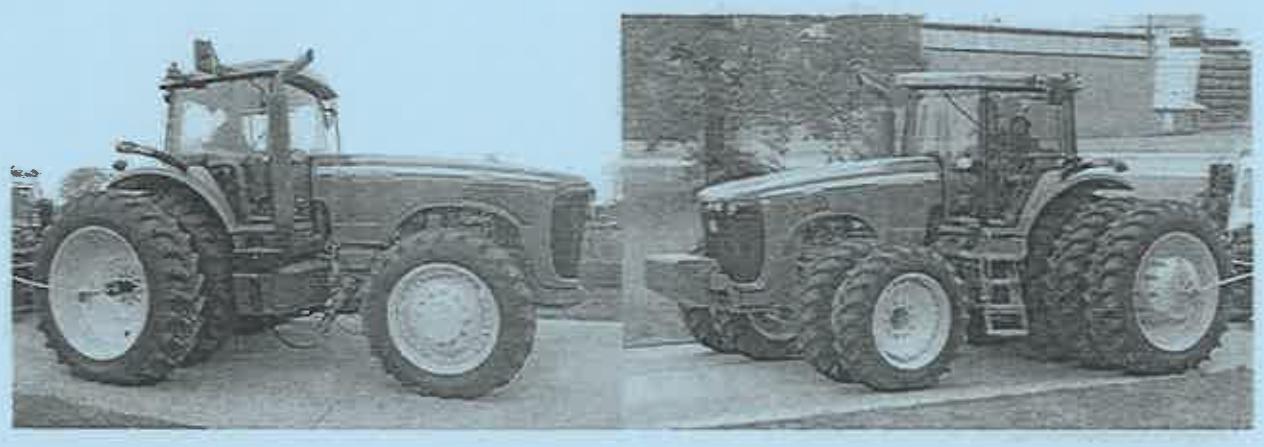
OECD APPROVAL NO. 2/2 047
CODE 2
DATE OF APPROVAL: 12 February 2003

NEBRASKA TRACTOR TEST 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 STANDARD CODE 2 FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS



JOHN DEERE 8520 POWERSHIFT
Mechanical Front Wheel Drive (MFWD)
40 km/h version

MANUFACTURED BY:	John Deere Tractor Works 3500 East Donald Street P.O. Box 270 Waterloo, Iowa 50704-0270
NEBRASKA TEST NO.	1801
TEST DATES:	May 2 – 31, 2002

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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, Code 2.

This report has been approved by the OECD Coordinating Centre in Paris on 12 February 2003 for the John Deere 8520 Powershift, mechanical front wheel drive (MFWD), 40 km/h version tractor with OECD Number 2/2 047.

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

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Nebraska Tractor Test Laboratory and
Chair, Nebraska Tractor Test Board

David L. Morgan, Assistant Director
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Brent T. Sampson, Test Engineer
Nebraska Tractor Test Laboratory

Date: MAR 2 1 2003

SPECIMEN TEST REPORT

Note: Units shown below, which appear in ISO 1000:1992, shall be stated and followed by national units in parentheses, if necessary.

- Tractor manufacturer's name and address:	John Deere Tractor Works 3500 East Donald St. P.O. Box 270 Waterloo, IA 50704-0270
- Location of tractor assembly:	Same
- Submitted for test by:	The Manufacturer
- Selected for test by:	The Manufacturer in agreement with the Nebraska Tractor Test Laboratory
- Place of running-in:	John Deere Product Engineering Center, Waterloo, Iowa
- Duration of running-in:	200 hours
- Location of test:	Nebraska Tractor Test Laboratory, Lincoln, Nebraska U.S.A.

1. SPECIFICATIONS OF TRACTOR

1.1 Identification

1.1.1 Make of the tractor:	John Deere
-Model:	8520
-Type:	Unit Construction, mechanical front wheel drive (MFWD), Powershift, 40 km/h version; JD ILS
-Number of driving wheels:	4
1.1.2 *Numbers*	
-1st Serial No:	CONFIDENTIAL
-Serial No:	RW8520P001241
1.1.3 *Other Specifications*	
-Transmission type:	Powershift

1.2 Engine

-Make:	John Deere
-Model:	6081HRW37
-Type:	4-stroke diesel; direct injection; turbocharged; air-to-air aftercooled
-Serial No:	RG6081H203783

1.2.1 *Cylinders*

-Number/disposition:	6, in-line, vertical
-Bore/stroke:	115.8 mm/ 128.5 mm
-Capacity:	8134 cm^3
-Compression ratio:	15.7:1
-Arrangement of valves:	Overhead
-Cylinder liners (wet or dry):	Wet; replaceable

1.2.2 *Supercharging*

-Make:	Borg-Warner
-Model:	RE516211
-Type:	Exhaust driven
-Pressure:	195 ± 10 kPa at rated engine speed and full load

1.2.3 *Fuel system*

-Fuel feed system:	Transfer pump with HPCR system
-Make:	RACOR
-Model:	RE509595 (Fuel Filter / Water Separator)
-Type of fuel filter(s):	Multi-layer-water-separating
-Capacity of fuel tank:	605 dm^3
-Make:	Denso
-Model:	RE501640
-Type of injection pump:	HPCR; electronic
-Serial No:	NA
-Manufacturer's production setting of injection pump	
· Flow rate (rated engine speed and full load):	55.5 ± 2 dm^3/hr
· Timing:	Variable
-Make:	Denso
-Model:	RE501010
-Type of injectors:	HPCR Injection
-Injection pressure:	113 MPa
-Make:	Denso
-Model:	NA
-Type of carburetor:	NA

1.2.4 *Governor*

- Make:	John Deere
- Model:	Focus
- Type:	Electronic Control
- Governed range of engine speed from... to ...	From 900 to 2325 min^{-1}(rev/min)
- Rated engine speed:	2200 min^{-1}(rev/min)

1.2.5 *Air cleaner*

- Pre-cleaner	
·Make:	Donaldson
·Model:	RE164824
·Type:	Strato-tube pre-cleaner with aspirator
·Location of air intake:	Under hood, front of tractor
- Main cleaner	
·Make:	Donaldson
·Model:	RE164839
·Type:	Pleated Paper
- Secondary cleaner	
·Make:	Donaldson
· Model:	RE172447
· Type:	Pleated Paper
- Maintenance indicator:	Dash mounted warning light and audible signal

1.2.6 *Lubrication system*

-Type of feed pump:	Full pressure; positive displacement
-Type of filter(s):	Full flow
-Number of filters:	One; Top Load

1.2.7 *Cooling system*

- Type of coolant:	Liquid
- Type of pump:	Centrifugal, Gear-driven
- Specification of fan or blower	Belt driven; suction type; variable speed
· Number of fan blades:	8
· Fan diameter:	737 mm
- Coolant capacity:	34 dm^3
- Type of temperature control:	2 thermostats and variable speed fan
- Superpressure system:	69 ± 5 kPa

1.2.8 *Starting system*

- Make:	Nippondenso
- Model:	RE69704
- Type:	Solenoid engaged
- Starter motor power rating:	4.0 kW
- Cold starting aid:	Ether spray in intake manifold
- Safety device:	Electrical lockout on gearshift lever

1.2.9 *Electrical system*

- Voltage:	12 V DC; neg ground
- Generator	
· Make:	Bosch
· Model	RE185213
· Type:	Belt-driven
· Power:	2.1 kW, 150 Amps
-Battery of accumulators	
· Number:	Two 12-volt batteries in parallel
· Rating	925 cold crank amp/battery, 175 Ah/battery at 20h rating

1.2.10 *Exhaust system*

-Make:	Nelson (muffler)
-Model:	RE164819
-Type:	Expansion Chamber
-Location:	Vertical muffler, right front corner of cab

1.3 Transmission

1.3.1 *Clutch (travel alone)*

- Make:	John Deere
- Model:	Multiple Plate
- Type:	Oil Cooled
- Number of plates:	7
- Diameter of plates:	232 mm
- Method of operation:	Hydraulic, pedal actuated

1.3.2 *Gear box*

- Make:	John Deere
- Model:	Full Powershift
- Type:	Mechanical
- Description:	Countershaft design consisting of 8 multi-disk hydraulically cooled clutches and multi-disk hydraulically cooled planetary brake.

	Forward	Reverse
Number of gears	16	4
Number of ranges/groups	NA	NA
Total of arrangements	16	4

- Available options:	16 x 5 (specialty market)
- Oil Cooler:	Heat exchanger with air

1.3.3 *Rear axle and final drives*

- Make:	John Deere
- Model:	NA
- Type:	Spiral bevel gear and pinion, differential and inboard planetary reduction
- Differential lock	
· Type:	Electro/Hydraulic
· Method of engagement:	Foot operated switch
· Method of disengagement:	Self-disengaging w/ brake operation

1.3.4 *Front axle and final drives*

- Make:	John Deere
- Model:	NA
- Type:	Spiral bevel gear and pinion, differential and outboard planetary reduction
- Differential lock	
· Type:	Limited slip
· Method of engagement:	Self-engaging
· Method of disengagement:	Self-disengaging

1.3.5 Total ratios and traveling speeds

Gear No.	Number of engine revolutions for one revolution of the driving wheels	Nominal traveling speed (*) at rated engine speed of 2200 min^{-1} (rev/min) km/h
FWD		
1	392.8867	1.91
2	293.3317	2.56
3	220.3247	3.40
4	164.4958	4.57
5	146.6777	5.12
6	127.2204	5.90
7	109.5105	6.85
8	94.9836	7.91
9	82.2545	9.12
10	71.3432	10.52
11	61.4118	12.22
12	53.2653	14.09
13	45.1948	16.61
14	33.7427	22.24
15	25.3445	29.61
16[a,b]	18.9224	38.67
REV		
R1	-420.0169	-1.79
R2	-156.8063	-4.79
R3[c]	-136.0055	-6.02
R4[d]	-48.3157	-10.59
R5[e]	-48.3157	-15.54

(*) Calculated with a rear track dynamic radius index of 905 mm
[a] Engine speed is limited to 2145 RPM in Gear 16 with Group 48 tires
[b] Engine speed is limited to 2260 RPM in Gear 16 with Group 47 tires
[c] Engine speed is adjustable to 2400 RPM in the Reverse Gear Number 3
[d] Engine speed is limited to 1500 RPM in the Reverse Gear Number 4
[e] Available in Specialty Markets only

- Number of revolutions of front wheels for one
  Revolution of rear-wheels:

Step 4 ILS Axle	1.254 (specific market version)
Step 5 ILS Axle	1.322 (North American Version, on tested tractor)

1.4 Power take-off

1.4.1 *Main power take-off*

- Type (independent, semi-independent or not independent):	Independent
- Method of engagement (if necessary describe the type of clutch):	Electro-Hydraulically actuated multi-plate wet clutch operated by single hand control switch
- Number of shafts:	One, 1000RPM only
- Method of changing power take-off shaft ends and speeds:	None

1.4.1.1 Power take-off proportional to engine speed

Power take-off at 1000 min^{-1} (rev/min)

- Location:	Rear of tractor, center plane
- Diameter of power take-off shaft end:	44.5 mm
- Number of splines:	20; in conformity with ISO 500:1991
- Height above ground:	723 mm
- Distance from the median plane of the tractor:	0 mm
- Distance behind rear-wheel axis:	683.5 mm
- PTO speed at rated engine speed (2200 rev/min):	1009 min^{-1} (rev/min)
- Engine speed at standard power take-off speed:	2179 min^{-1} (rev/min)
- Ratio of rotation speeds (engine speed/p.t.o. speed):	2.179:1
- Power restriction:	Maximum power available
- Maximum torque transmissible:	Maximum torque available
- Direction of rotation (viewed from behind tractor):	Clockwise

1.5 Hydraulic power lift

- Make:	John Deere
- Model:	NA
- Type:	Electro-Hydraulic lower link sensing; variable mix of draft and position control (optional slip control); adjustable rate of drop
- Type of hydraulic system:	Closed center, pressure and flow compensated
- Type and number of cylinders (single or double-acting):	2 external/ single acting Standard – 2 x 100 mm meter Optional – 1 x 100, 1 x 115 mm diameter SM – 1 x 100, 1 x 115 mm diameter
- Type of linkage lock for transport:	Electro-Hydraulic, with locking notch for hand lever in hand console
- Relief valve pressure setting (tolerance):	20 ± 0.3 Mpa
-Opening pressure of cylinder safety valve (if fitted):	23.25 ± 0.5 Mpa
-Lift pump type:	Axial piston, variable pressure and flow, pressure and flow compensated (45 cm^3 & optional 57 cm^3 displacement)
-Transmission between pump and engine:	Direct spur gear drive
-Type and number of filters:	Synthetic media, screw-on/One
-Site of oil reservoir:	Differential case housing
-Type, number and location of tapping points:	ISO standard breakaway couplers/3 standard with option 4th, 5th and additional inlet/outlet pair for externally controlled implements/rear of tractor
-Maximum volume of oil available to external cylinders:	20 dm^3; additional 10 dm^3 allowable overfill for total of 30 dm^3

1.6 Three point linkage

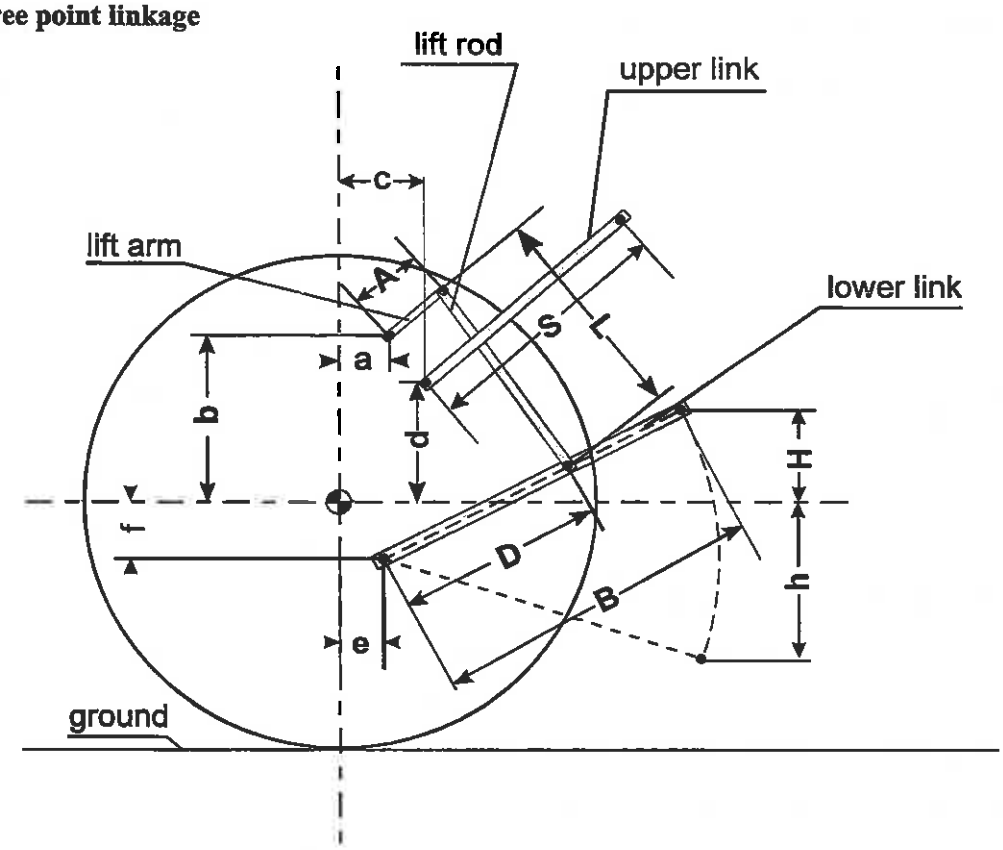


Figure 2.1
Lift test - Linkage Geometry

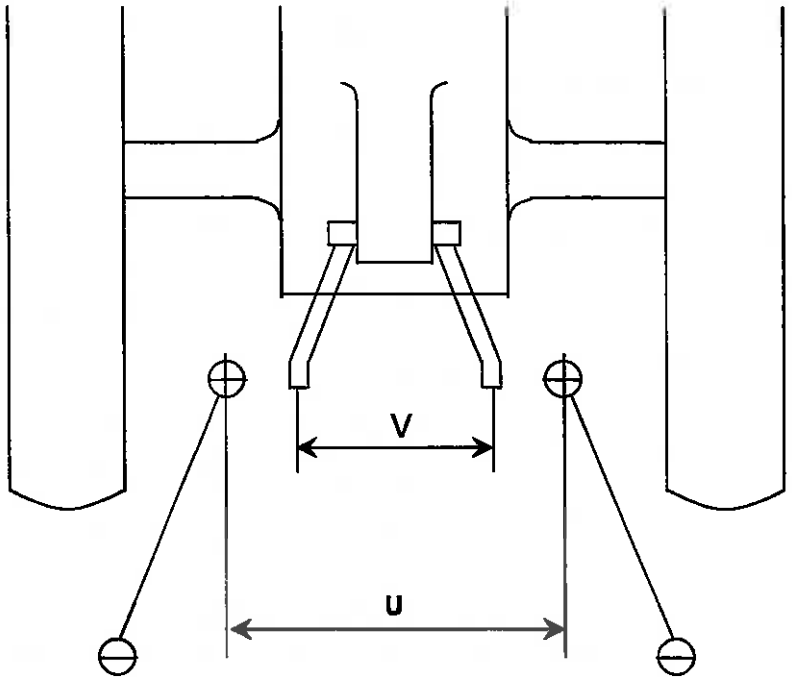


Figure 2.2
Lift test - Linkage Geometry

1.6.1 Three point linkage dimensions - Specific Market version

- Category: 3 in conformity with category 3 of ISO 730-1:1994 +Cor. 1:1995 and ISO 730-2:1979.
- Category adapter: Convertible to category-None

		Dimension or range	Settings used in test
		mm	mm
Rear tire radius:	**r**	905	972
Front tire radius:	**r'**	720	702
Length of lift arms:	**(A)**	520	same
Length of lower links:	**(B)**	1081	same
Distance of lift arm pivot point from rear-wheel axis:			
- horizontally	**(a)**	240	same
- vertically	**(b)**	495	same
Horizontal distance between the 2 lower link points:	**(u)**	594	same
Horizontal distance between the 2 lift arm end points:	**(v)**	758	same
Length of upper link:	**(S)**	729 to 900	805
Distance of upper link pivot point from rear wheel axis:			
- horizontally	**(c)**	548	same
- vertically	**(d)**	297	same
Distance of lower link pivot point from rear wheel axis:			
- horizontally	**(e)**	275	same
- vertically	**(f)**	350	same
Distance of lower link pivot points to lift rod pivot points on lower links:	**(D)**	733	same
Length of lift rods:	**(L)**	1009 to 1187	1127
Height of lower hitch points relative to the rear-wheel axis:			
- in low position	**(h)**	516 to 802	742
- in high position	**(H)**	57 to 288	81
Height above ground of lower hitch points when locked in transport position (*)		**885 to 1115**	**1053**

(*) Assuming r = 972 tyre dynamic radius index (pneumatic tyred tractors only)

1.6.2 Three point linkage dimensions– North American version

-Category: 3 in conformity with category 3 of ISO 730-1:1994 +Cor. 1:1995 and ISO 730-2:1979.
-Category adapter: Convertible to category-None

		Dimension or range	Settings used in test
		mm	mm
Rear tire radius:	**r**	905	972
Front tire radius:	**r'**	720	702
Length of lift arms:	**(A)**	520	same
Length of lower links:	**(B)**	1082	same
Distance of lift arm pivot point from rear-wheel axis:			
- horizontally	**(a)**	240	same
- vertically	**(b)**	495	same
Horizontal distance between the 2 lower link points:	**(u)**	594	same
Horizontal distance between the 2 lift arm end points:	**(v)**	758	same
Length of upper link:	**(S)**	694 to 866	732
Distance of upper link pivot point from rear wheel axis:			
- horizontally	**(c)**	515	same
- vertically	**(d)**	186	same
Distance of lower link pivot point from rear wheel axis:			
- horizontally	**(e)**	275	same
- vertically	**(f)**	350	same
Distance of lower link pivot points to lift rod pivot points on lower links:	**(D)**	733	same
Length of lift rods:	**(L)**	1009 to 1187	1150
Height of lower hitch points relative to the rear-wheel axis:			
- in low position	**(h)**	501 to 758	742
- in high position	**(H)**	20 to 249	23
Height above ground of lower hitch points when locked in transport position (*)		**855 to 1043**	**995**

(*) Assuming r = 972 tyre dynamic radius index (pneumatic tyred tractors only)

1.7 Swinging drawbar

North American Option, Cat III (optional – on tested tractor)

-Type:	Oscillating
-Height above ground	
· Maximum:	565.4 mm
· Minimum:	467.4 mm
-Type of adjustment:	Invert drawbar and reposition clevis
-Distance of hitch point from rear-wheel axis, horizontally:	1140.7, 1191.5 mm
-Distance of hitch point from power take-off shaft end	
· Vertically:	152, 250 mm
· Horizontally:	457, 508 mm
-Lateral adjustment (centre of clevis)	
· Right hand	203.75, 211.4 mm
· Left hand	203.75, 211.4 mm
-Distance of pivot point from rear-wheel axis, horizontally:	190.5 mm (forward)
-Diameter of drawbar pin hole:	40 mm
-Maximum vertical permissible load:	17.35 kN

North American Option, Cat IV (optional – not on tested tractor)

-Type:	Oscillating
-Height above ground	
· Maximum:	564 mm
· Minimum:	440 mm
-Type of adjustment:	Invert drawbar and reposition clevis
-Distance of hitch point from rear-wheel axis, horizontally:	1191.5 mm
-Distance of hitch point from power take-off shaft end	
· Vertically:	153, 277 mm
· Horizontally:	508 mm
-Lateral adjustment (centre of clevis)	
· Right hand	178 mm
· Left hand	178 mm
-Distance of pivot point from rear-wheel axis, horizontally:	190.5 mm (forward)
-Diameter of drawbar pin hole:	50.8
-Maximum vertical permissible load:	21.8 kN

SM Option (optional – not on tested tractor)

-Type:	Oscillating
-Height above ground	
· Maximum:	565.4 mm
· Minimum:	467.4 mm
-Type of adjustment:	Invert drawbar and reposition clevis
-Distance of hitch point from rear-wheel axis, horizontally:	1189, 1278 mm
-Distance of hitch point from power take-off shaft end	
· Vertically:	250, 152 mm
· Horizontally:	506, 595 mm
-Lateral adjustment (centre of clevis)	
· Right hand	212, 225.5 mm
· Left hand	212, 225.5 mm
-Distance of pivot point from rear-wheel axis, horizontally:	190.5 mm (forward)
-Diameter of drawbar pin hole:	33 mm
-Maximum vertical permissible load:	
· Short Position:	23.58 kN
· Long Position:	16.24 kN

1.8 Trailer hitch — Not available

1.9 Holed drawbar — Not available

1.10 Steering

-Make:	Eaton
- Model:	450 Series
- Type:	Hydrostatic gerotor metering unit with load sensing
-Method of operation	Steering wheel
· Pump(s):	Gear pump
· Ram(s):	Two external; double acting
-Working pressure:	18.5 ± 0.5 Mpa max

1.11 Brakes

1.11.1 *Service brake*

- Make:	Vickers-John Deere
- Model:	RE172130
- Type:	Load sensing power with manual backup
- Method of operation:	Hydraulically actuated oil immersed disk operated by two pedals that can be locked together
- Trailer braking take-off (hydraulic or air brake):	None

1.11.2 *Parking brake*

- Type:	Spring applied, hydraulically released multi-disk
- Method of operation:	Gear selector lever

1.12 Wheels

-Number	
· Front:	2 driving / 2 steering; 4 driving / 4 steering
· Rear:	2, 4, or 6 driving
-Wheelbase:	2991 mm

	Minimum	Maximum	Adjustment method
	mm	mm	
Front - inner	1525	2225	Reversing wheel and offset lug rims
Front - outer	2945	3645	Spacer between inner and outer wheels
Rear - inner	1470	2750	Rack and pinion axle; reversing wheels and offset lug rims
Rear - center	2710	3320	Rack and pinion axle; reversing wheels and offset lug rims
Rear - outer	3950	4560	Spacer between center and outer wheels

1.13 Protective structure

-Make:	John Deere
- Model:	SG-074
- Type:	Cab
-Manufacturer's name and address:	John Deere Waterloo Works Waterloo, Iowa, USA
-Protective device	
· Cab/frame/ rollguard/ other:	Cab
· Tiltable/not tiltable:	Not tiltable
-OECD approval	
· Approval number:	4/0 718 (Certified to SAE-J2194 and CSA-B352.0)
· Date of approval:	4 April 2002
· Nos. of minor modification certificates, if any:	none

1.14 Seat

1.14.1 *Driver's seat*

-Make:	John Deere
- Model:	Comfort Command
- Type:	Air cushion suspension
-Seat and steering wheel reversible: Yes/No	No
-Type of suspension:	Air Ride
-Type of damping:	Adjustable, viscous damping
-Range of adjustment	
· Longitudinally:	178 mm
· Vertically	172 travel
-Safety belt Yes/No	Yes

1.14.2 *Optional driver's seat(s)*

-Make:	John Deere
- Model:	John Deere Active Seat ™
-Type of suspension:	Air/Hydraulic
-Type of damping:	Active Position Control
-Range of adjustment	
· Longitudinally:	178 mm
· Vertically:	172 mm; 92 mm adjustment range

1.14.3 *Instructional seat*

- Location:	Optional Instructional Seat located left of drivers seat
- Capacity (number):	One

1.15 Lighting

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headlights			
Hood Inner	1680	125 x 80	210
Outer	1680	150 x 100	395
(Optional)			
Center	1739	125 x 80	62
Above Front weights	1380	152 x 127	500
Sidelights			
Upper mid-body	2085	160 x 110	700
Rearlights			
roof	2870	160 x 110	495
fender	2100	160 x 110	920
Taillights	1900	210 x 95	910
Hazard Lights			
Roof Front	2980	82 x 240(*)	770
Roof Rear	2980	82 x 240(*)	790
Extrememity Lights - Wide	2120	140 x 72	1854

*Wrap-around lights

2. TEST CONDITIONS

Separate tables may be added to report other test conditions or equipments.

2.1 Overall dimensions

	Length	Width		Height at top of	
		minimum	maximum	protective structure	exhaust pipe
	mm	mm	mm	mm	mm
Unballasted	5633	3012	3232	3060	3057
Ballasted	6145	5138	5695	3060	3057

2.2 Ground clearance (unballasted tractor): 380 mm

-Clearance-limiting part: Drawbar Safety Support

2.3 Tractor mass

Mass (with cab, full fuel tank):

	Without driver	With driver
	kg	kg
Unballasted		
Front	4392	4427
Rear	6408	6448
Total	10800	10875
Ballasted		
Front	6116	6151
Rear	9120	9160
Total	15236	15311

Ballast Added	Number of Weights	Total Mass	Liquid
		kg	kg
Front (weights)	16	726	-
Front (weight support)	1	136	-
Front (duals)	2	590	-
Rear (weights)	2	1165	-
Rear (weights)	2	114	-
Rear (weights)	4	744	-
Rear (triples)	2	961	-

2.5 Tyres and track width specifications

	Front	Rear
Tyres:	Goodyear	Goodyear
- dimensions	380/85R34	480/80R46
- load index	134	158
- type	Radial DT 712	Radial DT 712
- maximum load (tyre manufacturer's)	2300 kg	4250 kg
- maximum load (tractor manufacturer's)	2300 kg	4250 kg
- inflation pressure (tyre manufacturer's)	160 kPa	240 kPa
- dynamic radius index	720 mm	905 mm
Chosen track width*	1630 mm (inner) 3050 mm (outer)	1470 mm (inner) 2770 mm (center) 4010 mm (outer)

*Note: Tractor is equipped with single front wheels and dual rear wheels for unballasted drawbar tests. Tractor is equipped with dual front wheels and triple rear wheels for ballasted tests.

2.6 Fuel

-Type: No. 2 diesel in conformity with national standard
-Density at 15°C: 0.844 g/cm^3

2.7 Oils and lubricants

2.7.1 *Capacity and change interval*

	Capacity	Oil change	Filter change
	dm^3	h	h
Engine	25	250 (375 with John Deere PLUS-50 oil and John Deere filter)	Same
Final drive (front)	4.0	1500	Not Applicable
Hydraulic system (*)	150	1500	750
(*) Common with gear box , rear axle and rear final drive.			

2.7.2 *Specifications (SAE, API, CCMC, ACEA, Mil.L, ISO)*

	Recommended	Used during test
Engine oil · Type: · Viscosity: · Classification:	John Deere; Torq-Gard Supreme, PLUS-50 SAE 15W40 or 10W-40 12.5 - 16.3 cSt @ 100 C API CF-4; CH-4; ACEA E2	John Deere; Torq-Gard Supreme, PLUS-50 SAE 15W40
Transmission oils · Type: · Viscosity: · Classification:	John Deere HY-GARD; J20C SAE 10W-30 58 cSt at 43 C NA	Same
Final Drive Oil (front) · Type: · Viscosity: · Classification	John Deere HY-GARD; J20C SAE 10W-30 58 cSt at 43 C NA	Same
Hydraulic fluid · Type: · Viscosity: · Classification:	Same as Transmission	Same
Steering oil · Type: · Viscosity: · Classification:	Same as Transmission	Same
Grease	John Deere Moly High Temperature EP Grease	Same

2.7.3 *Grease*

Number of Lubrication points: 25

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

- Date and location of tests: 2-May-02 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

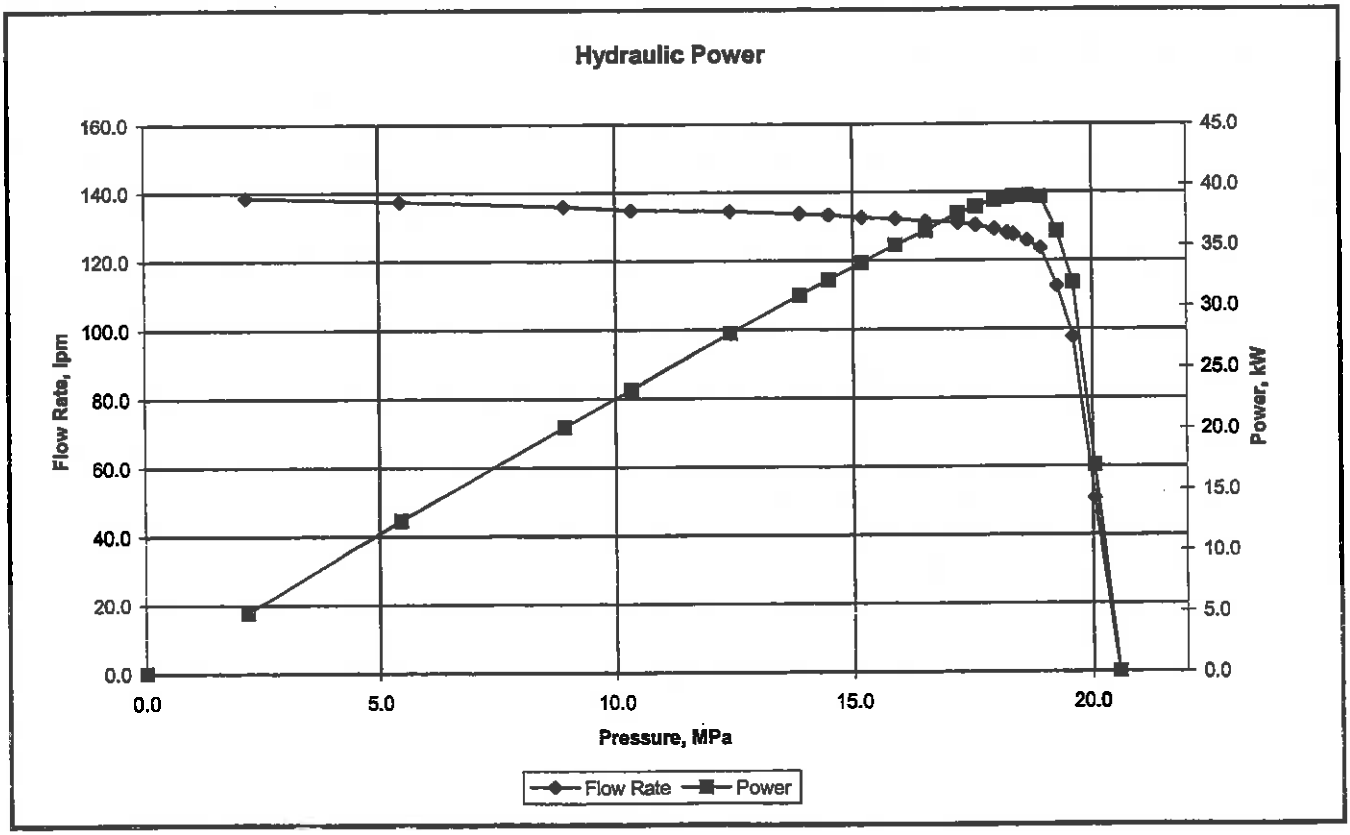
	Speed		Fuel consumption			Specific
Power	Engine	PTO	Hourly		Specific	energy
kW	rev/min		kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - TWO HOUR TEST						
218.40	2002	918	51.47	60.97	236	3.58
3.1.2 POWER AT RATED ENGINE SPEED						
191.26	2200	1009	47.85	56.68	250	3.37
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
191.26	2200	1009	47.85	56.68	250	3.37
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maximum power at rated engine speed						
191.26	2200	1009	47.85	56.68	250	3.37
3.1.4.2 85% of torque obtained in 3.1.4.1						
167.07	2261	1037	43.14	51.10	258	3.27
3.1.4.3 75% of torque defined in 3.1.4.2						
125.96	2271	1041	34.70	41.10	275	3.06
3.1.4.4 50% of torque defined in 3.1.4.2						
84.36	2283	1047	25.45	30.14	302	2.80
3.1.4.5 25% of torque defined in 3.1.4.2						
42.34	2294	1052	16.06	19.02	379	2.23
3.1.4.6 unloaded						
0.75	2302	1056	9.39	11.12	12525	0.07
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
3.1.5.1 the torque corresponding to maximum power						
191.26	2200	1009	47.85	56.68	250	3.37
3.1.5.2 85% of torque obtained in 3.1.5.1						
167.07	2261	1037	43.14	51.10	258	3.27
3.1.5.3 75% of torque defined in 3.1.5.2						
125.96	2271	1041	34.70	41.10	275	3.06
3.1.5.4 50% of torque defined in 3.1.5.2						
84.36	2283	1047	25.45	30.14	302	2.80
3.1.5.5 25% of torque defined in 3.1.5.2						
42.34	2294	1052	16.06	19.02	379	2.23
3.1.5.6 unloaded						
0.75	2302	1056	9.39	11.12	12525	0.07

- No load maximum engine speed: 2302 rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed 830 Nm
  - At 2-hour test 1042 Nm
- Maximum torque (equivalent crankshaft): 1250 Nm
  (engine speed: 1301 rev/min)

Mean atmospheric conditions:		
Dry bulb	24	°C
Pressure	97.5	kPa
Relative Humidity	18	%
Maximum temperatures:		
Coolant	105	°C
Engine oil	123	°C
Fuel	48	°C
Engine air intake	28	°C

3.2.1 Hydraulic Power (Standard Pump - two outlets - test data from 8320)

Date of Test:	31-May-02	John Deere 8320	
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:		
	20.57 MPa		
	2984 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	138.5 l/min		
	36.6 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	125.7 l/min	18.64 MPa	39.1 kW
	33.2 gpm	*2704 psig*	*52.4 hp*
	Maximum hydraulic power:		
	125.7 l/min	18.64 MPa	39.1 kW
	33.2 gpm	*2704 psig*	*52.4 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	65 °C		
	149 °F		
	This hydraulic system does not use an accumulator. Opening and closing pressures of the unloading valve could not be measured.		



3.2.2 POWER LIFT TEST Category III, Specific Market ,Walterscheid lower links with lifting cylinders 1 x 100 mm & 1 x 115 mm dia.
Date of test: 27 Feb 2002.

	Hitch points	Frame
Lower hitch points above ground - down position:	231 mm	231 mm
Vertical movement - without load:	823 mm	939 mm
with load:	805 mm	897 mm
Maximum corrected force exerted through full range:	80.5 kN	76.6 kN
Corresponding pressure:	17.7 MPa	17.7 MPa
Moment about rear axle:	109.2 kNm	150.7 kNm
Maximum mast tilt angle		8.6 degrees

Lifting height relative to horizontal position of lower links.

mm		-374	-297	-198	-98	2	101	201	301	401	431	523
Corrected lift forces												
At the hitch point	kN	80.5	82.3	84.5	86.6	88.5	90.4	92.5	94.3	95.2	95.2	--
At the frame	kN	90.4	86.4	85.5	84.9	84.5	84.1	82.8	--	81.0	--	76.6
Corresponding pressure	17.7 Mpa											

OECD Drawbar Data (SI)

Date of tests: 6,7-May-2002 — Fuel density: 0.844 kg/l

Type of track: Concrete — Test number: 1801

3.3.1 Maximum power in tested gears (unballasted, 4wd) — Tire pressure: 69 kPa, rear 159 kPa, front — Drawbar Height: 533 mm

Gear	Gear Designation	Power	Drawbar pull	Speed	Engine speed	Slip	Fuel		Temperature			Atmospheric conditions		
							SFC	SFE	Fuel	Coolant	Oil	Temperature	Relative humidity	Pressure
		kW	kN	km/h	rev/min	%	kg/kW.h	kW.h/l	°C	°C	°C	°C	%	kPa
*5	5	135.74	103.25	4.73	2261	11	0.320	2.64	40	94	115	13	83	97.5
*6	6	158.79	104.67	5.46	2232	9	0.303	2.79	40	94	113	14	84	97.5
7	7	168.22	97.50	6.21	2144	8	0.289	2.92	39	94	116	14	78	97.5
8	8	182.39	96.47	6.81	2034	8	0.278	3.04	39	94	117	14	78	97.5
9	9	187.67	85.41	7.91	2001	6	0.273	3.09	45	94	117	23	74	97.0
10	10	191.17	74.11	9.29	2002	4	0.269	3.14	44	95	117	21	73	97.0
11	11	189.30	62.71	10.87	2002	3	0.272	3.11	45	95	117	23	74	97.0
12	12	189.02	53.96	12.61	2003	3	0.271	3.11	45	95	117	23	74	97.0
13	13	187.24	45.29	14.88	1997	2	0.274	3.08	44	96	117	24	71	97.0
* Note:	Pull limited to avoid excessive bouncing.													
3.3.2 Fuel consumption														
3.3.2.1			In selected gear at maximum power at rated engine speed.											
10	10	167.19	58.29	10.33	2201	3	0.289	2.93	43	94	116	21	77	97.0
3.3.2.1.1			75% of pull at maximum power at rated engine speed											
10	10	129.82	43.69	10.70	2265	2	0.310	2.72	39	94	115	16	74	97.5
3.3.2.1.2			50% of pull at maximum power at rated engine speed											
10	10	87.56	29.15	10.82	2278	2	0.362	2.33	43	94	113	21	57	97.4
3.3.2.1.3			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
11	11	129.75	43.67	10.70	1951	2	0.275	3.07	41	96	115	16	74	97.5
3.3.2.1.4			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
11	11	87.56	29.10	10.83	1964	2	0.306	2.76	44	96	113	18	71	97.4
3.3.2.1.5			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
12	12	129.69	43.70	10.68	1690	2	0.262	3.22	41	96	115	16	75	97.5
3.3.2.1.6			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
12	12	87.58	29.12	10.83	1703	2	0.289	2.92	43	96	112	20	60	97.4
3.3.2.2			In selected gear nearest to 7.5 km/h at rated engine speed.											
8	8	167.88	79.05	7.65	2203	4	0.285	2.97	39	93	116	14	78	97.5
3.3.2.2.1			75% of pull at maximum power at rated engine speed											
8	8	131.13	59.22	7.97	2265	3	0.304	2.78	39	94	115	14	79	97.5
3.3.2.2.2			50% of pull at maximum power at rated engine speed											
8	8	88.96	39.58	8.09	2278	2	0.345	2.45	41	94	112	16	80	97.5
3.3.2.2.3			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
9	9	131.19	59.06	8.00	1967	3	0.271	3.11	40	96	115	15	74	97.5
3.3.2.2.4			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
9	9	88.91	39.52	8.10	1977	2	0.296	2.86	43	96	113	17	80	97.5
3.3.2.2.5			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
10	10	130.96	59.06	7.98	1704	3	0.257	3.29	40	96	114	16	69	97.5
3.3.2.2.6			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
10	10	88.72	39.54	8.08	1711	2	0.279	3.02	43	95	111	17	80	97.4

4.1 Drawbar Power (Unballasted - 2200 rev/min)

OECD Drawbar Data (SI)

Date of tests: 6,7-May-02						**Fuel density:** 0.844 kg/l								
Type of track: Concrete						**Test number:** 1801								
4.1.1 Maximum power in tested gears (unballasted, 4wd)							**Tire pressure:** 69 kPa, rear 159 kPa, front				**Drawbar Height:** 533 mm			
Gear	**Gear Designation**	**Power**	**Drawbar pull**	**Speed**	**Engine speed**	**Slip**	**Fuel**		**Temperature**			**Atmospheric conditions**		
							SFC	**SFE**	**Fuel**	**Coolant**	**Oil**	**Temperature**	**Relative humidity**	**Pressure**
		kW	**kN**	**km/h**	**rev/min**	**%**	**kg/kW.h**	**kW.h/l**	**°C**	**°C**	**°C**	**°C**	**%**	**kPa**
*6	6	157.14	103.18	5.48	2248	10	0.306	2.76	39	94	114	14	84	97.5
7	7	165.27	91.19	6.52	2203	6	0.290	2.91	39	94	115	13	83	97.5
8	8	167.88	79.05	7.65	2203	4	0.285	2.97	39	93	116	14	78	97.5
9	9	166.69	67.42	8.90	2202	3	0.289	2.92	43	94	114	22	73	97.0
10	10	167.19	58.29	10.33	2201	3	0.289	2.93	43	94	116	21	77	97.0
11	11	164.22	49.10	12.04	2201	3	0.295	2.87	44	94	115	23	74	97.0
12	12	162.10	41.88	13.94	2200	2	0.298	2.83	44	94	115	23	74	97.0
*** Note:**		**Pull limited to avoid excessive bouncing.**												

4.2 Drawbar Power (Ballasted - 2000 rev/min)

OECD Drawbar Data (SI)

Date of tests: 24-May-02 | Fuel density: 0.844 kg/l

Type of track: Concrete | Test number: 1801

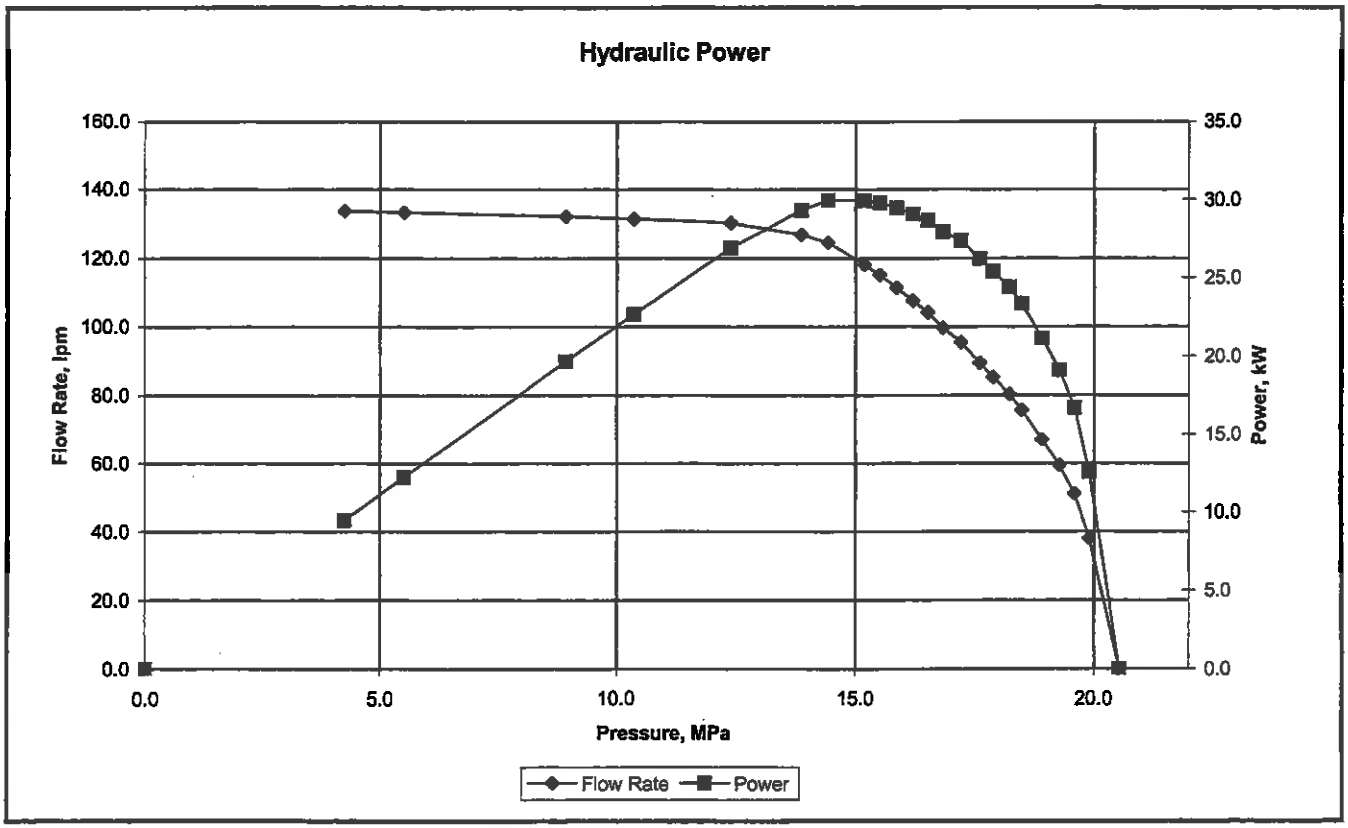
4.2.1 Maximum power in tested gears (ballasted, 4wd) | Tire pressure: 69 kPa, rear 124 kPa, front | Drawbar Height: 521 mm

Gear	Gear Designation	Power	Drawbar pull	Speed	Engine speed	Slip	Fuel		Temperature			Atmospheric conditions		
							SFC	SFE	Fuel	Coolant	Oil	Temperature	Relative humidity	Pressure
		kW	kN	km/h	rev/min	%	kg/kW.h	kW.h/l	°C	°C	°C	°C	%	kPa
*3	3	135.37	158.40	3.08	2260	13	0.329	2.57	39	95	113	8	80	98.1
4	4	169.02	149.18	4.08	2123	8	0.291	2.90	39	96	116	8	87	98.1
5	5	180.50	144.22	4.51	2069	7	0.280	3.01	39	95	116	8	87	98.1
6	6	190.58	134.65	5.10	2002	6	0.271	3.12	38	95	116	9	80	98.1
7	7	193.53	115.99	6.01	1998	4	0.266	3.17	37	95	117	9	75	98.2
8	8	193.37	99.56	6.99	2000	3	0.266	3.17	38	96	118	9	75	98.2
9	9	193.99	86.04	8.12	1999	3	0.265	3.18	37	96	118	11	64	98.2
10	10	192.69	73.74	9.41	2001	2	0.267	3.16	38	96	118	11	64	98.3
11	11	189.34	62.16	10.97	2000	2	0.271	3.12	37	97	116	11	65	98.3
12	12	187.47	53.27	12.67	1999	2	0.275	3.07	37	97	117	11	65	98.3
13	13	184.25	44.22	15.00	2002	2	0.280	3.02	37	97	117	11	59	98.3

* Note: Slip within operating procedures of testing station.

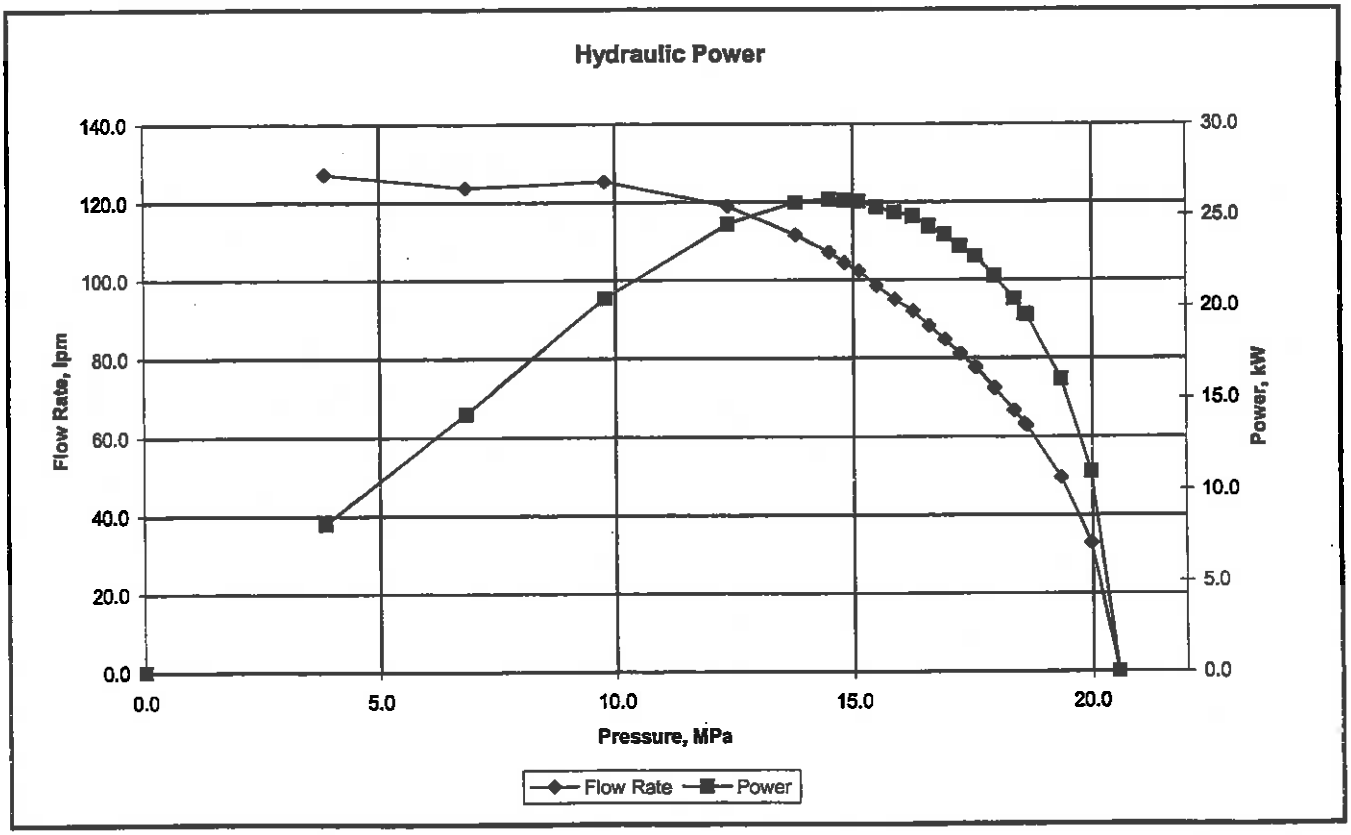
4.3 Hydraulic Power (Standard Pump - one outlet - test data from 8320)

Date of Test:	31-May-02	John Deere 8320	
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:		
	20.54 MPa		
	2979 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	133.6 l/min		
	35.3 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	75.7 l/min	18.48 MPa	23.3 kW
	20.0 gpm	*2681 psig*	*31.3 hp*
	Maximum hydraulic power:		
	124.5 l/min	14.42 MPa	29.9 kW
	32.9 gpm	*2091 psig*	*40.1 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	79 °C		
	174 °F		
	This hydraulic system does not use an accumulator. Opening and closing pressures of the unloading valve could not be measured.		



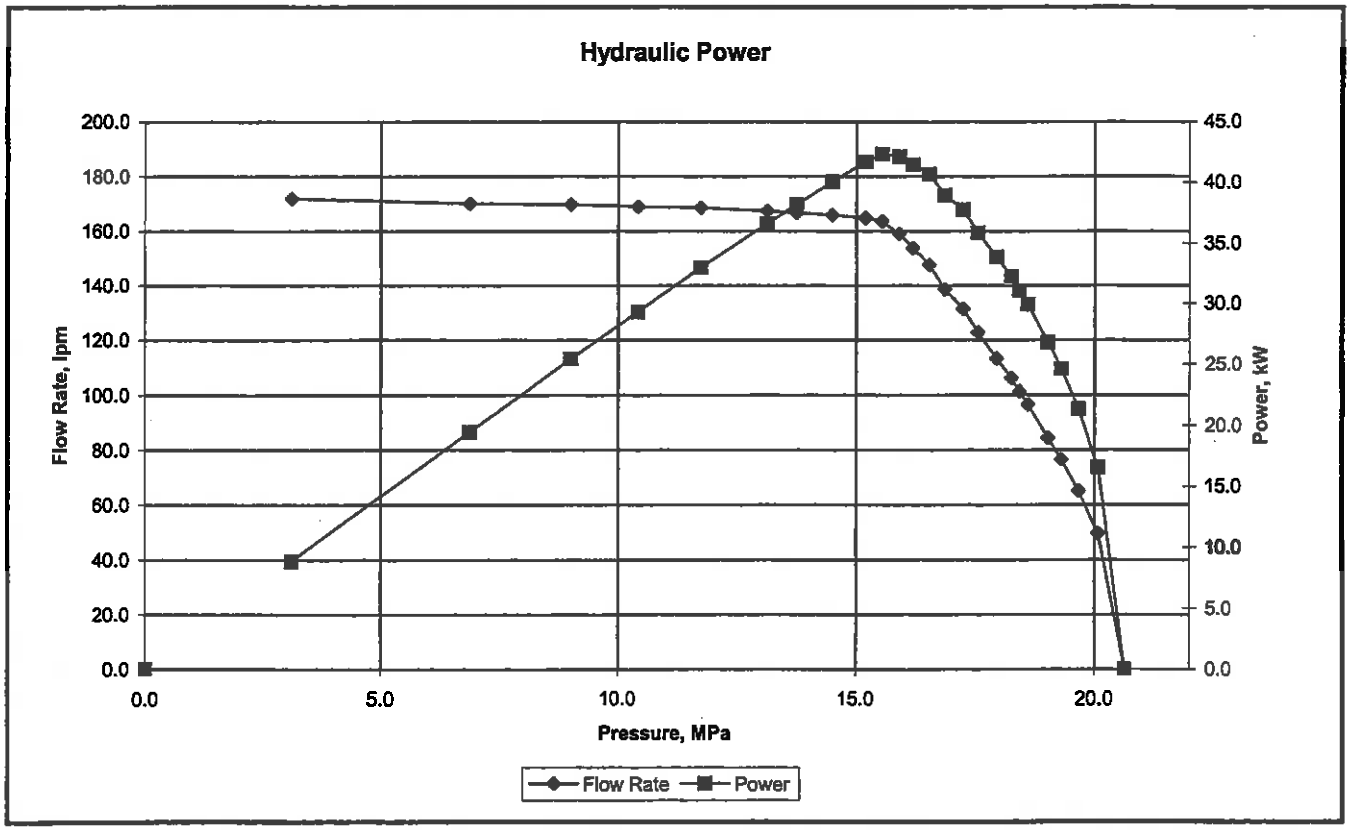
4.4 Hydraulic Power (High Flow Pump - one outlet - test data from 8520)

Date of Test:	31-May-02	John Deere 8520	
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:		
	20.56 MPa		
	2982 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	127.2 l/min		
	33.6 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	63.2 l/min	18.57 MPa	19.6 kW
	16.7 gpm	*2693 psig*	*26.2 hp*
	Maximum hydraulic power:		
	107.1 l/min	14.49 MPa	25.9 kW
	28.3 gpm	*2101 psig*	*34.7 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	79 °C		
	174 °F		
	This hydraulic system does not use an accumulator. Opening and closing pressures of the unloading valve could not be measured.		



4.5 Hydraulic Power (High Flow Pump - two outlets - test data from 8520)

Date of Test:	31-May-02	John Deere 8520	
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:		
	20.64 MPa		
	2993 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	171.9 l/min		
	45.4 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	96.5 l/min	18.60 MPa	29.9 kW
	25.5 gpm	*2698 psig*	*40.1 hp*
	Maximum hydraulic power:		
	163.5 l/min	15.53 MPa	42.3 kW
	43.2 gpm	*2253 psig*	*56.8 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	70 °C		
	159 °F		
	This hydraulic system does not use an accumulator. Opening and closing pressures of the unloading valve could not be measured.		



4.6 POWER LIFT TEST Category III, N.A. Quick attach linkage, with lifting cylinders (2) x 100 mm dia.
Date of test: 27 February 2002.

	Hitch points	Frame
Lower hitch points above ground - down position:	231 mm	239 mm
Vertical movement - without load:	765 mm	848 mm
with load:	745 mm	826 mm
Maximum corrected force exerted through full range:	76.3 kN	68.4 kN
Corresponding pressure:	17.7 MPa	17.7 MPa
Moment about rear axle:	103.6 kNm	134.6 kNm
Maximum mast tilt angle		8.4 degrees

Lifting height relative to horizontal position of lower links.

mm		-374	-366	-299	-198	-98	2	101	202	301	371	460
Corrected lift forces												
At the Hitch point	kN	76.3	–	77.3	78.8	80.4	81.7	83.0	84.3	84.8	83.9	–
at the frame	kN	–	90.6	83.7	80.6	79.1	77.6	76.4	74.6	–	71.6	68.4

Corresponding pressure 17.7 Mpa

4.7 POWER LIFT TEST Category III, N.A. Quick attach linkage, with lifting cylinders (1) x 100 mm & (1) x 115 mm dia.
Date of test: 27 February 2002.

	Hitch points	Frame
Lower hitch points above ground - down position:	231 mm	239 mm
Vertical movement - without load:	765 mm	848 mm
with load:	749 mm	829 mm
Maximum corrected force exerted through full range:	88.9 kN	79.6 kN
Corresponding pressure:	17.7 MPa	17.7 MPa
Moment about rear axle:	120.5 kNm	156.5 kNm
Maximum mast tilt angle		8.3 degrees

Lifting height relative to horizontal position of lower links.

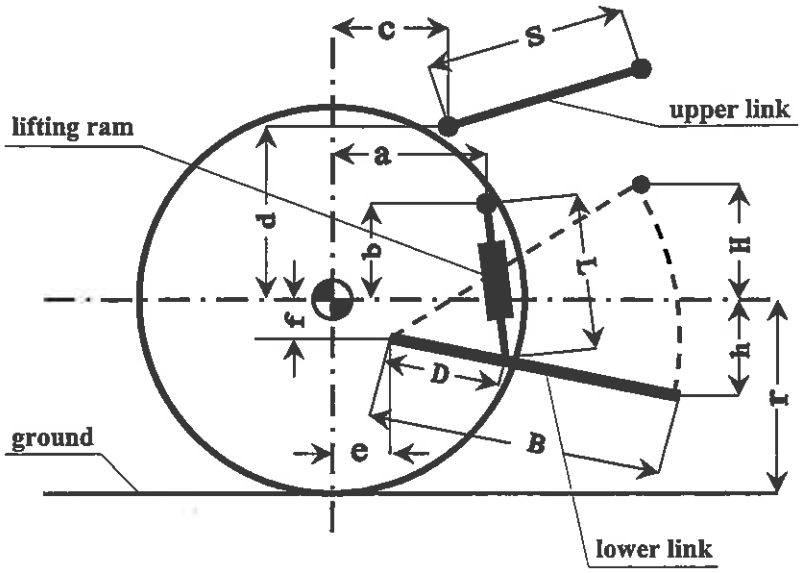
mm		-373	-366	-298	-198	-99	1	101	200	301	376	463
Corrected lift forces												
At the Hitch point	kN	88.9	–	89.9	91.6	93.4	95.2	96.1	97.9	98.8	97.9	--
at the frame	kN	–	114.8	97.7	94.1	92..3	90.6	89.1	86.9	–	83.4	79.6
Corresponding pressure	17.7 Mpa											

4.8 POWER LIFT TEST, Front Hitch, Category IIIN,
Date of test: 2 March 2002.

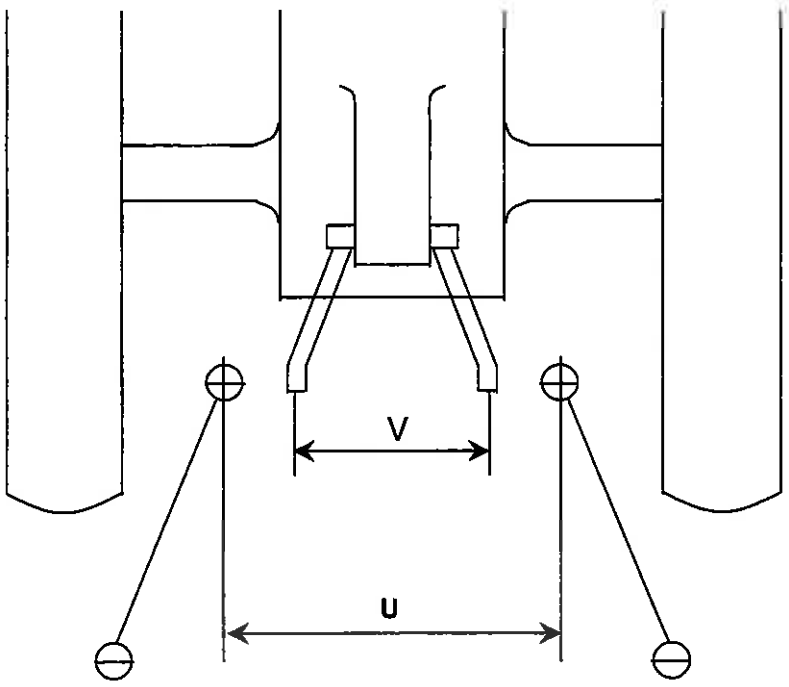
	Hitch points	Frame
Lower hitch points above ground - down position:	234 mm	257 mm
Vertical movement - without load:	747 mm	867 mm
with load:	728 mm	821 mm
Maximum corrected force exerted through full range:	45.0 kN	31.1 kN
Corresponding pressure:	17.8 MPa	17.8 MPa
Moment about front axle:	87.0 kNm	79.0 kNm
Maximum mast tilt angle		11.1 degrees

Lifting height relative to horizontal position of lower links.

mm		-335	-312	-202	-100	-2	96	197	298	393	509
Corrected lift forces											
At the Hitch point	kN	47.3	45.4	45.0	45.8	45.9	46.6	46.8	46.6	45.2	--
at the frame	kN	–	61.9	49.4	46.9	44.7	42.7	–	40.2	35.3	31.1
Corresponding pressure	17.8 Mpa										



Front Hitch Linkage Geometry



Front Hitch Linkage Geometry

Front Hitch Linkage Dimensions

-Category: 3N in conformity with category 3 of ISO 730-1:1994 +Cor. 1:1995 and ISO 730-2:1979.
-Category adapter: Convertible to category-None

		Dimension or range	Settings used in test
		mm	mm
Rear tire radius:	**r**	905	972
Front tire radius:	**r'**	720	702
Length of lift arms:	**(A)**	Not applicable	Not applicable
Length of lower links:	**(B)**	806	same
Distance of lift arm pivot point from front-wheel axis:			
- horizontally	**(a)**	1375	same
- vertically	**(b)**	400	same
Horizontal distance between the 2 lower link points:	**(u)**	600	same
Horizontal distance between the 2 lift arm end points:	**(v)**	436	same
Length of upper link:	**(S)**	485 to 705	515
Distance of upper link pivot point from front wheel axis:			
- horizontally	**(c)**	1416	same
- vertically	**(d)**	290, 410, 480	480
Distance of lower link pivot point from front wheel axis:			
- horizontally	**(e)**	1146	same
- vertically	**(f)**	151	same
Distance of lower link pivot points to lift rod pivot points on lower links:	**(D)**	130	same
Length of lift rods (cylinders):	**(L)**	470 to 685	variable
Height of lower hitch points relative to the front wheel axis:			
- in low position	**(h)**	472	same
- in high position	**(H)**	278	same
Height above ground of lower hitch points when locked in transport position (*)		998	980

(*) Assuming r = 702 mm (pneumatic tyred tractors only)

4.9 Measurement of External Noise Level – John Deere 8520

-- Date of Test	May 7, 2002
-- Location of Test	Nebraska Tractor Test Laboratory
-- Sound Level Meter	Bruel and Kjaer 2236
-- Type of Track	Concrete Oval
-- Gear Number	16
-- Speed Prior to Acceleration	29.00 km/h
-- Noise Level	86.9 dB(A)

4.10 Measurement of Noise Level at Operator's Ear*

-- Date of Test	May 7, 2002
-- Location of Test	Nebraska Tractor Test Laboratory
-- Sound Level Meter	Bruel and Kjaer 2236
-- Type of Track	Concrete Oval
-- Gear Number	8
-- Drawbar Load	None
-- Noise at Operator Ear	73.7 dB(A) - front wheel drive engaged 73.8 dB(A) - front wheel drive disengaged

* Note: Nebraska tractor test station guidelines.

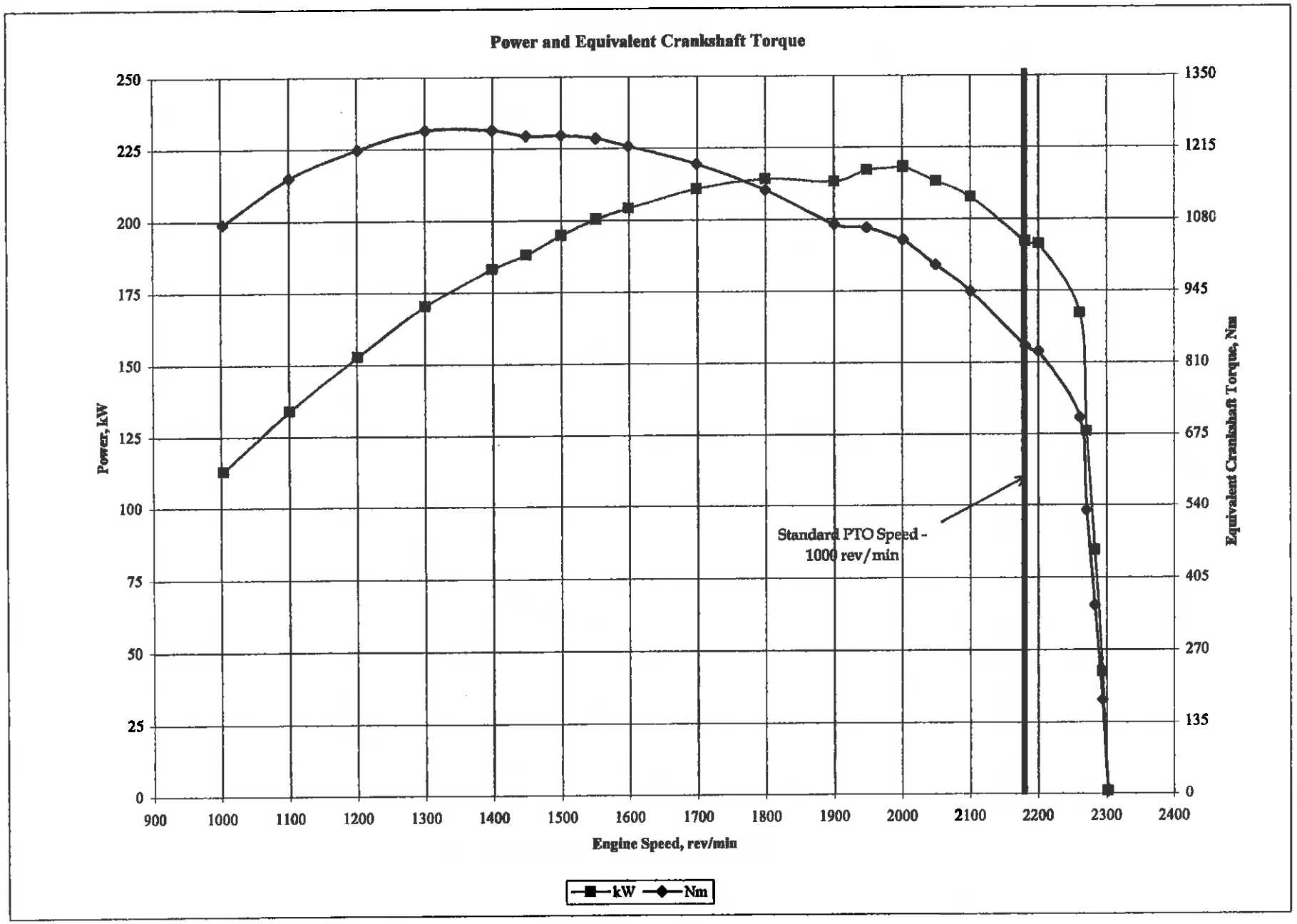
5. Repairs and Adjustments: None

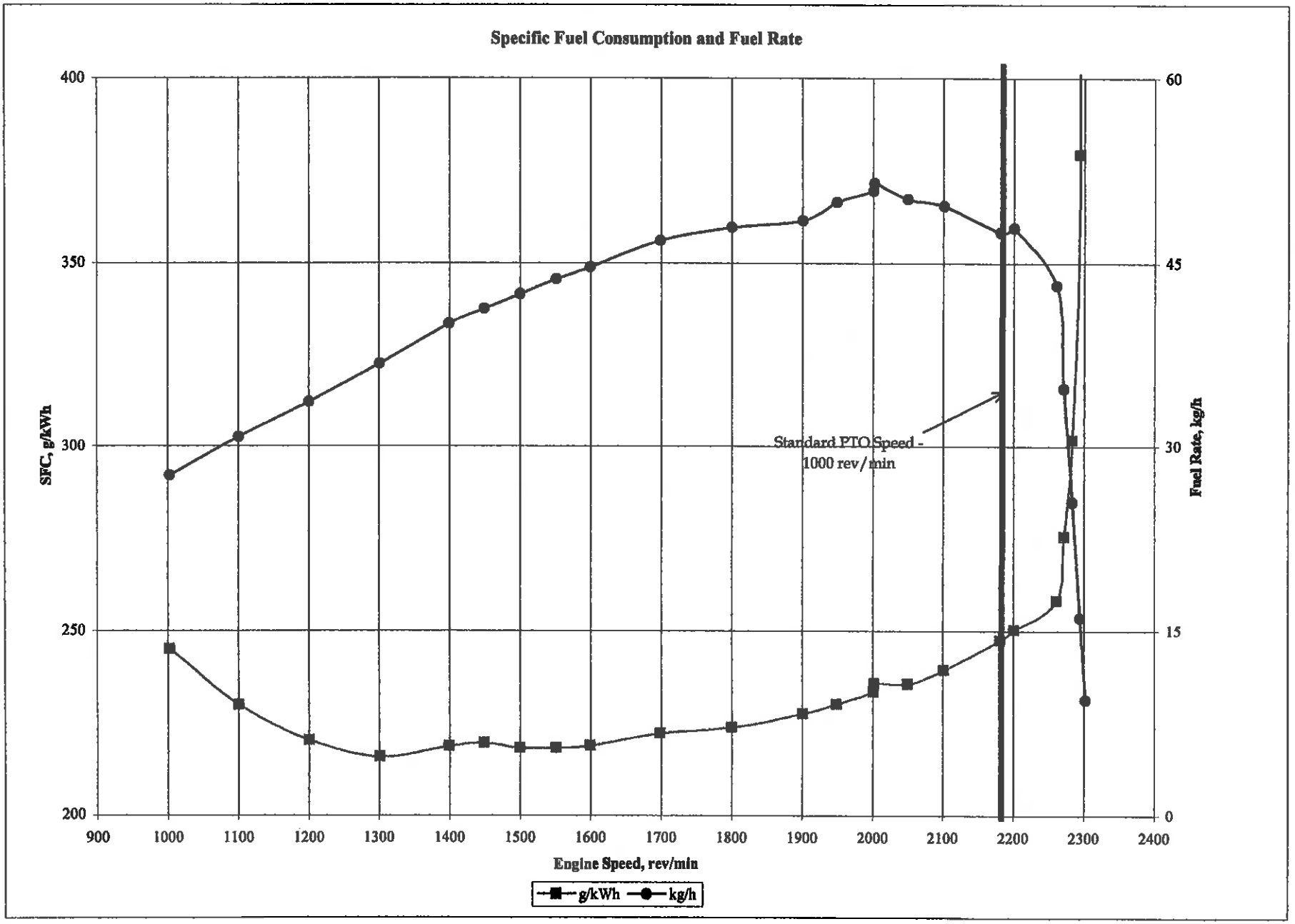
6. Remarks:

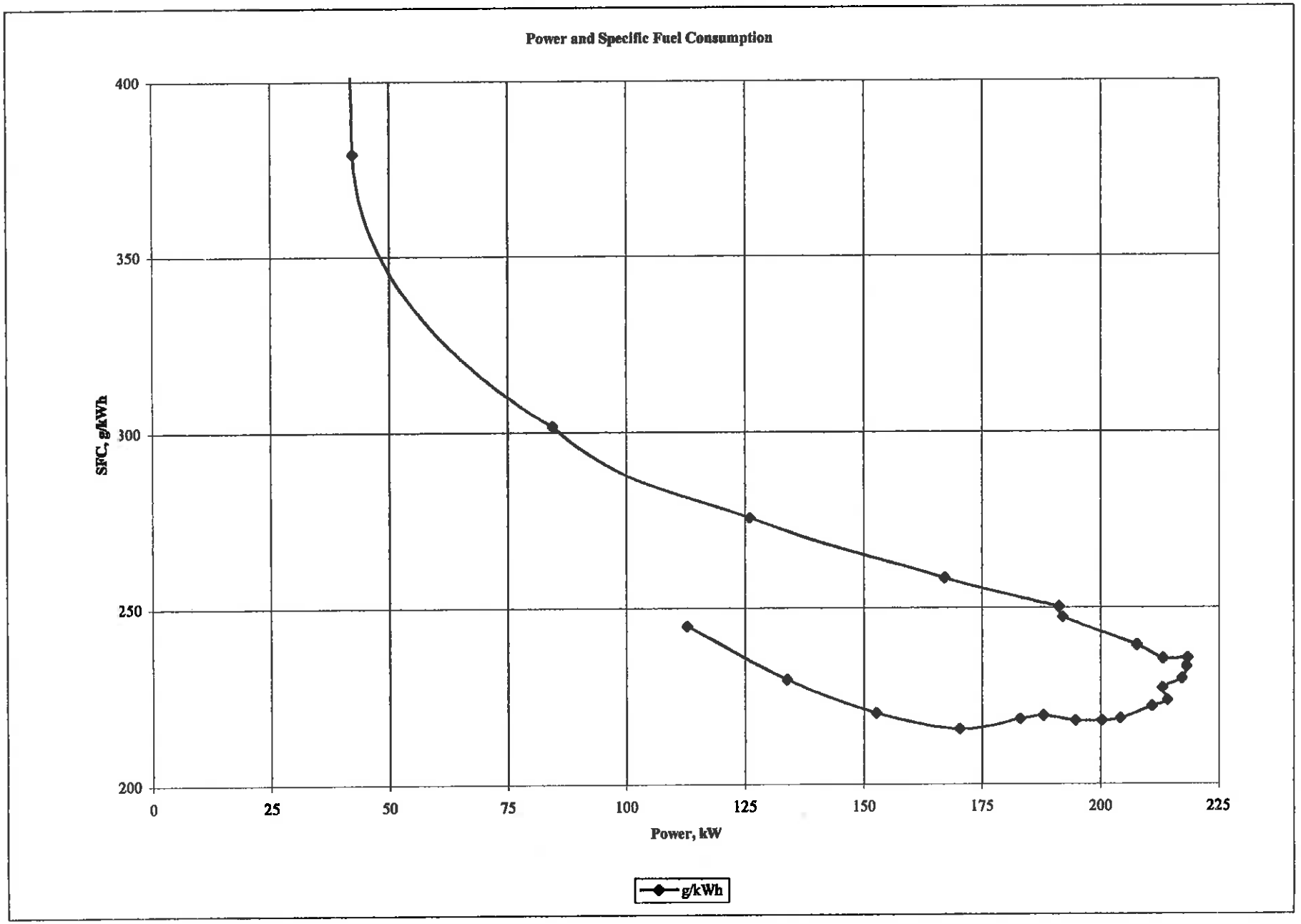
POWER LEVELS FOR JOHN DEERE 8520 TRACTORS:

The John Deere 8520 Tractor is equipped with an electronic engine performance control system which provides the following engine power levels in various conditions:

	Maximum Engine Power at 2200 rpm
a) Performance Level A In gears 1-7, and when the three point hitch rockshaft is lowered below the transport lock position and the PTO is off	185 kW
b) Performance Level B In gears 8 and above	190 kW


Power and Equivalent Crankshaft Torque
Power, kW
Equivalent Crankshaft Torque, Nm
Engine Speed, rev/min
Standard PTO Speed - 1000 rev/min
kW
Nm
250
225
200
175
150
125
100
75
50
25
0
1350
1215
1080
945
810
675
540
405
270
135
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400


Specific Fuel Consumption and Fuel Rate
SFC, g/kWh
Fuel Rate, kg/h
Engine Speed, rev/min
Standard PTO Speed - 1000 rev/min
g/kWh
kg/h
400
350
300
250
200
60
45
30
15
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400


Power and Specific Fuel Consumption
SFC, g/kWh
400
350
300
250
200
0
25
50
75
100
125
150
175
200
225
Power, kW
g/kWh