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CODE 2
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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 8110 POWERSHIFT
4 WD
40 km/h version

MANUFACTURED BY:	**John Deere Waterloo Works** **Tractor Assembly Division** **3500 East Donald Street** P.O. Box 270 **Waterloo, Iowa 50704-0270**
NEBRASKA TEST NO.	**1772**
TEST DATES:	**April 25 - 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 8110 Powershift, 4 WD, 40 km/h version, with OECD Number 2/1931.

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 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
- Duration of Running-in	107 hours
- Location of Test	Nebraska Tractor Test Laboratory, Lincoln, Nebraska, USA

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

- Make/Model/Type	John Deere/8110/unit construction, mechanical front wheel drive (MFWD), Powershift, 40 km/h version
- Number of driving wheels	4
- Serial No.	*RW8110P001652*
- 1st Serial No.	Confidential

1.2 ENGINE

- Make	John Deere
- Model	6081HRW11
- Type	4-stroke diesel; direct injection; turbocharged, air to air aftercooled
- Serial No.	*RG6081H098027*

1.2.1 Cylinders

- Number/Disposition	6 in-line, vertical
- Bore/Stroke	115.8 mm / 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
- Pressure	0.113 +/- 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 (Fuel Strainer), AR86745 (paper element)
- Capacity of Fuel Tank	511 dm^3
- Make of Injection Pump	Bosch
- Model of Injection Pump	RE501859
- Type of Injection Pump	Inline; electronic
- Serial No.	9672700059
- Manufacturer's Production Setting of Injection Pump:	
- Flow Rate	37.1 +/- 2.0 dm^3/h (at rated speed and load)
- Fuel Density	0.847 g / cm^3
- Timing	18 +/- 1° before BTDC
- Make of Injectors	Bosch
- Model of Injectors	RE61593
- 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)
- 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 pre-cleaner with aspirator
- Location of Air Intake	Underhood, front of tractor
- Main Cleaner Make	Donaldson
- Main Cleaner Model	RE51629
- Main Cleaner Type	pleated paper
- Secondary Cleaner Make	Donaldson
- Secondary Cleaner Model	RE51630
- Secondary Cleaner Type	pleated paper
- Maintenance Indicator	Dashed 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; negative ground
- Alternator Make	Nippondenso
- Alternator Model	RE46608
- Alternator Type	Belt-driven
- Power	1.9 kW
- Battery (Number of Accumulators)	Two 12-volt batteries in parallel
- Rating	925 cold crank amp/battery, 180 min. reserve capacity

1.2.10 Exhaust System

- Make	Nelson (muffler)
- Model	RE44716
- Type	Expansion chamber
- Location	Vertical muffler, 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
- Diameter of Plates	232 mm
- Method of Operation	Hydraulic; pedal actuated

1.3.2 Gear Box

- Make/Model/Type	John Deere/Full Powershift/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	Not applicable	Not applicable
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/ /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

- 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 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
1	344.0280	2.22
2	269.3176	2.83
3	211.5868	3.61
4	165.6378	4.61
5	136.7896	5.58
6	121.2289	6.29
7	107.0839	7.13
8	94.9024	8.04
9	84.1294	9.07
10	74.5592	10.23
11	65.8596	11.59
12	58.3676	13.07
13	45.8624	16.64
14	35.9028	21.25
15	28.2067	27.05
16[a]	22.0812	37.70
16[b]	22.0812	31.97
REV		
R1	-394.3959	-1.93
R2	-156.8165	-4.87
R3[c]	-138.9776	-5.99
R4[d]	-52.5770	-10.55
R5[e]	-52.5770	-14.51

(*) Calculated with a tyre dynamic radius index of 920 mm (pneumatic tyred tractors only)
[a] Engine speed is adjustable to 2400 RPM in the Gear Number 16
[b] Engine speed is limited to 2035 RPM in the Gear Number 16 in Specialty Markets
[c] Engine speed is adjustable to 2400 RPM in the 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

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 (ISO 500:1991)
- Height above ground	723 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	None
- Direction of rotation (viewed facing driving end)	Clockwise

1.4.2 Optional power take-off

Power take-off at 540 min^{-1} (rev/min)

- Location	Rear of tractor, vertical center plane
- Diameter of power take-off shaft end	35 mm
- Number of splines	6 (ISO 500:1991)
- Height above ground	723 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

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

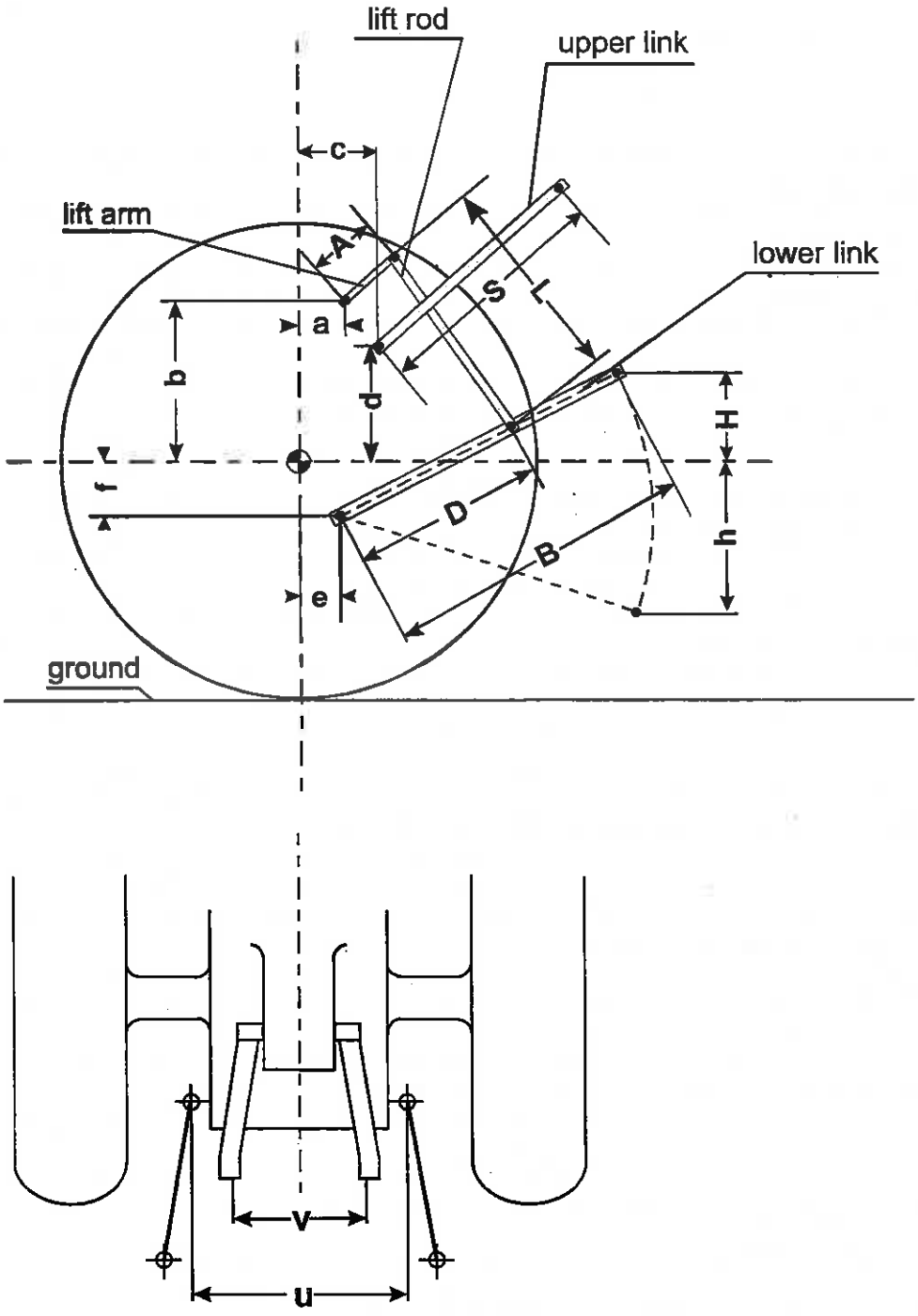
- Location	Rear of tractor, center plane
- Diameter of power take-off shaft end	35 mm
- Number of splines	21 (ISO 500:1991)
- Height above ground	723 mm
- Distance from the median plane of the tractor	0 mm
- Distance behind rear wheel axle	785 mm
- PTO speed at rated engine speed (2200 rev/min)	1009 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

1.4.3 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 - 1 x 80 mm, 1 x 90 mm diameter Optional - 1 x 90 mm, 1 x 100 mm diameter SM - 1 x 90 mm & 1 x 100 mm diameter
- Type of linkage lock for transport	Electro-hydraulic, with locking notch for hand lever in control console
- 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 option 4^{th}, 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 Three-Point Linkage -

- 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.

SM Version with Walterscheid lower links		Dimension or Range	Settings Used in Test
		mm	mm
Rear tire radius	r	920	905
Front tire radius	r'	715	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	 528 247
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 -

- 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.

North American Version		Dimension or Range	Settings Used in Test
		mm	mm
Rear tire radius	r	920	905
Front tire radius	r'	715	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)	694 to 865	718
Distance of upper link pivot point from rear wheel axis: - horizontally - vertically	 (c) (d)	 515 123	 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	1054
Height of lower hitch points relative to the rear-wheel axis: - in low position - in high position	 (h) (H)	 552 to 689 96 to 243	 676 114
Height above ground of lower hitch points when locked in transport position (*)		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 -

- 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	920	905
Front tire radius	r'	715	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)	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)	968 to 1063	1054
Height of lower hitch points relative to the rear-wheel axis: - in low position - in high position	 (h) (H)	 552 to 689 96 to 243	 676 114
Height above ground of lower hitch points when locked in transport position (*)		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

North American option (Tested version)

- Type	Oscillating
- Height above ground	
-Maximum (offset up)	565.4 mm
-Minimum (offset down)	467.4 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 (center 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

SM option (Not tested)

- Type	Oscillating
- Height above ground	
-Maximum (offset up)	565.4 mm
-Minimum (offset down)	467.4 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 (center 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	
-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	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	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)	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
- Rear — 2 or 4 driving

-Wheelbase — 2950 mm

	Minimum	Maximum	Adjustment Method
	mm	mm	
Front	1524	2235	Reversing wheel and off-set lug rims
Rear	1524	3318	Rack and pinion axle; reversing wheels and offset lug rims

1.13 PROTECTIVE STRUCTURE

- Make /Model/Type and address — John Deere/SG-052/Cab; John Deere Waterloo Works, Waterloo, Iowa, USA
- Protective device
  - Cab/frame/rollguard/other — Cab
  - Tiltable/not tiltable — Not tiltable
- OECD 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 ride
- Type of damping — Adjustable, viscous damping
- Range of adjustment
  - .Longitudinally — 178 mm
  - .Vertically — 172 travel, 106 mm adjustable range
  - .Right Rotation — 20°
  - .Left Rotation — 15°
- Safety Belt — Yes

1.14.2 Optional driver's seat(s) — Not available

1.14.3 Passenger seat — Not applicable

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	1739	70 x 127	200
outer	1739	71 x 127	335
Roof inner	3000	51 x 127	350
outer	3000	51 x 127	500
Upper mid-body	2040	70 x 127	930
Lower mid-body (optional)			
left	1045	70 x 127	930
right	1045	70 x 127	930
Rearlights			
roof	2958	70 x 127	640
fender	2120	70 x 127	950
Tail lights	1995	89 x 210	895
Hazard lights			
Roof front	3055	82 x 240*	770
Roof rear	3065	82 x 240*	790
Extremity Lights			
Wide	2115	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	3233	3090	3036
Ballasted	6012	3159	3800	3090	3036

2.2 **Ground Clearance** (unballasted tractor)

- Clearance 420 mm
- Limiting part Drawbar support bracket

2.3 **Tractor Mass**

Mass (with cab, full fuel tank)

	Without Driver [kg]	**With Driver [kg]**
Unballasted		
Front	3597	3613
Rear	5178	5237
Total	8775	8850
Ballasted		
Front	3923	3937
Rear	6480	6541
Total	10403	10478

Ballast Added	**Number of Weights**	**Total Mass [kg]**	**Liquid [kg]**
Front	4	182	----
Front weight bracket	1	70	----
Rear (weights)	2	428	----
Rear (weights)	2	150	----
Rear (duals)	2	798	----

2.4 Track Specifications N/A

2.5 Tyres and Track Width Specifications

	Front	Rear
Make	Goodyear	Goodyear
Size	14.9R34	18.4R46
Number/Ply rating	3 star	3 star
Type	Radial	Radial
Maximum load (tyre manufacturer's)	21.97 kN	38.00 kN
Maximum load (tractor manufacturer's)	same	same
Inflation pressure	210 kPa	210 kPa
Dynamic Radius Index	715 mm	920 mm
Chosen track width Singles Duals	 1829 mm 1829 mm	 1524 mm 3124 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	21.5	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 100^0 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 40^0 C JDM J20C	Same
Final Drive Oil (front) . 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
Hydraulic Fluid . Type . Viscosity . Classification	Same as Transmission	Same
Steering Oil	Same as transmission	Same
Grease	John Deere MOLY High Temperature EP Grease	Same

2.7.3 Grease

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

- Date and location of tests: 25-Apr-00 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

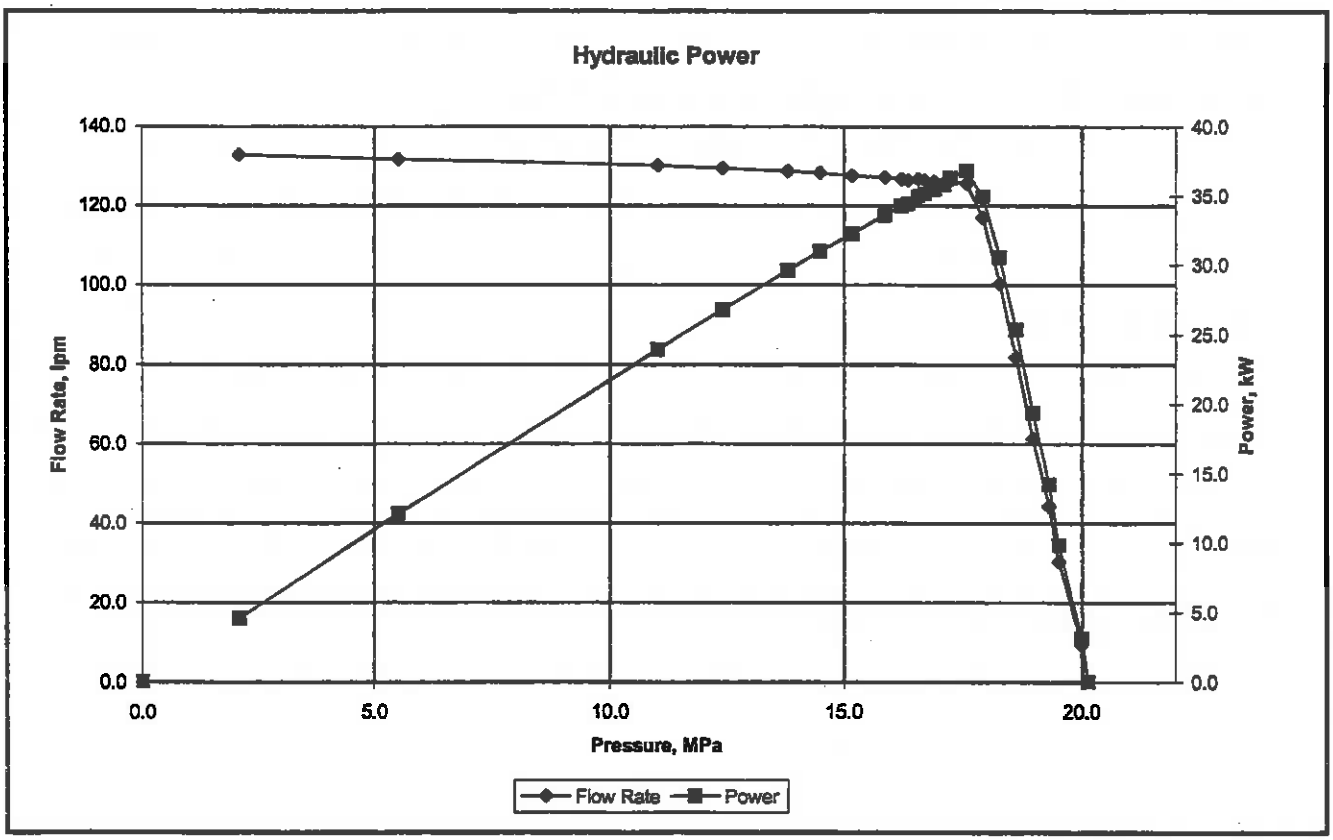
	Speed		Fuel consumption			Specific
Power	Engine	PTO	Hourly		Specific	energy
kW	rev/min		kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - TWO HOUR TEST						
140.38	2000	917	32.33	38.17	230	3.68
3.1.2 POWER AT RATED ENGINE SPEED						
123.33	2200	1009	30.73	36.28	249	3.40
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min)						
123.33	2200	1009	30.73	36.28	249	3.40
3.1.4 PART LOADS						
3.1.4.1 the torque corresponding to maximum power at rated engine speed						
123.33	2200	1009	30.73	36.28	249	3.40
3.1.4.2 85% of torque obtained in 3.1.4.1						
107.64	2256	1035	28.44	33.59	264	3.21
3.1.4.3 75% of torque defined in 3.1.4.2						
80.77	2265	1039	23.27	27.48	288	2.94
3.1.4.4 50% of torque defined in 3.1.4.2						
54.18	2276	1044	17.96	21.21	332	2.55
3.1.4.5 25% of torque defined in 3.1.4.2						
27.13	2284	1047	13.20	15.59	487	1.74
1.4.6 unloaded						
0.75	2290	1051	8.57	10.12	11490	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						
123.33	2200	1009	30.73	36.28	249	3.40
3.1.5.2 85% of torque obtained in 3.1.5.1						
107.64	2256	1035	28.44	33.59	264	3.21
3.1.5.3 75% of torque defined in 3.1.5.2						
80.77	2265	1039	23.27	27.48	288	2.94
3.1.5.4 50% of torque defined in 3.1.5.2						
54.18	2276	1044	17.96	21.21	332	2.55
3.1.5.5 25% of torque defined in 3.1.5.2						
27.13	2284	1047	13.20	15.59	487	1.74
3.1.5.6 unloaded						
0.75	2290	1051	8.57	10.12	11490	0.07

- No load maximum engine speed: 2290 rev/min
- Torque (equivalent crankshaft) at rated speed:
  - At rated engine speed 535 Nm
  - At 2-hour test 670 Nm
- Maximum torque (equivalent crankshaft): 794 Nm
  (engine speed: 1000 rev/min)

Mean atmospheric conditions:		
Dry bulb	23	°C
Pressure	98.2	kPa
Relative Humidity	58	%
Maximum temperatures:		
Coolant	98	°C
Engine oil	84	°C
Fuel	42	°C
Engine air intake	31	°C

3.2 Standard pump - two outlets

Date of Test:	5-May-00	John Deere 8110	
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 (1) 90 mm dia & (1) 100 mm dia.
Date of test: 10 July 1995. Test results extracted from OECD test 2/1576 on the John Deere 8200- 4WD, which is mechanically equivalent.

	Hitch points	Frame
Lower hitch points above ground - down position:	229 mm	208 mm
Vertical movement - without load:	851 mm	975 mm
with load:	833 mm	950 mm
Maximum corrected force exerted through full range:	54.6 kN	53.6 kN
Corresponding pressure:	18.2 MPa	18.2 MPa
Moment about rear axle:	72.8 kNm	104.1 kNm
Maximum mast tilt angle		9.1 degrees

Lifting height relative to horizontal position of lower links.

mm	-351	-330	-297	-198	-97	3	102	203	302	401	503	599
Corrected lift forces												
At the Hitch point kN	--	54.6	57.3	58.8	62.4	67.4	67.4	70.1	73.0	76.0	77.8	--
at the frame kN	53.6	56.6	--	55.3	57.4	58.4	58.6	59.1	59.2	--	58.4	55.4
Corresponding pressure 18.2 Mpa												

OECD Drawbar Data (SI)

Date of tests: 08-May-00 | Fuel density: 0.847 kg/l
Type of track: Concrete | Test number: 1772
3.3.1 Maximum power in tested gears (unballasted, 4wd) | Tire pressure: 124 kPa, rear 165 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
3	3	77.05	85.31	3.25	2260	14	0.344	2.47	56	87	101	16	90	96.9
4	4	97.81	85.72	4.11	2203	13	0.314	2.69	59	89	102	17	85	96.9
5	5	113.22	82.42	4.95	2090	9	0.280	3.03	59	90	104	16	85	96.9
6	6	120.17	80.12	5.40	1998	8	0.267	3.17	58	93	105	16	84	97.0
7	7	122.60	70.45	6.27	1997	5	0.262	3.23	59	94	108	16	84	97.0
8	8	123.04	61.93	7.15	1998	5	0.261	3.24	58	95	109	15	79	97.0
9	9	122.22	54.12	8.13	1999	4	0.263	3.22	58	95	109	15	79	97.1
10	10	122.53	47.74	9.24	2002	3	0.261	3.24	58	94	109	14	84	97.1
11	11	120.93	41.50	10.49	1998	3	0.266	3.18	58	95	108	14	84	97.2
12	12	119.88	36.28	11.90	2000	2	0.267	3.17	58	96	107	16	79	97.2
13	13	117.39	27.76	15.22	2001	2	0.274	3.09	58	96	107	16	79	97.2
3.3.2 Fuel consumption														
3.3.2.1			In selected gear at maximum power at rated engine speed.											
8	8	107.83	48.71	7.97	2199	3	0.284	2.98	59	93	109	15	79	97.1
3.3.2.1.1			75% of pull at maximum power at rated engine speed											
8	8	83.86	36.52	8.27	2261	2	0.311	2.72	57	89	103	16	79	97.2
3.3.2.1.2			50% of pull at maximum power at rated engine speed											
8	8	56.58	24.36	8.36	2271	2	0.363	2.33	55	87	99	15	84	97.2
3.3.2.1.3			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
9	9	83.98	36.55	8.27	2005	2	0.286	2.96	55	88	102	16	79	97.2
3.3.2.1.4			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
9	9	56.51	24.34	8.36	2012	2	0.328	2.58	54	87	99	15	84	97.2
3.3.2.1.5			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.1											
10	10	84.06	36.55	8.28	1779	2	0.267	3.17	53	89	101	16	79	97.2
3.3.2.1.6			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.1.2											
10	10	56.62	24.27	8.40	1792	2	0.302	2.80	51	86	97	15	84	97.2
3.3.2.2			In selected gear nearest to 7.5 km/h at rated engine speed.											
7	7	107.87	55.29	7.02	2199	4	0.284	2.98	60	93	108	16	79	97.0
3.3.2.2.1			75% of pull at maximum power at rated engine speed											
7	7	83.94	41.36	7.31	2262	3	0.311	2.72	58	90	104	16	79	97.2
3.3.2.2.2			50% of pull at maximum power at rated engine speed											
7	7	56.66	27.58	7.40	2270	2	0.363	2.33	56	86	100	15	84	97.2
3.3.2.2.3			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
8	8	83.67	41.44	7.27	1994	3	0.282	3.00	55	89	101	16	79	97.2
3.3.2.2.4			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
8	8	56.72	27.61	7.39	2012	2	0.324	2.61	53	86	99	15	84	97.2
3.3.2.2.5			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.1											
9	9	83.94	41.46	7.29	1772	3	0.266	3.18	53	89	101	16	79	97.2
3.3.2.2.6			Higher gear at reduced engine speed, same pull and travel speed as 3.3.2.2.2											
9	9	56.61	27.68	7.36	1776	2	0.298	2.84	51	87	98	15	84	97.2

4.1 Drawbar Power - Ballasted - 2200 rev/min

OECD Drawbar Data (SI)

Date of tests: 09-May-00						**Fuel density:** 0.847 kg/l								
Type of track: Concrete						**Test number:** 1772								
Maximum power in tested gears (ballasted, 4wd)							**Tire pressure:** 76 kPa, rear 193 kPa, front				**Drawbar Height:** 559 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	95.15	105.93	3.23	2252	14	0.321	2.64	59	89	103	17	53	97.5
4	4	106.00	85.55	4.46	2198	5	0.290	2.92	59	92	106	18	50	97.5
5	5	108.34	71.14	5.48	2202	4	0.282	3.00	59	92	107	19	43	97.5
6	6	108.38	62.79	6.21	2200	3	0.282	3.00	60	93	107	19	43	97.5
7	7	107.66	54.82	7.07	2202	3	0.284	2.98	59	93	108	20	34	97.5
8	8	108.00	48.59	8.00	2201	2	0.283	2.99	59	93	107	20	34	97.5
9	9	106.41	42.28	9.06	2202	2	0.288	2.94	59	92	107	20	34	97.5
10	10	106.01	37.26	10.24	2201	2	0.288	2.94	59	92	106	21	35	97.5
11	11	102.98	31.86	11.64	2203	2	0.298	2.85	59	93	108	21	32	97.5
12	12	102.48	28.11	13.12	2198	2	0.301	2.81	59	92	105	21	32	97.5

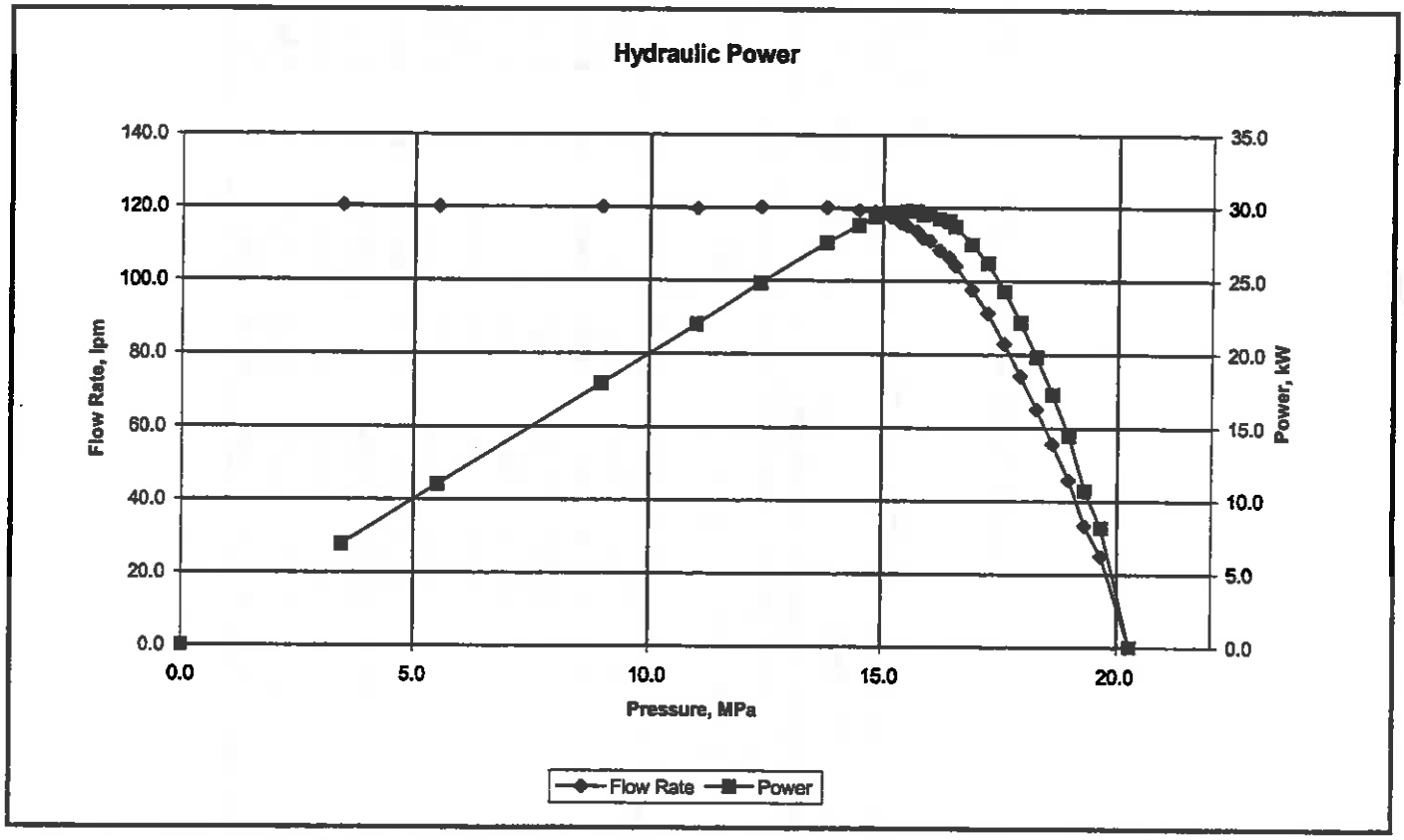
4.2 Drawbar Power - Ballasted - 2000 rev/min

OECD Drawbar Data (SI)

Date of tests: 09-May-00							**Fuel density:** 0.847 kg/l							
Type of track: Concrete							**Test number:** 1772							
Maximum power in tested gears (ballasted, 4wd)							**Tire pressure:** 76 kPa, rea 193 kPa, front					**Drawbar Height:** 559 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	95.77	106.03	3.25	2252	14	0.320	2.64	59	89	103	17	53	97.5
4	4	112.78	100.73	4.03	2068	9	0.283	2.99	58	91	105	18	50	97.5
5	5	122.01	90.01	4.88	1999	6	0.264	3.20	58	93	107	18	46	97.5
6	6	122.49	79.09	5.58	1998	4	0.263	3.22	58	93	107	19	43	97.5
7	7	122.96	69.57	6.36	2000	4	0.261	3.24	59	94	108	19	40	97.5
8	8	123.00	61.28	7.23	2001	3	0.261	3.24	59	95	109	20	34	97.5
9	9	122.56	53.94	8.18	2000	3	0.263	3.22	59	96	109	20	34	97.5
10	10	121.73	47.20	9.28	2005	2	0.263	3.22	59	94	107	21	35	97.5
11	11	120.13	41.11	10.52	2000	2	0.267	3.17	58	95	108	21	35	97.5
12	12	119.51	36.16	11.90	2000	2	0.267	3.17	59	94	107	22	30	97.5
13	13	116.91	27.66	15.22	2002	1	0.275	3.08	58	94	107	22	30	97.5

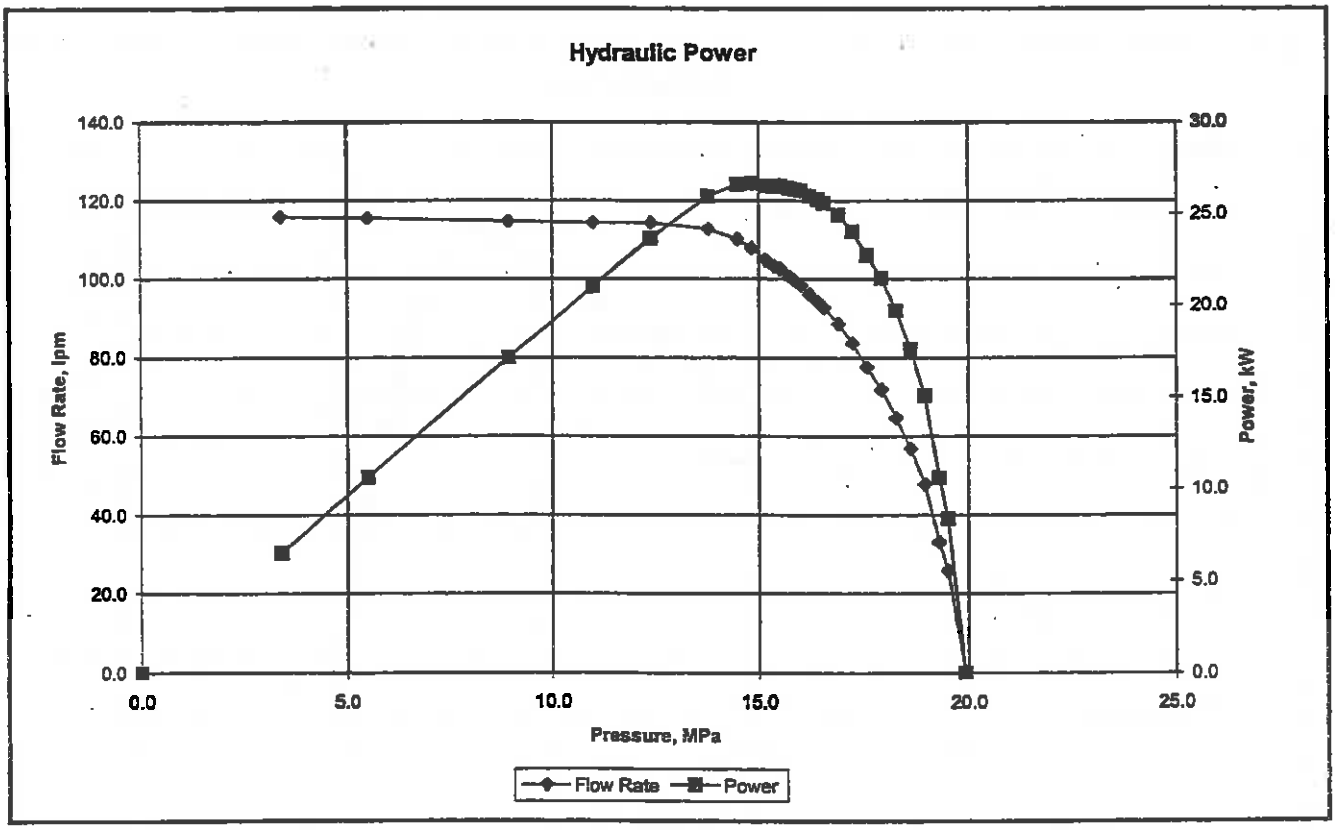
4.3 Hydraulic power, Standard pump - one outlet

Date of Test:	12-May-00	John Deere 8110	
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.		



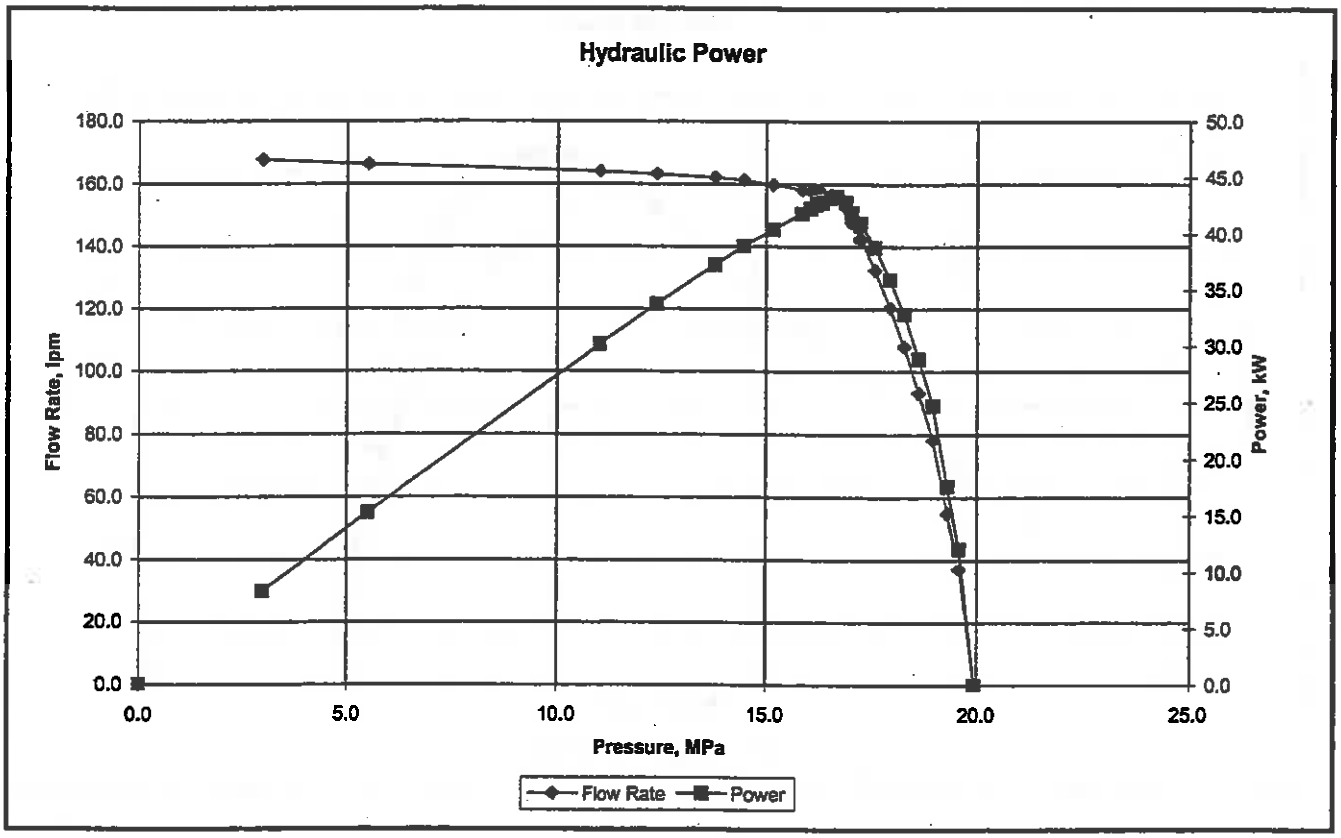
4.4 Hydraulic power, High flow pump - one outlet

Date of Test:	20-Apr-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:		
	19.93 MPa		
	2890 psig		
II.	Pump delivery rate at minimum pressure at rated engine speed:		
	115.8 l/min		
	30.6 gpm		
III.	Flow rate, pressure, power:		
	90% of relief valve setting		
	71.9 l/min	17.93 MPa	21.5 kW
	19.0 gpm	*2600 psig*	*28.8 hp*
	Maximum hydraulic power:		
	107.9 l/min	14.82 MPa	26.7 kW
	28.5 gpm	*2150 psig*	*35.7 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	67.0 °C		
	153 °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 - 2 outlets

Date of Test:	20-Apr-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:		
	19.93 MPa		
	2890 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		
	120.4 l/min	17.93 MPa	36.0 kW
	31.8 gpm	*2600 psig*	*48.2 hp*
	Maximum hydraulic power:		
	156.0 l/min	16.69 MPa	43.4 kW
	41.2 gpm	*2420 psig*	*58.2 hp*
IV.	Hydraulic fluid temperature at flow meter:		
	68.1 °C		
	155 °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, North American version, Quick attach linkage, with lifting cylinders (1) 80 mm dia & (1) 90 mm dia.
Date of test: 11 July 1995. Tests results extracted from OECD test 2/1576 on the John Deere 8200- 4WD, which is mechanically equivalent.

	Hitch points	Frame
Lower hitch points above ground - down position:	229 mm	196 mm
Vertical movement - without load:	795 mm	940 mm
with load:	770 mm	902 mm
Maximum corrected force exerted through full range:	47.2 kN	42.8 kN
Corresponding pressure:	18.1 MPa	18.1 MPa
Moment about rear axle:	62.8 kNm	83.0 kNm
Maximum mast tilt angle		9.4 degrees

Lifting height relative to horizontal position of lower links.

mm		-363	-330	-295	-198	-97	3	102	203	302	401	439	538
Corrected lift forces													
At the Hitch point	kN	--	47.9	47.2	49.9	52.3	54.6	56.8	58.9	60.6	62.3	62.1	--
at the frame	kN	45.6	45.2	--	46.2	46.8	47.0	46.9	46.4	--	45.2	43.7	42.8
Corresponding pressure	18.1 Mpa												

4.7 POWER LIFT TEST Category III, N.A. Quick attach linkage, with lifting cylinders (1) 90 mm dia & (1) 100 mm dia.
Date of test: 11 July 1995. Test results extracted from OECD test 2/1576 on the John Deere 8200 - 4WD, which is mechanically equivalent.

	Hitch points	Frame
Lower hitch points above ground - down position:	229 mm	211 mm
Vertical movement - without load:	782 mm	848 mm
with load:	770 mm	826 mm
Maximum corrected force exerted through full range:	60.9 kN	60.6 kN
Corresponding pressure:	18.1 MPa	18.1 MPa
Moment about rear axle:	81.1 kNm	117.6 kNm
Maximum mast tilt angle		3.6 degrees

Lifting height relative to horizontal position of lower links.

mm		-348	-330	-297	-198	-97	3	102	203	302	401	439	478
Corrected lift forces													
At the Hitch point	kN	–	62.8	60.9	65.1	69.6	70.9	73.4	74.9	77.2	80.7	80.7	--
at the frame	kN	66.7	66.4	--	65.9	66.2	66.5	68.1	65.5	64.4	--	62.1	60.6
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							
7	0	7.54	2290	2		72.4	
7	0	7.61	2290	4	72.1		72.4
4.8.1.2 Unloaded test in the gear giving the maximum forward speed							
16	0	38.3	2380	2		74.5	
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)]							
7	52.3	6.95	2251	2		74.9	
7	50.4	7.23	2253	4	75.2		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							
7	0	7.54	2290	2		72.4	72.4
7	0	7.61	2290	4	72.1		

4.9 Measurement of External Noise Level

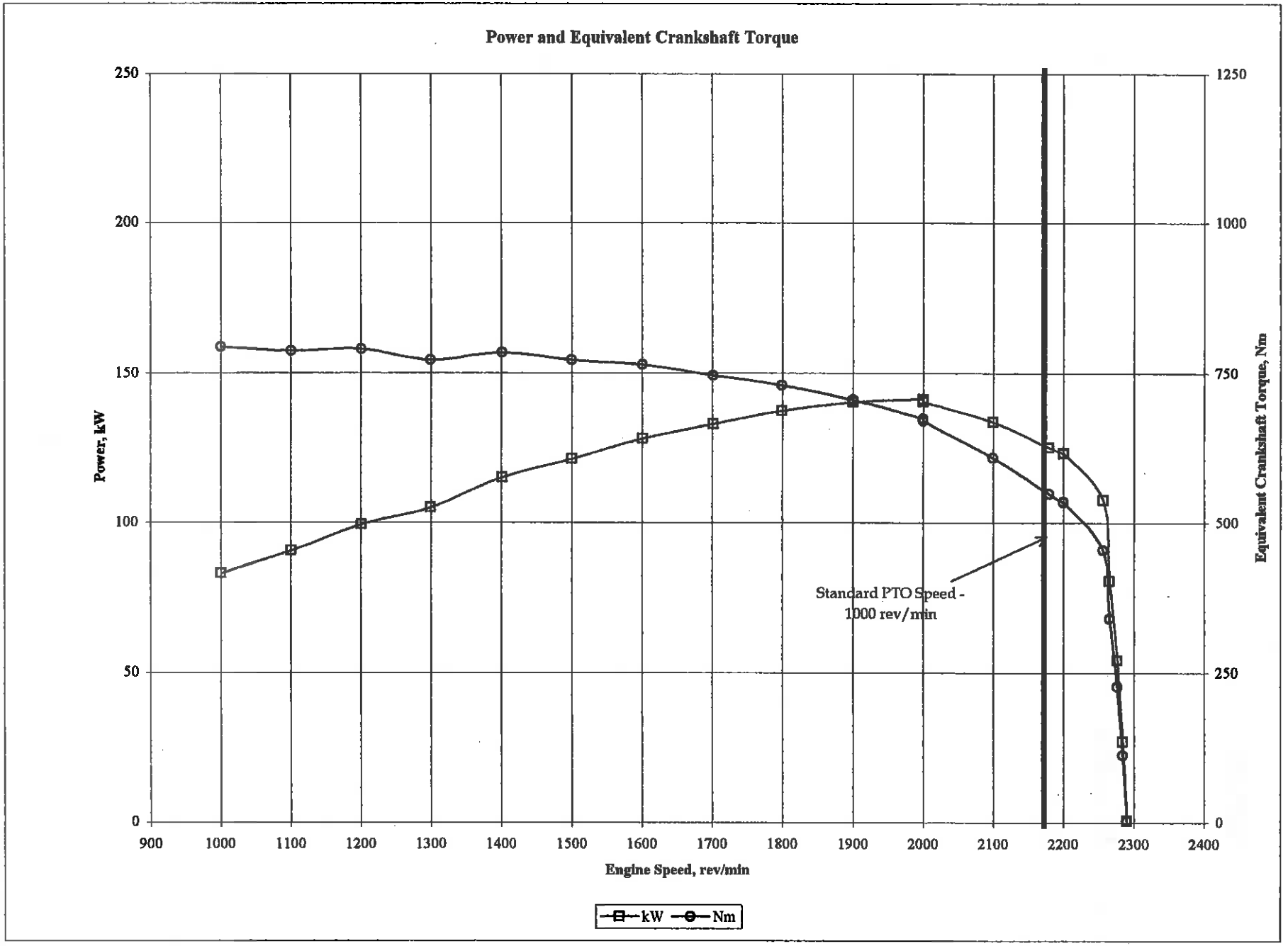
Date of Test	May 4, 2000
Location of Test	Nebraska Tractor Test Laboratory
Sound Level Meter	Bruel and Kjaer 2236
Type of Track	Concrete Oval
Gear Number	16
Speed Prior to Acceleration	28.3 km / h
Noise Level	88.7 dB(A)

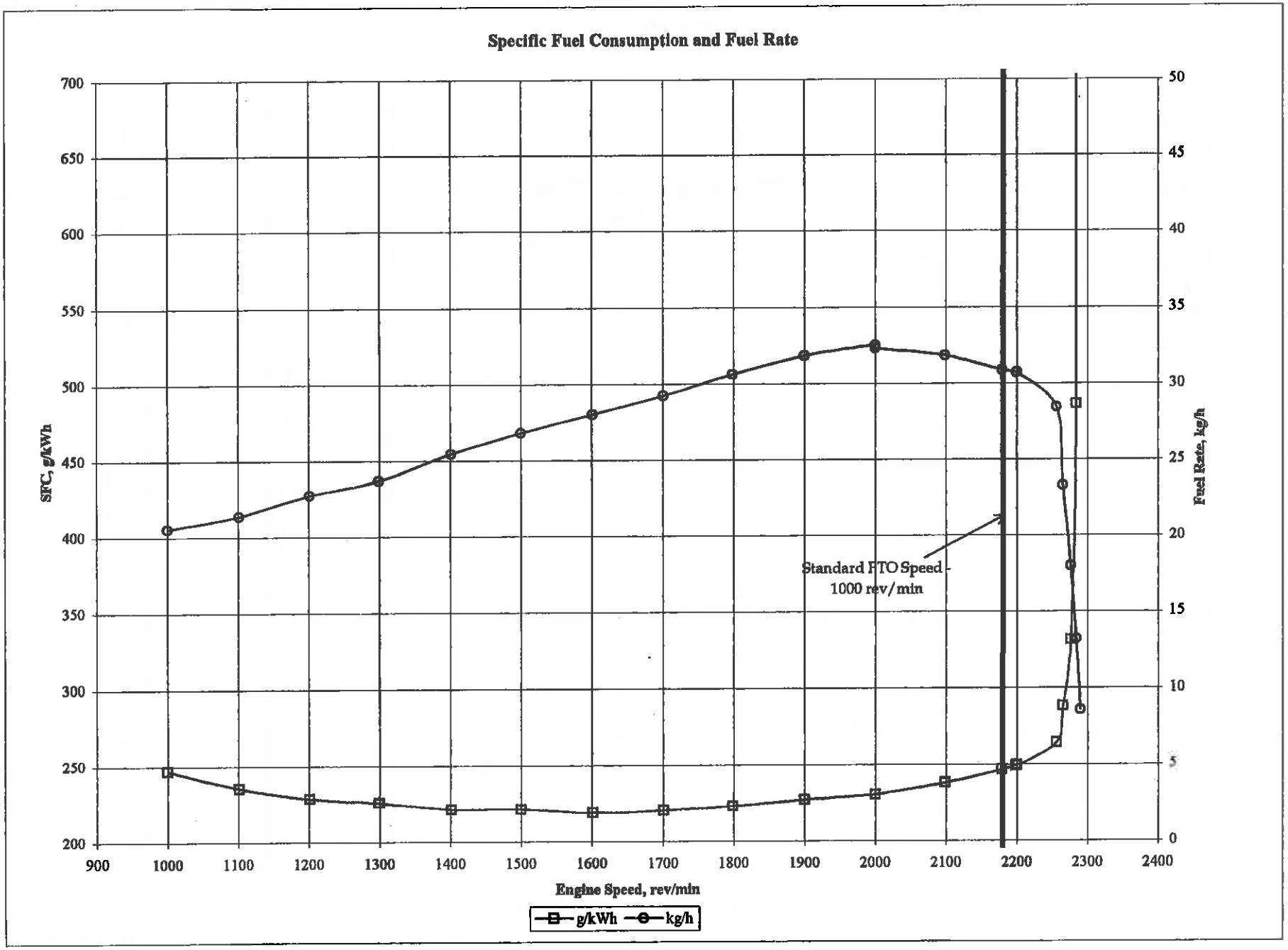
5. REPAIRS

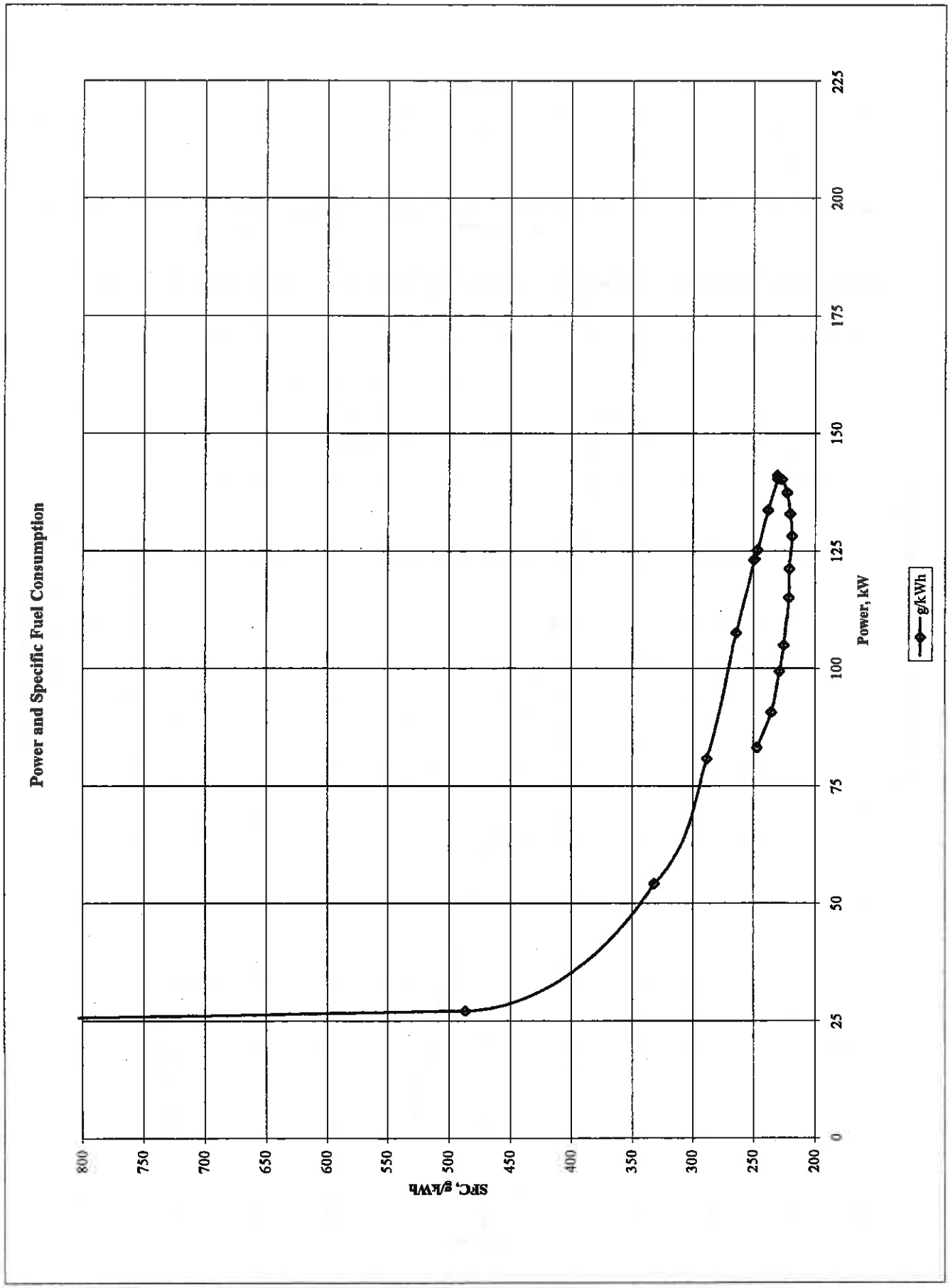
None

6. REMARKS

None


Power and Equivalent Crankshaft Torque
Power, kW
Equivalent Crankshaft Torque, Nm
Engine Speed, rev/min
Standard PTO Speed - 1000 rev/min
kW
Nm
250
200
150
100
50
0
1250
1000
750
500
250
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
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


Power and Specific Fuel Consumption
SFC, g/kWh
800
750
700
650
600
550
500
450
400
350
300
250
200
0
25
50
75
100
125
150
175
200
225
Power, kW
g/kWh