OECD APPROVAL NO. 2/1932
CODE 2
DATE OF APPROVAL: 2 November 2000

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 8310 POWERSHIFT
4WD
40 km/h version

MANUFACTURED BY:	**John Deere Waterloo Works** **3500 East Donald Street** **P.O. Box 270** **Waterloo, Iowa U.S.A.**
NEBRASKA TEST NO.	**1775**
TEST DATES:	**April 13 - May 12, 2000**

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 2 November 2000 for the John Deere 8310 Powershift, 4 WD, 40 km/h version, with OECD Number 2/1932.

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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- Manufacturer's Name/Address	John Deere Waterloo Works Tractor Assembly Division 3500 East Donald St. P.O. Box 270 Waterloo, Iowa U.S.A.
- 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 U.S.A.
- Duration of Running-in	98 hours
- Location of Test	Nebraska Tractor Test Laboratory, Lincoln, Nebraska, USA.

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

- Make	John Deere
- Model	8310
- Type	Unit construction, mechanical front wheel drive (MFWD), Powershift, 40 km/h version
-Number of driving wheels	4
- Serial No.	*RW8310P001626*
- 1st Serial No.	Confidential

1.2 ENGINE

- Make	John Deere
- Model	6081HRW15
- Type	4 stroke diesel; direct injection; turbocharged, air to air aftercooled
- Serial No.	*RG6081H098910*

1.2.1 Cylinders

- Number/Disposition	6 in-line, vertical
- Bore/Stroke	115.8 mm X 128.5 mm
- Capacity	8134 cm^3
- Compression Ratio	16.5:1
- Arrangement of Valves	Overhead
- Cylinder Liners (Wet/Dry)	Wet, replaceable

1.2.2 Supercharging

- Make	Schwitzer
- Model	RE64765
- Type	Exhaust gas driven
- Pressure	0.144 +/- 0.015 MPa at rated speed and full load

1.2.3 Fuel System

- Fuel Feed System	Transfer Pump integral with injection pump
- Fuel Filter(s) Make	Stanadyne
- Model	AR103220/AR86745
- Type	Spin-on cartridge.
- Capacity of Fuel Tank	511 dm^3
- Make of Injection Pump	Bosch
- Model of Injection Pump	RE501859
- Type of Injection Pump	In-line, Electronic
- Serial No.	9702500062
- Manufacturer's Production Setting of Injection Pump:	
- Flow Rate	44.8 +/- 2.0 dm^3/hr (at rated speed and load)
- Fuel Density	0.847 g / cm^3
- Timing	18 +/- 1° before BTDC
- Make of Injectors	Bosch
- Model of Injectors	RE63073
- Type of Injectors	P-type nozzle
- Injection Pressure	29.0 + 1.2/-0.0 MPa
- Make/Model/Type of Carburetor	N/A

1.2.4 Governor

- Make	John Deere
- Model	Focus
- Type	Electronic Control
- Governed Range of Engine Speed	From 800 to 2400 min^{-1}, (rev/min) , gears 1-16
- Rated Engine Speed	2200 min^{-1} (rev/min)

1.2.5 Air Cleaner

- Pre-cleaner Make	Donaldson
- Pre-cleaner Model	RE164286
- Pre-cleaner Type	Strato-tube precleaner with aspirator
- Location of Air Intake	Underhood, front of tractor
- Main Cleaner Make	Donaldson
- Main Cleaner Model	RE51629 Primary, RE51630 Secondary
- Main Cleaner 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; Spin-on
- Oil Cooler	Heat exchanger with engine coolant

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	711 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
- Generator Make	Nippondenso
- Generator Model	RE 46608
- Generator Type	Alternator, belt-driven
- Power	1.9 kW
- Battery (Number of Accumulators)	Two 12-volt batteries in parallel
- Rating	925 cold cranking amps / battery 180 minutes reserve capacity

1.2.10 Exhaust System

- Make	Nelson (muffler)
- Model	RE44716
- Type	Expansion chamber
- Location	External muffler, integrated with vertical exhaust pipe near right front corner of cab

1.3 TRANSMISSION

1.3.1 Clutch (Travel Alone)

- Make/Model/Type	John Deere / Multiple plate/ Oil-cooled
- Number of Plates	7 friction
- Diameter of Plates	232 mm
- Method of Operation	Hydraulic; pedal actuated

1.3.2 Gear Box

- Make/Model/Type	John Deere / Full Powershift / Mechanical Countershaft design consisting of 8 multi-disk hydraulically cooled planetary brake

	Forward	Reverse
Number of gears	16	4
Number of ranges/groups	N/A	N/A
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/Model/Type	John Deere / N/A / 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 with brake operation

1.3.4 Front Axle and Final Drives

<u>MFWD</u>

- Make/Model/Type	John Deere / /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 Speed

Standard transmission, Version fitted on the tested tractor.

Standard Transmission Gear No.	Number of Engine Revolutions for One Revolution of the Driving Wheels	Nominal Traveling Speed (*) at Rated Engine Speed of 2200 rev/min km/h
FWD		
1	344.0280	2.18
2	269.3176	2.79
3	211.5868	3.55
4	165.6378	4.53
5	136.7896	5.49
6	121.2289	6.19
7	107.0839	7.01
8	94.9024	7.91
9	84.1294	8.92
10	74.5592	10.07
11	65.8596	11.40
12	58.3676	12.86
13	45.8624	16.37
14	35.9028	20.91
15	28.2067	26.61
16[a]	22.0812	37.08
16[b]	22.0812	31.44
REV		
R1	-394.3959	-1.90
R2	-156.8165	-4.79
R3[c]	-138.9776	-5.89
R4[d]	-52.5770	-10.38
R5[e]	-52.5770	-14.28

(*) Calculated with a tyre dynamic radius index of 905 mm (pneumatic tyred tractors only)
[a] Engine speed is adjustable to 2400 RPM in Gear Number 16
[b] Engine speed is limited to 2035 RPM in Gear Number 16 in Specialty Markets
[c] Engine speed is adjustable to 2400 RPM in Reverse Gear Number 3
[d] Engine speed is limited to 1600 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 equals 1.330

1.4 POWER TAKE-OFF

1.4.1 Main Power Take-Off

- Type	Independent
- Method of engagement	Electro-Hydraulically actuated multi-plate wet clutch operated by single hand control switch
- Number of shafts	One, 1000 RPM only; two optional 540/1000 RPM
- Method of changing power take-off shaft ends and speeds	None; optional removal shaft and reversible shaft

1.4.1.1 Power take-off proportional to engine speed

1000 rev/min

- Location	Rear of tractor, center plane
- Diameter of power take-off shaft end	44.5 mm
- Number of splines	20
- Height above ground	708 mm
- Distance from the median plane of the tractor	0 mm
- Distance behind rear wheel axle	683.5 mm
- PTO speed at rated engine speed (2200 rev/min)	1009 rev/min
- Engine speed at standard power take-off speed	2179 rev/min
- Ratio of rotation speeds (engine speed/p.t.o. speed)	2.179 to 1
- Power restriction and maximum torque	No restrictions
- Direction of rotation (viewed facing driving end)	Clockwise

1.4.1.2 Power take-off proportional to ground speed **Not Available**

1.4.2 Optional power take-off

540 rev/min

- Location	Rear of tractor, center plane
- Diameter of power take-off shaft end	35 mm
- Number of splines	6
- Height above ground	708 mm
- Distance from the median plane of the tractor	0 mm
- Distance behind rear wheel axle	785 mm
- PTO speed at rated engine speed (2200 rev/min)	601 rev/min
- Engine speed at standard power take-off speed	1978 rev/min
- Ratio of rotation speeds (engine speed/p.t.o. speed)	3.663 to 1
- Power restriction and maximum torque	56 kW 1100 Nm
- Direction of rotation (viewed facing driving end)	Clockwise

1.4.1.3

1000 rev/min

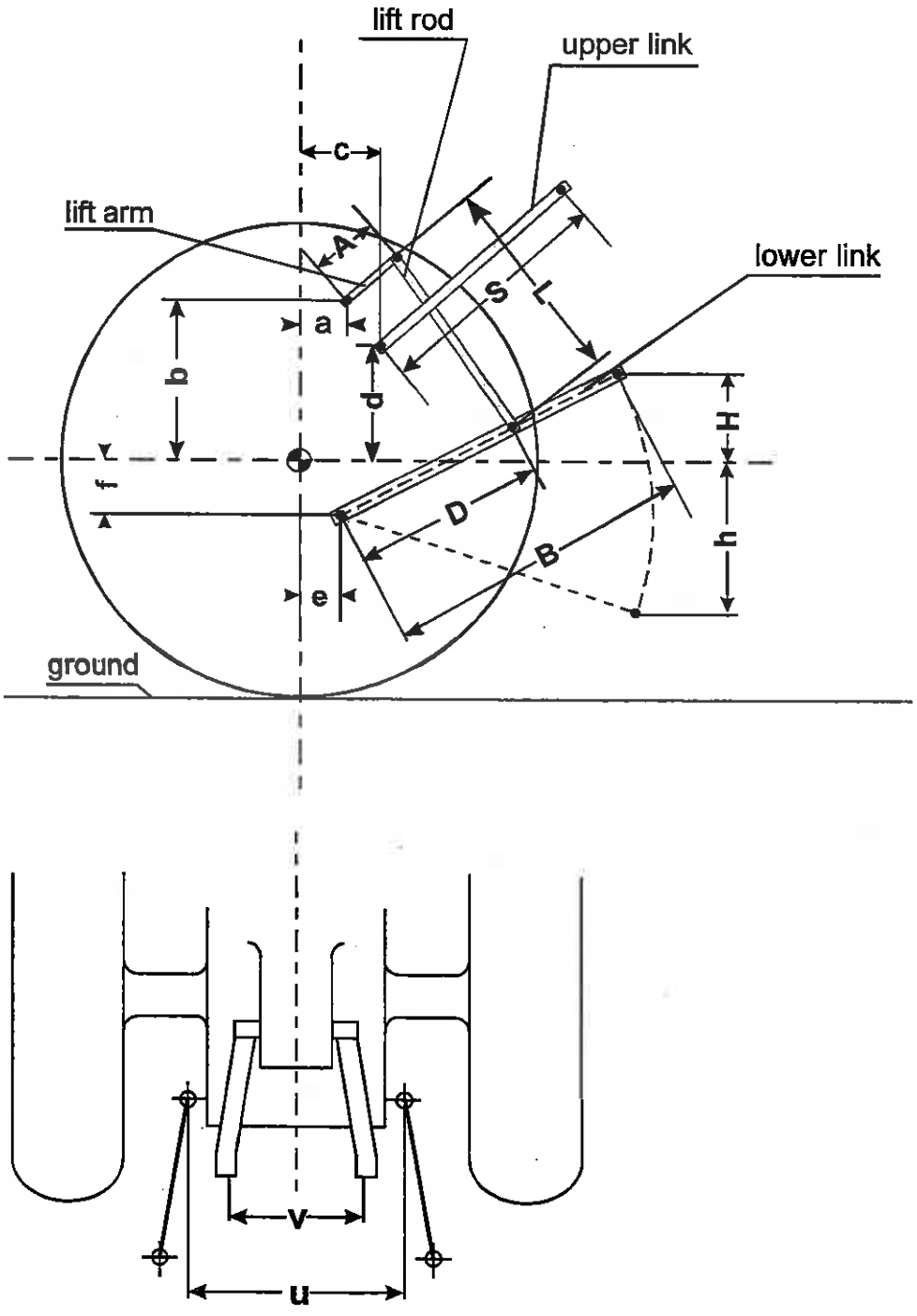
- Location	Rear of tractor, center plane
- Diameter of power take-off shaft end	35 mm
- Number of splines	21
- Height above ground	708 mm
- Distance from the median plane of the tractor	0 mm
- Distance behind rear wheel axle	785 mm
- PTO speed at rated engine speed (2200 rev/min)	1009 rev/min
- Engine speed at standard power take-off speed	2179 rev/min
- Ratio of rotation speeds (engine speed/p.t.o. speed)	2.179 to 1
- Power restriction and maximum torque	112 kW / 1100 Nm
- Direction of rotation (viewed facing driving end)	Clockwise

1.4.1.4 Power Take-off proportional to ground speed: None

1.5 Hydraulic Power Lift

- Make/Model/Type	John Deere / / Electro-Hydraulic lower link sensing; variable mix of draft and position control (option 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 90 mm Optional - 2 x 100 mm diameter SM - 2-100 mm diameter
- Type of linkage lock for transport	Electro-hydraulic (with locking notch for hand lever control)
- Relief valve pressure setting (tolerance)	20.3 +/- 0.3 Mpa (pump stall pressure)
- 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 optional 4^{th} and 5^{th} 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



1.6.1 SM Version with Walterscheid lower links

- Category 3 in conformity with ISO 730-1:1994 and ISO 730-2:1979
- Category adapter Convertible to Category - none

Table 2.1 Dimensions of linkage geometry when connected to the standard frame.

		Dimension or Range	Settings Used in Test
		mm	mm
Rear tire radius	**r**	905	905
Front tire radius	**r'**	695	695
Length of lift arms	**(A)**	495	same
Length of lower links	**(B)**	1065	same
Distance of lift arm pivot point from rear wheel axis: - horizontally - vertically	 **(a)** **(b)**	 -240 495	 same same
Horizontal distance between the 2 lower link points	**(u)**	600	same
Horizontal distance between the 2 lift arm end points	**(v)**	750	same
Length of upper link	**(S)**	729 to 900	806
Distance of upper link pivot point from rear wheel axis: - horizontally - vertically	 **(c)** **(d)**	 515,528 123,186,247	 same same
Distance of lower link pivot point from rear wheel axis: - horizontally - vertically	 **(e)** **(f)**	 275 350	 same same
Distance of lower link pivot points to lift rod pivot points on lower links	**(D)**	720	same
Length of lift rods	**(L)**	968 to 1063	1045
Height of lower hitch points relative to the rear-wheel axis: - in low position - in high position	 **(h)** **(H)**	 559 to 709 162 to 283	 676 175
Height above ground of lower hitch points when locked in transport position (*)		1073 to 1193	1080
(*)Assuming r = 905 mm tyre dynamic radius index of ISO 4251-1:1992			

1.6.2 Three-Point Linkage - North American

- Category: 3 in conformity with ISO 730-1:1994 and ISO 730-2:1979
- Category adapter: Convertible to Category - none

Table 2.2 Dimensions of linkage geometry when connected to the standard frame.

		Dimension or Range	Settings Used in Test
		mm	mm
Rear tire radius	r	905	905
Front tire radius	r'	695	695
Length of lift arms	(A)	495	same
Length of lower links	(B)	1065	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)	600	same
Horizontal distance between the 2 lift arm end points	(v)	750	same
Length of upper link	(S)	from 694 to 865	718
Distance of upper link pivot point from rear wheel axis:			
- horizontally	(c)	515	same
- vertically	(d)	123	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)	720	same
Length of lift rods	(L)	from 968 to 1063	1054
Height of lower hitch points relative to the rear-wheel axis:			
- in low position	(h)	from 552 to 689	676
- in high position	(H)	from 96 to 243	114
Height above ground of lower hitch points when locked in transport position (*)		from 1022 to 1126	1092

(*)Assuming r = 905 mm tyre dynamic radius index of ISO 4251-1:1992
Hitch settings used based on: front tires 16.9R30
rear tires 20.8R42

1.6.3 Three-Point Linkage - North American

- Category — 3 in conformity with ISO 730-1:1994 and ISO 730-2:1979
- Category adapter — Convertible to Category - none

Table 2.3 Dimensions of linkage geometry when connected to the standard frame.

North American Version, High Lift version and setting		Dimension or Range	Settings Used in Test
		mm	mm
Rear tire radius	r	905	905
Front tire radius	r'	695	695
Length of lift arms	(A)	495	same
Length of lower links - without quick-attach hitch - with quick-attach hitch	(B)	967 1056	same same
Distance of lift arm pivot point from rear wheel axis: - horizontally - vertically	 (a) (b)	 -240 495	 same same
Horizontal distance between the 2 lower link points	(u)	600	same
Horizontal distance between the 2 lift arm end points	(v)	750	same
Length of upper link	(S)	from 694 to 865	724
Distance of upper link pivot point from rear wheel axis: - horizontally - vertically	 (c) (d)	 515 123/186	 same 186
Distance of lower link pivot point from rear wheel axis: - horizontally - vertically	 (e) (f)	 275 350	 same same
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	720	same
Length of lift rods	(L)	from 968 to 1063	1054
Height of lower hitch points relative to the rear-wheel axis: - in low position - in high position	 (h) (H)	 from 552 to 689 from 96 to 243	 676 114
Height above ground of lower hitch points when locked in transport position (*)		from 1022 to 1126	1092
(*)Assuming r = 905 mm tyre dynamic radius index of ISO 4251-1:1992 Hitch settings used based on: front tires 16.9R30 rear tires 20.8R42			

1.7 SWINGING DRAWBAR

- Type	Oscillating
- Height above ground	
- Maximum	550.4 mm
- Minimum	452.4 mm
- Type of adjustment	Invert drawbar and reposition clevis
- Distance of hitch point from rear wheel axis, horizontally	1040.7, 1091.5 mm
- Distance of hitch point from power take-off shaft end	
- Vertically	305, 207 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 drawbar pin hole	40 mm
- Maximum vertical permissible load (Static load)	17.35 kN

SM Option (Not Tested)

- Type	Oscillating
- Height above ground	
- Maximum	550.4 mm
- Minimum	452.4 mm
- Type of adjustment	Invert drawbar and reposition clevis
- Distance of hitch point from rear wheel axis, horizontally	1090, 1178 mm
- Distance of hitch point from power take-off shaft end	
- Vertically	305, 207 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 drawbar pin hole	33 mm
- Maximum vertical permissible load (Static load)	
- Short Position	23.58 kN
- Long Position	16.24 kN

1.8 TRAILER HITCH N/A

1.9 HOLED DRAWBAR

N/A

1.10 STEERING

- Make	Eaton
- Model	450 Series
- Type	Hydrostatic gerotor metering unit with load sensing
- Method of operation	
- Pump/s	Gear Pump
- Ram/s	2 external; double acting
- Working pressure	18.5 +/- 0.5 Mpa

1.11 BRAKES

1.11.1 Service Brake

- Make	Vickers-John Deere
- Model	N/A
- 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)	Not applicable

1.11.2 Parking Brake

- Type	Spring applied, hydraulically released multidisk
- Method of Operation	Gear selector lever

1.12 WHEELS

Number	
- Front	2 driving / 2 steering
- Rear	2 driving
Wheelbase	2950 mm
- Track width adjustment:	
- Front	1828 mm
- Rear	1676 mm

	Minimum	Maximum	Adjustment Method
	mm	mm	
Front	1524	2235	Reversing wheel and off-set lug rims
Rear	1659	3585	Rack and pinion axle Reversing wheels and offset lug rims

1.13 PROTECTIVE STRUCTURE

- Make /Model/Type	John Deere/SG-052/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	CSS 0287
- Date of Approval	4 July 1994
- Nos. of Minor Modification Certificates, if any: MOD 1	1 24 August 1999

1.14 SEAT

1.14.1 Driver's Seat

- Make/Model/Type	Sears Mfg / RE61527 (SM:RE152546) Comfort Command™ / Air cushion suspension
- Seat and Steering Wheel Reversible	No
- Type of Suspension	Air
- Type of damping	Adjustable, viscous damping
- Range of adjustment	
- Longitudinally	178 mm
- Vertically	172 travel, 106 adjustable range
- Right Rotation	20°
- Left Rotation	15°
- Safety Belt	Yes

1.14.2 OPTIONAL DRIVER'S SEAT N/A

1.14.3 PASSENGER SEAT N/A

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	1716	70 x 127	200
outer	1716	71 x 127	335
Roof inner	2985	51 x 127	350
Outer	2985	51 x 127	500
Upper mid-body	2025	70 x 127	930
Lower Mid-body			
Optional			
left	1030	70 x 127	640
right	1030	70 x 127	930
Rear Lights			
roof	2943	70 x 127	640
fender	2105	70 x 127	950
Tail lights	1980	89 x 210	895
Hazard lights			
Roof front	3040	82 x 240*	770
Roof rear	3050	82 x 240*	790
Extremity Lights			
Wide	2100	106.7 dia.	1905

*Wrap around lights

2.0 TEST CONDITIONS

2.1 Overall Dimensions, mm

	Length	Width		Height at Top of	
		Minimum	Maximum	Protective Structure	Exhaust Pipe
	mm	mm	mm	mm	mm
Unballasted	5487	3012	3377	3075	3021
Ballasted	6012	3835	4210	3075	3021

2.2 Ground Clearance

- Clearance 405 mm
- Limiting part Drawbar support bracket

2.3 Tractor Mass

Mass with cab:

	Without Driver [kg]	With Driver [kg]
Unballasted		
Front	3660	3685
Rear	5350	5400
Total	9010	9085
Ballasted		
Front	4726	4740
Rear	7521	7582
Total	12247	12322

Ballast Added	Number of Weights	Total Mass [kg]	Liquid [kg]
Front	16	724	----
Front weight support	1	70	----
Rear weights	2	150	----
Rear weights	6	1245	----
Rear duals	2	1048	----

2.4 Track Specifications N/A

2.5 Tyres and Track Width Specifications

	Front	Rear
Make	Goodyear	Goodyear
Size	480/70R30	620/70R42
Number/Ply rating	152 A8	160 A8
Type	Radial	Radial
Maximum load (tyre manufacturer's)	34.81 kN	44.13 kN
Maximum load (tractor manufacturer's)	same	same
Inflation pressure (tyre manufacturer's)	320 kPa	160 kPa
Dynamic Radius Index	695 mm	905 mm
Chosen track width Singles Duals	 1829 mm 1829 mm	 1676 mm 3420 mm

2.6 Fuel

- Type — No. 2 diesel, in conformity with national standard
- Density at 15°C — 0.847 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
Front Axle	13.6	1500	Not applicable
Final Drive (Front)	3.4	1500	Not applicable
Hydraulic System (*)	140	1500	As required or 750
(*) Common with Gear Box, rear axle and final drive (rear).			

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 12.8 cSt at 100° C API CF-4; ACEA E-2	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 40° C JDM J20C	Same
Hydraulic Fluid . Type . Viscosity . Classification	(Same as Transmission)	Same
Front Axle Differential and Final Drive Oil . Type .Viscosity . Classification	John Deere GL-5 Gear Lubricant or John Deere EXTREME-GARD™ SAE 85W-140 JDM J11E (API GL-5)	John Deere GL-5 Gear Lubricant
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: 19

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

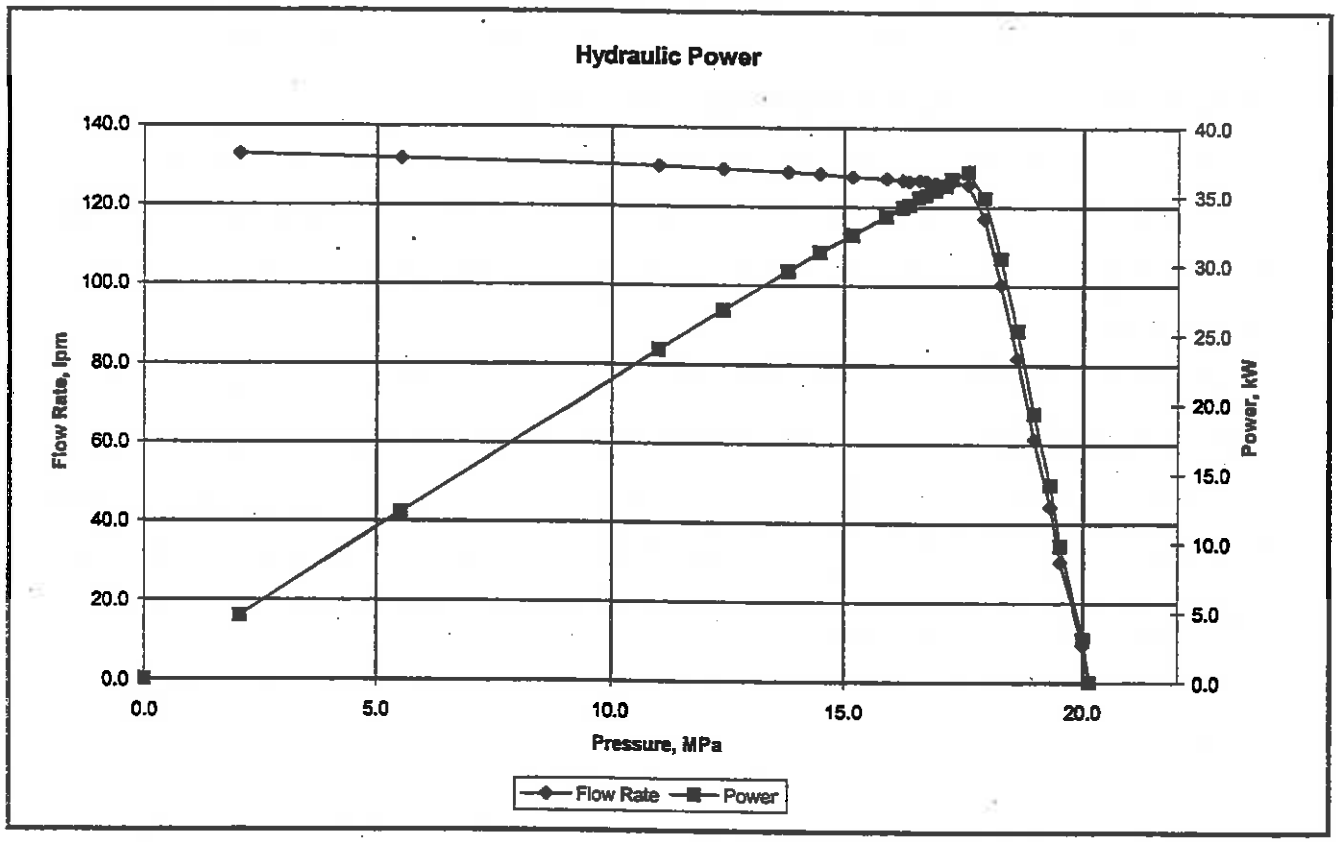
- Date and location of tests: 13-Apr-00 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

	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						
176.54	2000	917	39.84	47.04	226	3.75
3.1.2 POWER AT RATED ENGINE SPEED						
154.55	2200	1009	37.27	44.01	241	3.51
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
154.55	2200	1009	37.27	44.01	241	3.51
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maximum power at rated engine speed						
154.55	2200	1009	37.27	44.01	241	3.51
3.1.4.2 85% of torque obtained in 3.1.4.1						
134.70	2254	1034	33.88	40.01	252	3.37
3.1.4.3 75% of torque defined in 3.1.4.2						
101.42	2265	1039	27.49	32.46	271	3.12
3.1.4.4 50% of torque defined in 3.1.4.2						
67.68	2273	1042	21.23	25.07	314	2.70
3.1.4.5 25% of torque defined in 3.1.4.2						
34.22	2286	1048	14.70	17.35	429	1.97
3.1.4.6 unloaded						
0.75	2293	1052	8.71	10.28	11661	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						
154.55	2200	1009	37.27	44.01	241	3.51
3.1.5.2 85% of torque obtained in 3.1.5.1						
134.70	2254	1034	33.88	40.01	252	3.37
3.1.5.3 75% of torque defined in 3.1.5.2						
101.42	2265	1039	27.49	32.46	271	3.12
3.1.5.4 50% of torque defined in 3.1.5.2						
67.68	2273	1042	21.23	25.07	314	2.70
3.1.5.5 25% of torque defined in 3.1.5.2						
34.22	2286	1048	14.70	17.35	429	1.97
3.1.5.6 unloaded						
0.75	2293	1052	8.71	10.28	11661	0.07

- No load maximum engine speed: 2293 rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed 671 Nm
  - At 2-hour test 843 Nm
- Maximum torque (equivalent crankshaft): 1005 Nm
  (engine speed: 1100 rev/min)

Mean atmospheric conditions:		
Dry bulb	25	°C
Pressure	97.9	kPa
Relative Humidity	48	%
Maximum temperatures:		
Coolant	100	°C
Engine oil	107	°C
Fuel	44	°C
Engine air intake	32	°C

Date of Test:	5-May-00		
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:		
	20.13 MPa		
	2920 psig		
II.	Pump delivery rate at minimum pressure at full throttle:		
	132.9 l/min		
	35.1 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	100.3 l/min	18.27 MPa	30.6 kW
	26.5 gpm	*2650 psig*	*41.0 hp*
	Maximum hydraulic power:		
	125.7 l/min	17.58 MPa	36.8 kW
	33.2 gpm	*2550 psig*	*49.4 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	66.5 °C		
	152 °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, Walterscheid lower links with lifting cylinders (2) x 100 mm dia.
Date of test: 10 July 1995. Tests results extracted from OECD test 2/1577 on John Deere 8300 - 4WD, which is mechanically equivalent.

	Hitch points	Frame
Lower hitch points above ground - down position:	229 mm	206 mm
Vertical movement - without load:	851 mm	975 mm
with load:	833 mm	950 mm
Maximum corrected force exerted through full range:	60.1 kN	59.3 kN
Corresponding pressure:	18.2 MPa	18.2 MPa
Moment about rear axle:	80.0 kNm	115.3 kNm
Maximum mast tilt angle		8.9 degrees

Lifting height relative to horizontal position of lower links.

mm	-353	-330	-297	-198	-97	3	102	203	302	401	503	597
Corrected lift forces												
At the Hitch point kN	--	60.1	63.5	65.0	68.5	71.5	74.4	77.5	83.4	83.5	87.1	--
at the frame kN	59.3	62.0	--	61.9	63.6	64.9	65.5	65.9	65.3	--	64.5	61.5
Corresponding pressure 18.2 Mpa												

OECD Drawbar Data (SI)

Date of tests: 25-Apr-00					Fuel density: 0.847 kg/l									
Type of track: Concrete					Test number: 1775									
3.3.1 Maximum power in tested gears (unballasted, 4wd)							Tire pressure: 90 kPa, rear 110 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
4	4	86.33	78.19	3.97	2261	16	0.354	2.40	58	85	105	17	75	98.1
5	5	111.33	82.33	4.87	2253	14	0.318	2.67	60	89	107	15	74	98.1
6	6	121.87	78.38	5.60	2244	13	0.308	2.75	60	89	109	16	77	98.1
7	7	131.60	76.09	6.23	2159	11	0.291	2.91	60	91	107	18	71	98.1
8	8	140.88	75.38	6.73	2066	11	0.281	3.02	60	91	110	18	71	98.1
9	9	148.33	70.99	7.52	1997	9	0.269	3.14	61	92	111	18	69	98.1
10	10	150.94	62.64	8.67	1999	6	0.267	3.17	61	92	112	18	67	98.1
11	11	151.80	54.88	9.96	1999	5	0.261	3.25	60	93	110	19	63	98.1
12	12	151.38	48.15	11.32	1998	4	0.263	3.22	60	92	111	18	67	98.1
13	13	149.85	36.98	14.59	2000	3	0.265	3.19	60	94	112	18	67	98.1
3.3.2 Fuel consumption														
3.3.2.1			In selected gear at maximum power at rated engine speed.											
11	11	130.81	42.36	11.12	2201	4	0.283	2.99	61	91	111	18	67	98.1
3.3.2.1.1			75% of pull at maximum power at rated engine speed											
11	11	101.73	31.79	11.52	2259	3	0.307	2.76	59	91	105	18	67	98.1
3.3.2.1.2			50% of pull at maximum power at rated engine speed											
11	11	68.72	21.20	11.67	2270	2	0.356	2.38	55	85	102	19	58	101.5
3.3.2.1.3			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
12	12	101.76	31.85	11.50	1998	3	0.281	3.01	57	88	106	18	67	98.1
3.3.2.1.4			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
12	12	68.86	21.31	11.63	2005	2	0.324	2.61	55	86	103	19	59	98.1
3.3.2.1.5			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
13	13	101.82	31.84	11.51	1572	3	0.259	3.27	55	93	106	18	67	98.1
3.3.2.1.6			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
13	13	68.78	21.24	11.66	1578	2	0.293	2.89	53	88	102	19	59	98.1
3.3.2.2			In selected gear nearest to 7.5 km/h at rated engine speed.											
8	8	131.41	62.94	7.52	2200	6	0.284	2.98	60	90	110	18	71	98.1
3.3.2.2.1			75% of pull at maximum power at rated engine speed											
8	8	103.81	47.41	7.88	2259	4	0.298	2.84	59	88	108	18	67	98.1
3.3.2.2.2			50% of pull at maximum power at rated engine speed											
8	8	70.45	31.56	8.04	2271	3	0.341	2.48	57	84	104	18	67	98.2
3.3.2.2.3			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
9	9	103.91	47.40	7.89	2005	4	0.275	3.08	58	88	107	18	67	98.1
3.3.2.2.4			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
9	9	70.46	31.58	8.03	2012	3	0.305	2.77	55	86	103	18	67	98.2
3.3.2.2.5			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
10	10	103.77	47.47	7.87	1772	4	0.258	3.28	56	90	106	18	67	98.1
3.3.2.2.6			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
10	10	70.36	31.61	8.01	1780	3	0.285	2.97	54	86	103	18	67	98.2

4.1 Drawbar Power: Ballasted - 2200 rev/min

OECD Drawbar Data (SI)

Date of tests: 28-Apr-00					**Fuel density:** 0.847 kg/l									
Type of track: Concrete					**Test number:** 1775									
Maximum power in tested gears (ballasted, 4wd)						**Tire pressure:** 62 kPa, rear 172 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	100.94	116.20	3.13	2256	14	0.327	2.59	59	86	105	14	68	98.2
4	4	125.16	108.87	4.14	2201	9	0.296	2.86	60	89	108	14	68	98.2
5	5	132.66	91.88	5.20	2201	6	0.280	3.02	61	90	110	17	52	98.2
6	6	132.54	80.58	5.92	2198	5	0.281	3.01	60	90	110	18	54	98.2
7	7	135.25	72.12	6.75	2197	4	0.276	3.07	61	90	109	18	54	98.3
8	8	134.57	63.09	7.68	2201	3	0.277	3.06	62	91	112	19	51	98.3
9	9	134.14	55.51	8.70	2200	3	0.279	3.04	61	92	112	21	53	98.2
10	10	133.55	48.79	9.85	2200	2	0.280	3.02	61	91	109	22	47	98.1
11	11	130.70	42.01	11.20	2200	2	0.284	2.98	61	91	111	23	48	98.1
12	12	129.68	36.90	12.65	2196	2	0.289	2.93	61	91	109	23	48	98.1

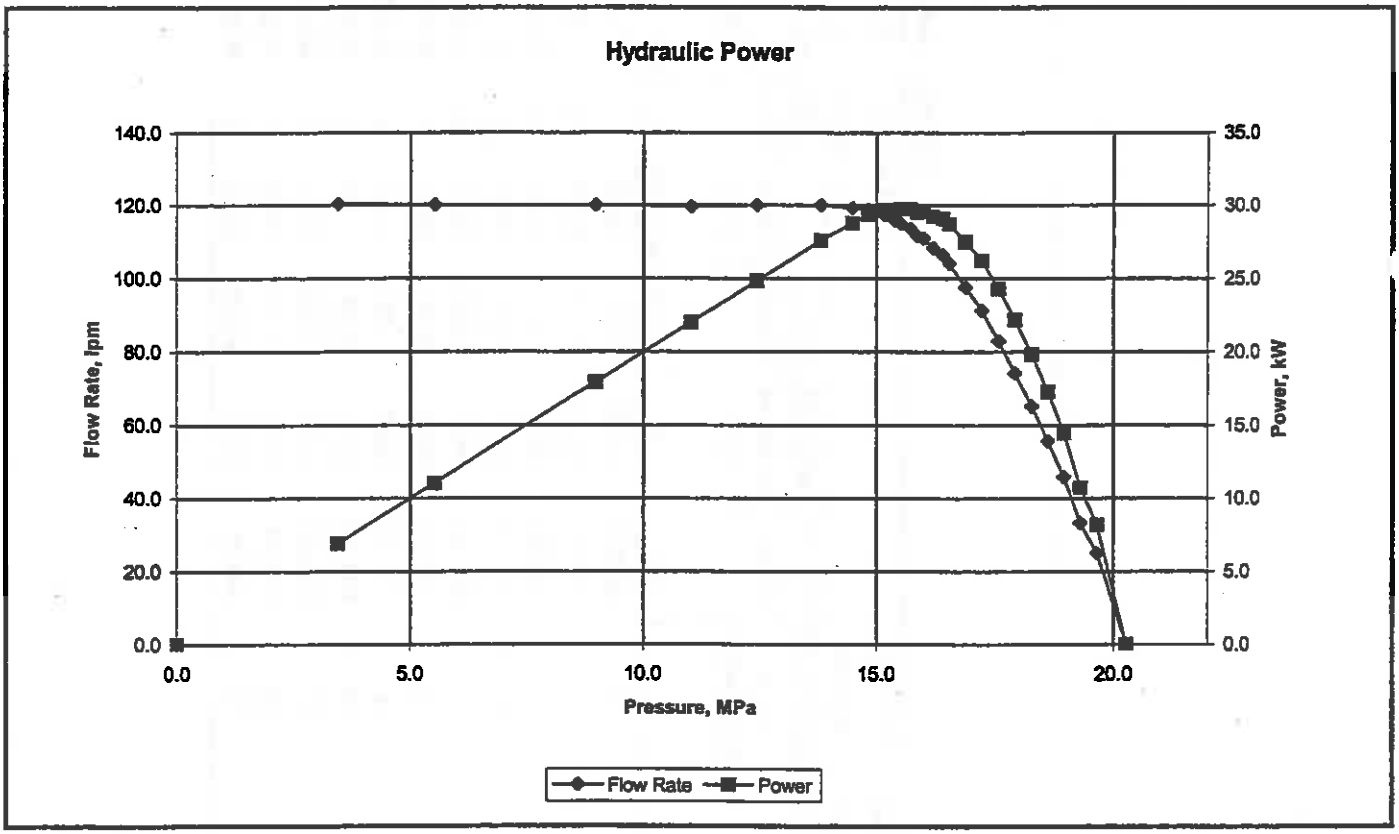
4.2 Drawbar Power: Ballasted - 2000 rev/min

OECD Drawbar Data (SI)

Date of tests: 28-Apr-00					**Fuel density:** 0.847 kg/l									
Type of track: Concrete					**Test number:** 1775									
Maximum power in tested gears (ballasted, 4wd)						**Tire pressure:** 62 kPa, rear 172 kPa, front					**rawbar Heigh** 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	102.06	118.32	3.11	2255	15	0.327	2.59	59	86	104	14	68	98.2
4	4	123.69	110.57	4.03	2188	11	0.302	2.81	60	88	109	14	59	98.3
5	5	140.26	108.61	4.65	2068	10	0.279	3.03	60	89	109	16	55	98.3
6	6	147.13	102.05	5.19	1998	8	0.270	3.14	61	92	111	18	54	98.2
7	7	152.25	90.83	6.03	2001	6	0.261	3.24	60	92	112	18	54	98.3
8	8	153.26	80.11	6.89	2000	5	0.259	3.26	61	93	112	19	51	98.3
9	9	154.17	70.87	7.83	2000	4	0.259	3.28	61	93	112	20	52	98.2
10	10	154.08	62.41	8.89	2000	3	0.258	3.29	61	93	112	22	50	98.2
11	11	153.02	54.54	10.10	1999	3	0.260	3.25	61	91	109	23	48	98.1
12	12	151.71	47.73	11.44	1998	3	0.263	3.22	61	92	111	23	48	98.1
13	13	148.08	36.31	14.68	2002	2	0.269	3.15	61	92	110	23	48	98.1

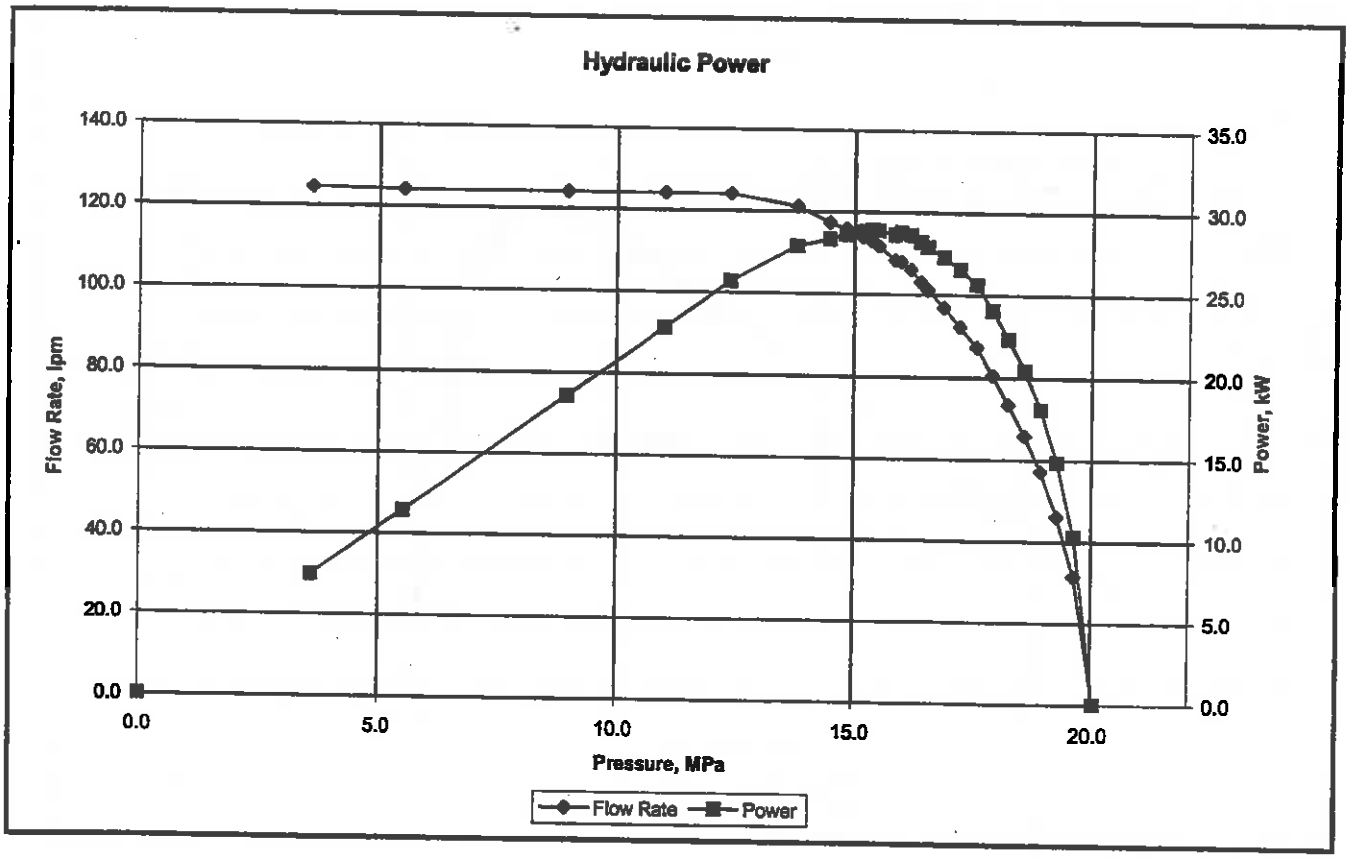
4.3 Hydraulic Power: Standard pump - one outlet

Date of Test:	12-May-00		
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:		
	20.27 MPa		
	2940 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	120.4 l/min		
	31.8 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	65.1 l/min	18.27 MPa	19.8 kW
	17.2 gpm	*2650 psig*	*26.6 hp*
	Maximum hydraulic power:		
	115.1 l/min	15.51 MPa	29.8 kW
	30.4 gpm	*2250 psig*	*39.9 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	65.7 °C		
	150 °F		
	This hydraulic system does not use an accumulator. Opening and closing pressures of the unloading valve could not be measured.		



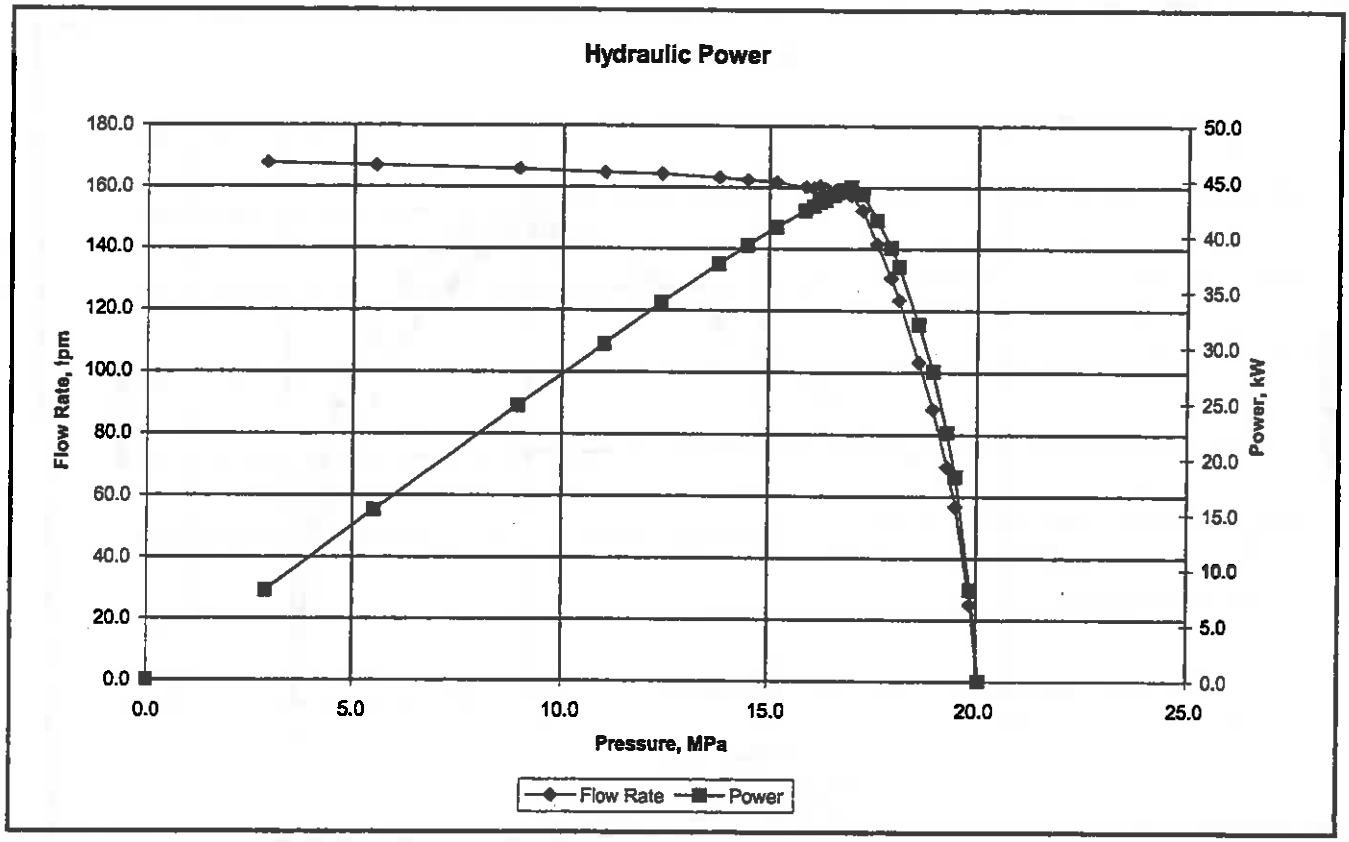
4.4 Hydraulic Power: High flow pump - one outlet

Date of Test:	12-May-00	John Deere 8310	
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:		
	20.06 MPa		
	2910 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	124.5 l/min		
	32.9 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	80.6 l/min	17.93 MPa	24.1 kW
	21.3 gpm	*2600 psig*	*32.3 hp*
	Maximum hydraulic power:		
	112.8 l/min	15.38 MPa	28.9 kW
	29.8 gpm	*2230 psig*	*38.8 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	64.7 °C		
	148 °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

Date of Test:	19-Apr-00	John Deere 8310	
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:		
	20.06 MPa		
	2910 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	167.7 l/min		
	44.3 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	123.4 l/min	18.13 MPa	37.3 kW
	32.6 gpm	*2630 psig*	*50.0 hp*
	Maximum hydraulic power:		
	157.5 l/min	16.96 MPa	44.5 kW
	41.6 gpm	*2460 psig*	*59.7 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	67.5 °C		
	154 °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 90 mm dia.
Date of test: 11 July 1995. Tests results extracted from OECD test 2/1577 on the John Deere 8300 - 4WD, which is mechanically equivalent.

	Hitch points	Frame
Lower hitch points above ground - down position:	229 mm	198 mm
Vertical movement - without load:	795 mm	940 mm
with load:	769 mm	899 mm
Maximum corrected force exerted through full range:	52.1 kN	48.2 kN
Corresponding pressure:	18.0 MPa	18.0 MPa
Moment about rear axle:	69.3 kNm	93.5 kNm
Maximum mast tilt angle		9.4 degrees

Lifting height relative to horizontal position of lower links.

mm		-361	-330	-297	-198	-97	3	102	203	302	401	439	538
Corrected lift forces													
At the Hitch point	kN	--	52.1	55.5	56.7	59.5	61.8	63.9	66.1	67.8	69.6	70.1	--
at the frame	kN	50.7	53.0	--	52.1	52.7	52.8	52.5	54.4	--	50.9	48.9	48.2
Corresponding pressure	18.0 Mpa												

4.7 POWER LIFT TEST Category III, N.A. Quick attach linkage, with lifting cylinders (2) x 100 mm dia.
Date of test: 11 July 1995. Tests results extracted from OECD test 2/1577 on the John Deere 8300 -4WD, which is mechanically equivalent.

	Hitch points	Frame
Lower hitch points above ground - down position:	229 mm	208 mm
Vertical movement - without load:	782 mm	848 mm
with load:	770 mm	826 mm
Maximum corrected force exerted through full range:	65.6 kN	67.4 kN
Corresponding pressure:	18.1 MPa	18.1 MPa
Moment about rear axle:	87.3 kNm	130.7 kNm
Maximum mast tilt angle		3.3 degrees

Lifting height relative to horizontal position of lower links.

mm	-351	-330	-297	-198	-97	3	102	203	302	401	439	475
Corrected lift forces												
At the Hitch point kN	--	65.6	66.7	71.2	73.8	77.6	80.5	83.2	85.7	88.2	88.3	--
at the frame kN	73.3	74.9	--	75.5	73.7	73.7	75.1	72.7	71.3	--	69.1	67.4
Corresponding pressure 18.1 Mpa												

4.8.1 Results presentation according to OECD standard code (Annex 1)

a. Front axle engaged
b. Front axle disengaged

Gear Number	Drawbar Pull	Measured Traveling Speed	Engine Speed	Number of Driving Wheels	Sound Level		
					4WD Version Front Axle		Extension to 2WD Version
					a	b	
	kN	km/h	rev/min	2/4	dB(A)		
4.8.1.1	Unloaded test in the gear giving the forward speed nearest to 7.5 km/h						
8	0	8.33	2300	2		73.5	
8	0	8.36	2300	4	73.5		73.5
4.8.1.2	Unloaded test in the gear giving the maximum forward speed						
16	0	37.1	2290	2		75.8	
4.8.1.3	Tests with a drawbar pull for which the tractor gives the maximum sound level [combination of gear giving the nearest nominal forward speed to 7.5 km/h and also in any gear with a sound level increase of at least 1 dB(A)]						
8	60.7	7.06	2228	2		74.4	
8	61.5	7.66	2231	4	74.0		
13	27.4	16.24	2235	2		75.6	75.6
9	54.5	8.69	2211	4	75.2		

4.8.2 Results presentation (without load) according to OECD standard code (Annex 2)

Gear Number	Drawbar Pull	Measured Traveling Speed	Engine Speed	Number of Driving Wheels	Sound Level		
					4WD Version Front Axle		Extension to 2WD Version
					a	b	
	kN	km/h	rev/min	2/4	dB(A)		
4.8.2.1	Unloaded test in the gear giving the forward speed nearest to 7.5 km/h						
8	0	8.33	2300	2		73.5	
8	0	8.36	2300	4	73.5		73.5

4.9 Measurement of External Noise Level

Date of Test	April 18, 2000
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	27.8 km / h
Noise Level	88.6 dB(A)

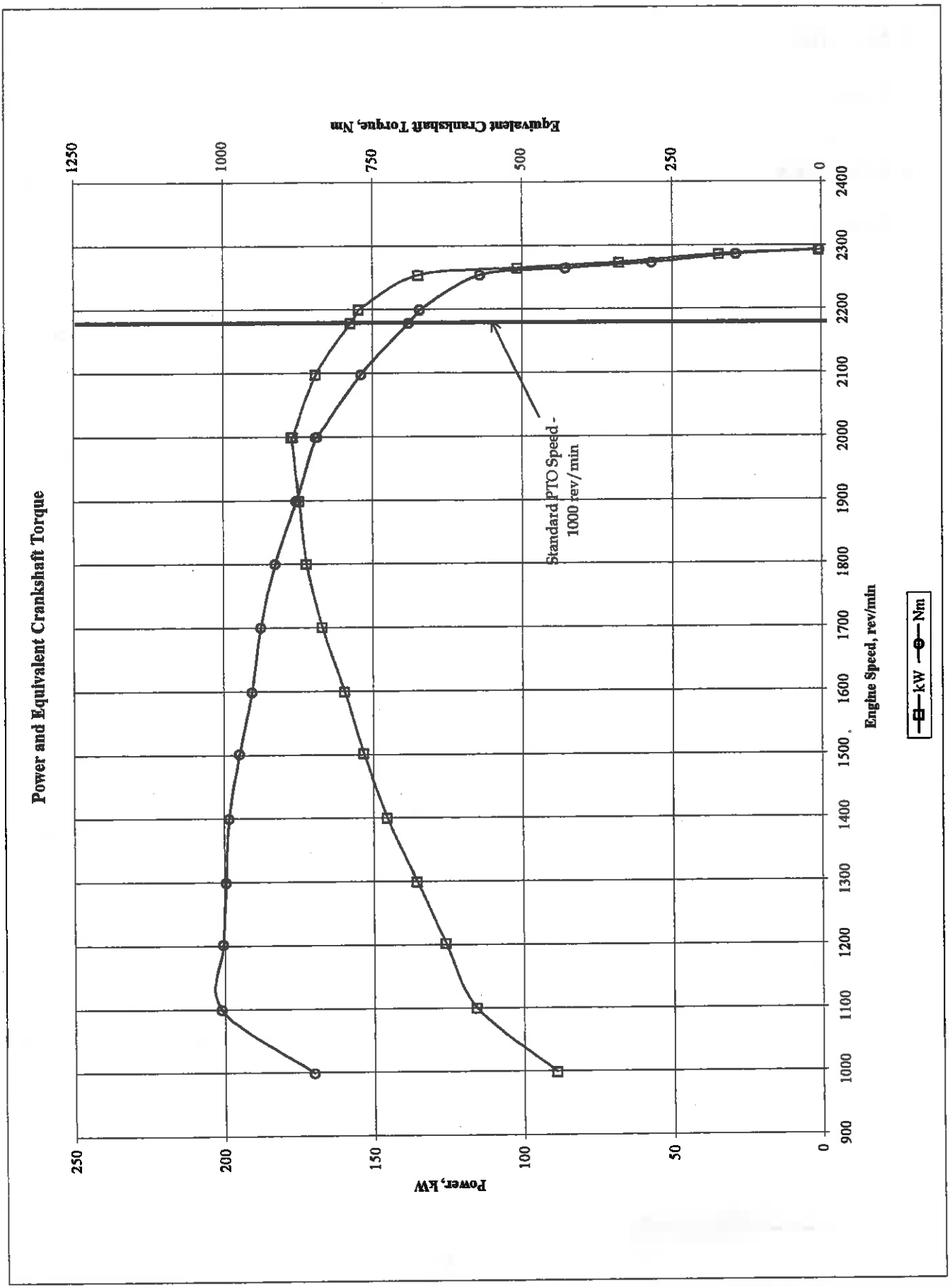
5. REPAIRS

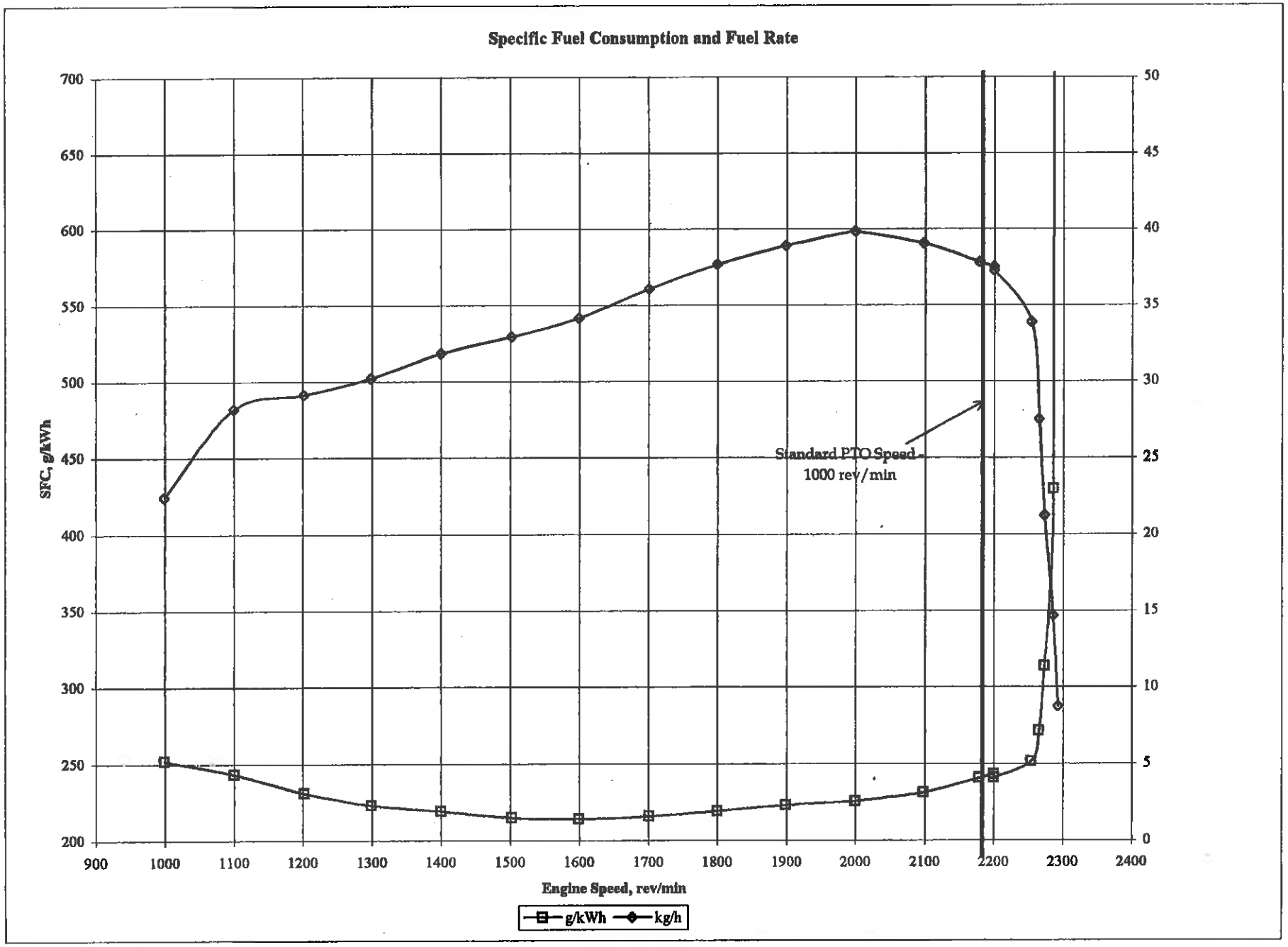
None

6. REMARKS

None

John Deere 8310




Specific Fuel Consumption and Fuel Rate
SFC, g/kWh
700
650
600
550
500
450
400
350
300
250
200
50
45
40
35
30
25
20
15
10
5
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
Standard PTO Speed -
1000 rev/min
Engine Speed, rev/min
g/kWh
kg/h

John Deere 8310

