	0.430	16.26	144	185	221	47	39	51%	28.72
C1	307.58	26292	4.39	1899	3.08%	0.425	16.47	143	183	221	47	39	51%	28.72
B2	306.11	24000	4.78	1898	2.81%	0.426	16.43	144	186	226	47	39	51%	28.64
B3	306.19	22256	5.16	1901	2.45%	0.425	16.45	145	184	222	41	35	58%	28.72
C2	302.53	21395	5.30	1904	2.54%	0.428	16.32	145	186	224	54	45	48%	29.07
C3	305.52	20139	5.69	1899	2.45%	0.424	16.51	144	186	224	54	45	48%	29.07
B4	303.65	18380	6.20	1897	2.09%	0.428	16.35	144	185	224	54	45	48%	29.07
C4	301.48	16463	6.87	1901	1.82%	0.432	16.20	144	190	228	57	45	34%	28.64
B5	304.42	16043	7.12	1900	1.72%	0.427	16.38	143	190	226	52	42	46%	28.64
C5	303.73	14490	7.86	1900	1.45%	0.429	16.30	143	189	223	52	42	46%	28.64
B6	300.20	13186	8.54	1896	1.36%	0.434	16.12	142	189	225	52	42	46%	28.64

THREE POINT LINKAGE

- CATEGORY IV in conformity with ISO 730/1-1990
- CATEGORY ADAPTOR - Quick Attach





Linkage geometry dimensions *.
ISO Category IV

		Dimension or range [mm]	Settings used [mm]
Lift category		IV	IV
Rear Tire - Radius Index	(r)	905	918
Front Tire - Radius Index	(r')	905	918
Length of lift arms	(A)	472	same
Length of lower links	(B)	1097	same
Distance of lift arm pivot from: horizontal	(a)	244	same
rear wheel axis: vertical	(b)	620	same
Horizontal distance between the 2 lower link points	(U)	640	same
Horizontal distance between the 2 lift arm end points	(V)	750	same
Length of upper link	(S)	747 to 868	787
Distance of upper link pivot point from rear wheel axis - horizontal	(c)	577	same
- vertical	(d)	288	same
Distance of lower link pivot from: horizontal	(e)	288	same
rear wheel axis: vertical	(f)	350	same
Distance of lower link pivot points to lift rod pivot pts on lower links.	(D)	718	same
Length of lift rods	(L)	1030 to 1150	1133
Height of lower hitch points relative to rear wheel axis In low position	(h)	521 to 724	668
In high position	(H)	89 to 284	145
Height above ground of lower hitch points when locked in transport position.		1005 to 1201	1063

* Tire dynamic index of 918 mm - ISO 4251/1-1984
Note: Category IV available with optional axle and 100 mm lift cylinders

2.2 POWER LIFT TEST. Cat IV, quick attach, 100 mm cylinders
(for settings see p. 21)

Date of test: 1 June 1989

		Hitch points	Frame
Lower hitch points above ground - down position:	[mm/in]	250/10.0	238/9.4
Vertical movement: without load:	[mm/in]	813/32.0	886/34.9
Vertical movement: with load:	[mm/in]	746/29.4	828/32.6
Maximum corrected force through full range:	[kN/lb]	63.4/14252	62.9/14148
Corresponding pressure:	[kPa/psi]	15840/2297	
Moment about rear axle:	[kN.m/lb.ft]	97.3/71791	135.0/99561
Maximum mast tilt angle:	[deg]	--	6.2

Lifting height relative to horizontal position of lower links.

	[mm]	-330	-314	-233	-131	1
	[in]	-13.0	-12.4	-9.2	-5.2	0
Corrected lift forces						
Hitch point.	[kN]	--	63.4	66.2	69.2	72.7
	[lb]	--	14252	14873	15666	16349
at frame	[kN]	65.6	--	66.3	67.2	67.9
	[lb]	14742	--	14895	15102	15264

Lifting height relative to horizontal position of lower links.

	[mm]	128	229	331	432	498
	[in]	5.0	9.0	13.0	17.0	19.6
Corrected lift forces						
Hitch point	[kN]	75.4	77.4	79.0	80.0	--
	[lb]	16961	17411	17753	17996	--
at frame	[kN]	67.8	67.0	65.6	--	62.9
	[lb]	15237	15057	14751	--	14148

MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of test	2 November 1993
Sound level meter Make/Model/Type	Bruel and Kjaer 2203
Type of Track	Concrete Oval
Gear Number	24th (D-6)
Travel Speed before acceleration	28.8 km/h
Sound Level	85.5 dB(A)

Repairs: None
Remarks: None