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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
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LINCOLN, NEBRASKA 68583-0832, USA

REPORT ON TEST IN ACCORDANCE WITH OECD STANDARD CODE 2 FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS



John Deere 8230 Power Shift
Mechanical Front Wheel Drive (MFWD)

MANUFACTURED BY:	**John Deere Tractor Works** **3500 East Donald Street** **Waterloo, IA 50704-0270**
NEBRASKA TEST NO.	**1885**
TEST DATES:	**June – October, 2006**

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 27 August 2007 for the John Deere 8230 Power Shift, Mechanical Front Wheel Drive (MFWD) tractor with OECD Number 2/2 377.

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TABLE OF CONTENTS

Page

1. **SPECIFICATIONS** 1

2. **TEST CONDITIONS** 14

3. **COMPULSORY TESTS**
   - **3.1** Main Power Take-Off Performance 17
   - **3.2** Hydraulic Power and Lifting Forces 19
   - **3.3** Drawbar Performance 22

4. **OPTIONAL TESTS**
   - **4.1** Drawbar Power - Unballasted-2100 rev/min 23
   - **4.2** Drawbar Power – Ballasted -1800 rev/min 24
   - **4.3** Measurement of External Noise Level 25
   - **4.4** Measurement of Noise Level at Operator's Ear 25

5. **REPAIRS** 25

6. **REMARKS** 25

7. **PTO PERFORMANCE CURVES** 26

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.

C[1]		- Tractors manufacturer's name and address:	John Deere Tractor Works 3500 East Donald St. P.O. Box 270 Waterloo, IA 50704-0270
D[1]		- Location of tractor assembly:	Same
D		- Submitted for test by:	The Manufacturer
C		- Selected for test by:	The Manufacturer in agreement with the Nebraska Tractor Test Laboratory
D		- Place of running-in:	John Deere Product Engineering Center, Waterloo, Iowa
D		- Duration of running-in (hours):	71 hours
C		- Location of test:	Nebraska Tractor Test Laboratory, Lincoln, Nebraska U.S.A.
	1.	**SPECIFICATIONS OF TRACTOR**	
	1.1	**Identification**	
C	1.1.1	- Make of tractor (*):	John Deere
C		- Model (trade name):	8230
C		- Type: • *2 WD or 4 WD; rubber or steel tracks (if applicable); articulated 4 WD or articulated 4WD with twin (dual) wheels (if applicable)*	4WD
		(*) *Possibly different from tractor manufacturer's name*	
	1.1.2	Numbers	
D		- 1st Serial No. or prototype:	CONFIDENTIAL
C		- Serial No.:	*RW8230P005318*
	1.1.3	Other specifications (if applicable)	
D		- Model(s) for other countries:	N/A
C		- Transmission type or gears x ranges:	40K Power Shift Transmission (PST)
C		- Speed version: • *30, 40, or 50 km/h*	40 km/h
D		- Manufacturer identification or Technical type number:	N/A

1. The information opposite each item shall be validated by the Testing Station. An item marked "C" indicates to the test report user that the information declared by the manufacturer has been checked; an item marked "D" that the manufacturer's declaration has been endorsed. For example, the make of the supercharging device is declared by the manufacturer and checked "C" as consistent with the tractor by the testing station, while the pressure of the supercharging device is simply declared "D" by the manufacturer. Testing station's markings show compliance with article 8 of Appendix 3 to the Decision.

	1.2	**Engine**	
C		- Make / Model / Type:	John Deere / 6090HRW02 / Diesel; 4-stroke; turbocharged, direct injection, air to air intercooled
C		- Serial No.:	*RG6090L006226*
	1.2.1	Cylinders	
C		- Number / disposition:	6 / inline, vertical
D		- Bore / Stroke (mm / mm):	118.4 x 136
D		- Capacity (cm^3):	8984
D		- Compression ratio:	16.3 : 1
D		- Arrangement of valves:	Overhead; 4 valves per cylinder
D		- Cylinder liners (wet or dry):	Wet; replaceable
	1.2.2	Supercharging	
C		- Make / Model / Type:	Borg Warner / RE529978 / Variable Geometry exhaust gas driven
D		- Pressure (MPa):	0.167
	1.2.3	Fuel System	
C		- Fuel feed system:	Electric Transfer Pump
		- Make / Model / Type of fuel filter(s)	
C		. Primary:	Racor / RE520906 / 10 micron multilayer water separating
C		. Secondary:	Racor / RE523236 / 2 micron multilayer water separating
D		- Capacity of fuel tank (dm^3):	681.4
C		- Make / Model / Type of injection pump:	Denso / RE519597 / HPCR; electronic
C		- Serial No.:	N/A
		- Manufacturer's production setting of injection pump	
C		. Flow rate (rated engine speed and full load) (dm^3/h):	42.3 +/- 1.7
D		. Timing:	Variable
D		- Make / Model / Type of injectors:	Denso / RE529151 / HPCR Injection
D		- Injection pressure (MPa):	125
C		- Make / Model / Type of carburetor:	N/A
	1.2.4	Governor	
C		- Make / Model / Type:	John Deere / FOCUS / Electronic Control
C		- Governed range of engine speed from ____ to ____ (min^{-1} (rev/min)):	900 to 2200
C		- Rated engine speed (min^{-1} (rev/min)):	2100

	1.2.5	Air Cleaner	
		- Pre-cleaner	
C		. Make / Model / Type:	Fleetguard / RE242336 / 25 tube precleaner with fan source scavenge
C		. Location of air intake:	Under hood, middle of tractor
		- Main cleaner	
		. Make / Model / Type	
C		- Primary:	Fleetguard / RE210102 / Opti-Air™ pleated paper media
C		- Secondary:	Fleetguard / RE210103 / Pleated paper
C		. Location of air intake (in case of no pre-cleaner):	Under hood, in front of cab
C		- Maintenance indicator:	Console mounted warning light and audible signal
	1.2.6	Lubrication system	
D		- Type of feed pump:	Full pressure, positive displacement
C		- Type of filter(s):	Full Flow
C		- Number of filter(s):	1 top load
	1.2.7	Cooling system	
C		- Type of coolant:	Liquid
D		- Type of pump:	Centrifugal, gear driven
		- Specification of fan or blower	
C		. Number of fan blades:	8
C		. Fan diameter (mm):	788
D		- Coolant capacity (dm^3):	40
C		- Type of temperature control:	Two thermostats and variable speed fan
D		- Superpressure system (kPa):	69 +/- 6.9
	1.2.8	Starting system	
C		- Make / Model / Type:	Denso / RE529661 / Solenoid engaged
D		- Starter motor power rating (kW):	4.0
C		- Cold starting aid:	Ether spray in intake manifold
C		- Safety device:	Electrical lockout on gearshift lever
	1.2.9	Electrical system	
C		- Voltage (V):	12
		- Generator	
C		. Make / Model / Type:	Bosch/ RE210793 / Belt driven alternator with built-in regulator
D		. Power (kW):	2.8
		- Battery of accumulators	
C		. Number:	Two; 950 CCA, RC 180
D		. Rating (Ah at ____ hours):	154 Ah at 20 hours

1.2.10 Exhaust system

C - Make / Model / Type: Fleetguard / RE210829 / Expansion Chamber

C - Location: Vertical muffler, right front corner of cab

1.3 Transmission

1.3.1 Clutch (travel and power take-off / travel alone)

D - Make / Model / Type: John Deere / Multiple plate / Oil cooled

D - Number of plates: 7

D - Diameter of plates (mm): 232

C - Method of operation: Electro-Hydraulic; pedal actuated

1.3.2 Gear box

D - Make / Model / Type: John Deere / 40K PST / 16 Speed full power shift

- Description: Countershaft design consisting of 8 multiple disk hydraulically cooled clutches and multiple disk hydraulically cooled planetary brake

	Forward	Reverse
C Number of ranges	N/A	N/A
C Number of gears	16	4
C Total of arrangements	N/A	N/A

D - Available options: 16 x 5 (specialty market)

1.3.3 Rear axle and final drives

D - Make / Model / Type: John Deere / AR254851 / Spiral bevel gear and pinion, differential and inboard planetary reduction

- Differential lock

D . Type: Electo-hydraulic, wet multi-plate

C . Method of engagement: Foot operated switch

C . Method of disengagement: Self-disengaging with brake pedal operation

1.3.4 Front axle and final drives

D - Make / Model / Type: John Deere / AR211702 / Spiral bevel and pinion, differential and outboard planetary reduction

- Differential lock

D . Type: Limited slip

C . Method of engagement: Self-engaging

C . Method of disengagement: Self-disengaging

1.3.5 Total ratios and traveling speeds

Gear No.	Group or range	Number of engine revolutions for one revolution of the driving wheels	Nominal traveling speed (*) at rated engine of 2100 min^{-1} (rev / min) km/h
1	1	394.919	1.81
2	2	294.849	2.43
3	3	221.464	3.24
4	4	165.347	4.33
5	5	147.436	4.86
6	6	127.878	5.60
7	7	110.077	6.51
8	8	95.475	7.50
9	9	82.680	8.67
10	10	71.712	9.99
11	11	61.729	11.61
12	12	53.541	13.38
13	13	45.429	15.77
14	14	33.917	21.12
15	15	25.476	28.12
16	16	19.020	37.67
1R	1R	-422.189	-1.70
2R	2R	-157.617	-4.55
3R	3R	-136.709	-5.74 [1]
4R	4R	-48.566	-10.54 [2]
5R	5R	-48.566	-14.75 [3]

(*) Calculated with a tyre dynamic radius index of 905 mm (pneumatic tyred tractors only)

[1] Travel Speed at 2300 engine rpm
[2] Travel Speed at 1500 engine rpm
[3] Specific market feature only

- Number of revolutions of front wheels for one revolution of rear-wheels (For 4WD tractors only): MFWD – 1.330 (as tested); ILS Axle – Step 4 1.254; ILS Axle – Step 5 1.322

1.4 Power take-off (PTO)

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 switch
- Number of shafts: One

C		- Method of changing power take-off shaft ends and speeds:	Type 2 PTO available; Removable shaft
	1.4.1.1	Power take-off proportional to engine speed	
		Power take-off at 540 min^{-1} (rev / min)	
C		- Location:	N/A
C		- Diameter of power take-off shaft end (mm):	N/A
C		- Number of splines: (Conformity to ISO 500:1991)	N/A
C		- Height above ground (mm):	N/A
C		- Distance from the median plane of the tractor (mm):	
C		- Distance behind rear-wheel axis (mm):	N/A
C		- PTO speed at rated engine speed (min^{-1} (rev/min)):	N/A
C		- Engine speed at standard power take-off speed (min^{-1} (rev/min)):	N/A
C		- Ratio of rotation speeds (engine speed / p.t.o. speed):	N/A
D		- Power restriction (kW):	N/A
D		- Maximum torque transmissible (Nm):	N/A
C		- Direction of rotation: (viewed from behind tractor)	N/A
		Power take-off at 1000 min^{-1} (rev / min)	
C		- Location:	Rear of tractor, center plane
C		- Diameter of power take-off shaft end (mm):	45
C		- Number of splines: (Conformity to ISO 500:1991)	20; conforms to ISO 500 / 1991
C		- Height above ground (mm):	705
C		- Distance from the median plane of the tractor (mm):	0
C		- Distance behind rear-wheel axis (mm):	683.3
C		- PTO speed at rated engine speed (min^{-1} (rev/min)):	1048
C		- Engine speed at standard power take-off speed (min^{-1} (rev/min)):	2003
C		- Ratio of rotation speeds (engine speed / p.t.o. speed):	2.003 : 1
D		- Power restriction (kW):	None
D		- Maximum torque transmissible (Nm):	Maximum engine torque
C		- Direction of rotation: (viewed from behind tractor)	Clockwise

	1.4.1.2	Power take-off proportional to ground speed	
C		- Indicate 540 or 1000 min^{-1} (rev / min):	N/A
C		- Traveling distance for one revolution of take-off shaft (m):	
C		- Number of power take-off shaft revolutions for one revolution of (rear) driving wheels:	
C		- Direction of rotation with forward gear engaged (viewed from behind tractor):	
	1.4.2	Optional power take-off	
C		- Give the same description as for the main PTO:	Same as 1.4.1
	1.5	**Hydraulic power lift**	
C		- Make / Model / Type:	John Deere / N/A / Electro-hydraulic lower link sensing; variable mix of draft and position control; adjustable rate of drop
C		- Type of hydraulic system:	Closed center; pressure and flow compensated
C		- Type and number of cylinders (single or double acting):	Two external, single acting 2 x 90 mm standard, 2 x 100 mm optional (as tested)
C		- Type of linkage lock for transport:	Electro-hydraulic
D		- Relief valve pressure setting (tolerance) (MPa):	20.4 +/- 0.3
D		- Opening pressure of cylinder safety valve (if fitted) (MPa):	23.25 +/- 0.5
D		- Lift pump type:	Closed center, load sensing pressure-flow compensated axial piston pump with partial flow charge pump with combined return flow charge
D		- Transmission between pump and engine:	Gear driven; Rear Differential case hypoid gear set
C		- Type and number of filters:	Synthetic spin on filter; two
C		- Site of oil reservoir:	Differential case housing
C		- Type, number, and location of tapping points:	ISO standard breakaway couplers / 3 standard with 4^{th}, 5^{th}, and power beyond optional; rear of tractor
D		- Maximum volume of oil available to external cylinders (dm^3):	25; Optional 50

1.6 Three point linkage

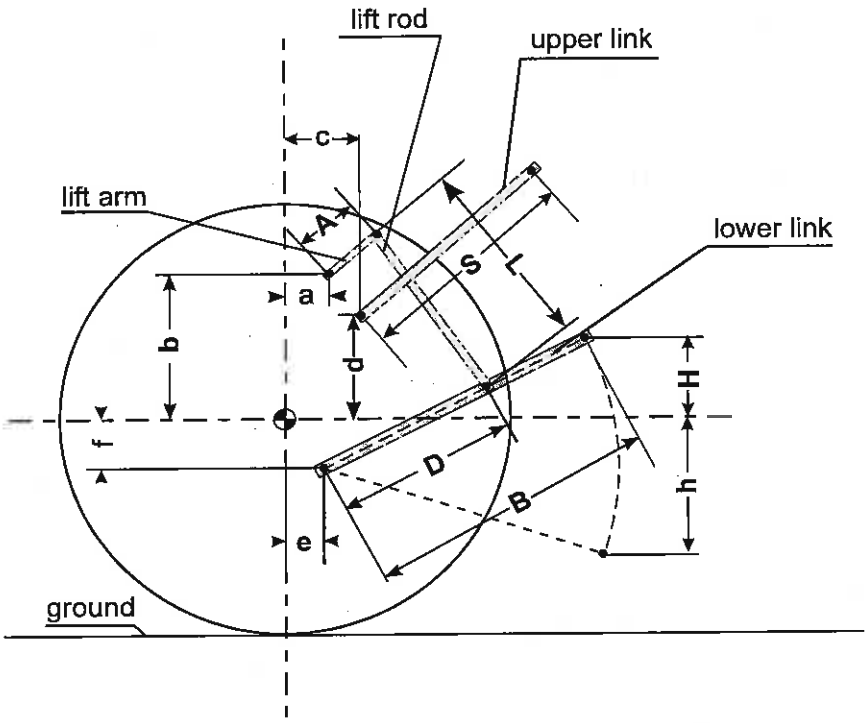


Figure 2.1
Lift Test – Linkage geometry

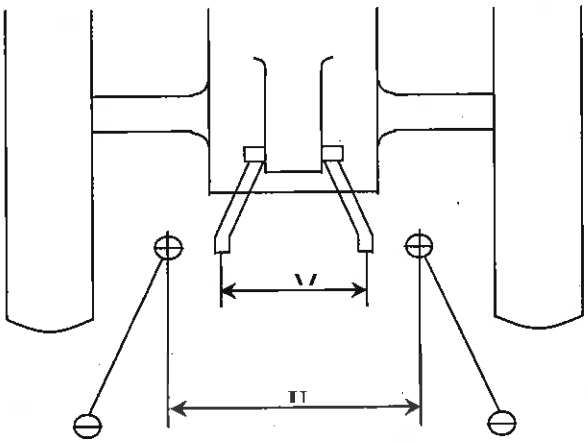


Figure 2.2
Lift Test – Linkage geometry

C	- Category:	3
	• *Conformity with categories 1, 2, 3, 4, 3N, or 4N of ISO 730-1:1994 + Cor.1:1995 and ISO 730-2:1979*	Specific Market Version
C	- Category adapter:	None

			Dimension or range	Settings used in test(s)
			mm	mm
C	Length of arms:	(A)	520	Same
C	Length of lower links:	(B)	1081	Same
	Distance of lift arm pivot point from rear wheel axis			
C	- horizontally:	(a)	230	Same
C	- vertically:	(b)	480	Same
C	Horizontal distance between the 2 lower link points:	(u)	871	Same
C	Horizontal distance between the 2 lift arm end points:	(v)	758	Same
C	Length of upper arm link:	(S)	727 to 906	809
	Distance of upper link pivot point from rear wheel axis			
C	- horizontally:	(c)	555	Same
C	- vertically:	(d)	304	Same
	Distance of lower link pivot point from rear wheel axis			
C	- horizontally:	(e)	276	Same
C	- vertically:	(f)	365	Same
C	Distance of lower link pivot points to lift rod pivot points on lower links:	(D)	733	Same
C	Length of lift rods:	(L)	1028 to 1120	1067
	Height of lower hitch points relative to the rear wheel axis			
C	- in low position:	(h)	590 – 739	675
C	- in high position:	(H)	119 - 237	161
C	Height above ground of lower hitch points when locked in transport position (*):		1035 – 1152	1066
	(*) Assuming r = 905 (pneumatic tyred tractors only)			

Table 1.1

Dimensions of linkage geometry when connected to the standard frame

	1.7	Swinging drawbar	
C		- Type:	Oscillating
		- Height above ground	
C		. Minimum (mm):	441
C		. Maximum (mm):	539
C		- Type of adjustment:	Offset drawbar
		- Distance of hitch point from rear wheel axis	
C		. Horizontally (mm):	1192, 1141
		- Distance of hitch point from power take-off shaft end	
C		. Horizontally (mm):	508, 457
C		. Vertically (mm):	166, 264
C		- Lateral adjustment (center of clevis)	
C		. Left hand (mm):	214, 206
C		. Right hand (mm):	214, 206
		- Distance of pivot point from rear wheel axis	
C		. Horizontally (mm):	190.5 (forward)
C		- Diameter of drawbar pinhole (mm):	40.3
D		- Maximum vertical permissible load (kN):	18.0 kN – standard (as tested) 48.9 kN – optional
	1.8	**Trailer hitch**	
C		- Type:	N/A
C		- Hole diameter (mm):	
C		- Height above ground (mm):	
		- Distance of hitch point from rear wheel axis	
C		. Horizontally (mm):	
		- Distance of hitch point from take-off shaft end	
C		. Horizontally (mm):	
C		. Vertically (mm):	
D		- Maximum vertical permissible load (kN):	
	1.9	**Holed drawbar**	
C		- Number of holes:	N/A
C		- Distance between holes (mm):	
C		- Hole diameter (mm):	
C		- Thickness / width of the drawbar (mm /mm):	
		- Height above ground	
C		. Minimum (mm):	
C		. Maximum (mm):	
C		- Horizontal distance to power take-off shaft end (rear) (mm):	

	1.10	**Steering**	
D		- Make / Model / Type:	Sauer / OSPF / Hydrostatic gerotor metering unit with load sensing
		- Method of operation	
D		. Pump(s):	Same as main hydraulic pump
D		. Rams(s):	Integrated symmetrical design
D		- Working pressure (MPa):	20.7
	1.11	**Brakes**	
	1.11.1	Service brake	
D		- Make / Model / Type:	Eaton / RE210856 / John Deere Oil immersed
C		- Method of operation:	Hydraulic, operated by two pedals which can be locked together
C		- Trailer braking take-off (hydraulic or air brakes):	Optional air or hydraulic (not installed)
	1.11.2	Parking brake	
C		- Type:	Spring applied; hydraulically released multiple disk
C		- Method of operation:	Gear selector lever
	1.12	**Wheels**	
		- Number	
C		. Front (driving / steering):	Two; driving and steering
C		. Rear (driving / steering):	Two; Driving
C		- Wheelbase (mm):	MFWD – 3050 (as tested) ILS – 3020
		- Track width adjustment:	

		Minimum mm	Maximum mm	Adjustment method
D	Front	1524	2235	Reversing wheels and offset lug rims
D	Rear – single	1524	2710 – as single 2278 – with duals	Rack and pinion axle; reversing wheels and offset lug rims
D	Rear – dual	2622	3368	Rack and pinion axle; reversing wheels and offset lug rims

	1.13	**Protective structure**	
C		- Make / Model / Type:	John Deere/SG096/Cab
C		- Manufacturer's name and address:	John Deere Waterloo Works Waterloo, Iowa, USA
		- Protective device	
C		. Cab / frame / rollguard / other:	Cab
C		. Tiltable / not tiltable:	Not tiltable
		- OECD approval	
C		. approval number:	4/0 914
C		. Date of approval:	8 November 2005

C		. Nos. of minor modification certificates, if any:	None
	1.14	**Seat(s)**	
	1.14.1	Driver's seat	
C		- Make / Model / Type	John Deere/ Sears Manufacturing / Comfort Command / air cushion suspension
C		- Seat and steering wheel reversible: Yes / No	No
C		- Type of suspension:	Air ride
C		- Type of damping:	Adjustable viscous damping
		- Range of adjustment	
C		. Longitudinally (mm):	178
C		. Vertically (mm):	172
C		- Safety belt:	Yes
		. Type:	2 point, fully retractable
	1.14.2.	Optional driver's seat(s)	
	1.14.2.1	Option 1	
D		- Make / Model / Type	John Deere/ Sears Manufacturing/ John Deere Active Seat
D		- Type of suspension:	Air/Hydraulic
D		- Type of damping:	Active position control
		- Range of adjustment	
D		. Longitudinally (mm):	178
D		. Vertically (mm):	172; (87 mm adjustment range)
	1.14.2.2	Option 2	
D		- Make / Model / Type	
D		- Type of suspension:	
D		- Type of damping:	
		- Range of adjustment	
D		. Longitudinally (mm):	
D		. Vertically (mm):	
	1.14.3	Passenger seat	
C		- Location:	Optional Instruction seat located left of driver's seat
C		- 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			
C Inner Pair	1742	155 x 110	238
C Outer Pair	1742	122 x 86	376
Sidelights			
C Midbody	2349	160 x 110	700
Rearlights			
C Roof	3038	160 x 110	508
C Fender	2267	160 x 110	914
Reflectors			
C Front	3114	180 x 72	736
C Rear	3114	180 x 72	743
C Brake	2032	210 x 95	910
C Extremity	2229	140 x 72	1855

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
Ballasted	6494	3102	3848	3155	3171
Unballasted	5938	3012	3190	3155	3171

** Assumes rear duals for ballasted width and rear singles for unballasted width.*

2.2 Ground clearance (unballasted tractor)

(mm): 336

- Clearance – limiting part: Drawbar safety support

2.3 Tractor mass

- Mass (with cab):

	With driver	Without driver
	kg	kg
Unballasted		
Front	4051	4044
Rear	5702	5634
Total	9753	9678
Ballasted		
Front	4581	4574
Rear	7752	7684
Total	12333	12258

Ballast Added	Number of Weights	Total Mass	Liquid
		kg	kg
Front (weight support)	1	175	-
Front (weights)	4	181	
Rear (weights)	2	150	-
Rear (weights)	6	1225	-
Rear (duals)	2	849	-

2.4 Track specifications

Track materials:	N/A
Track width and base (mm):	
Dynamic radius (rolling radius) (mm):	
Track support system:	
Treadbars	
. Number of treadbars per metre:	
. Height, width, and length (mm):	
Other specifications:	

2.5 Tyres and track specifications

	Front	Rear
Tyres		
- dimensions:	Goodyear 420/90R30	Goodyear 480/80R46
- ply rating:	142 A8	158 A8
- type:	Radial	Radial
- maximum load (tyre manufacturer's) (kN):	25.9 kN	41.6 kN
- maximum load (tractor manufacturer's) (kN):	Same	Same
- inflation pressure (tyre manufacturer's) (kPa):	From 60 to 160	From 60 to 240
- dynamic radius index (mm):	720	905
Chosen track width (mm):	1524	1568

2.6 Fuel

- Type:
  - *in conformity / not in conformity with national standards*

No. 2 Diesel in conformity with national standards

- Density at 15° C:

0.839 kg/l

2.7 Oil and lubricants

2.7.1 Capacity and change interval

	Capacity	Oil Change	Filter change
	Dm^3	h	h
Engine	24	250 (375 with John Deere PLUS-50 and John Deere filter)	Same
Gear Box	150	1500	Same
Front Axle	13.6	1500	N/A
Rear Axle	Common w/gearbox	1500	Common w/gearbox
Final Drive (front)	3.4	1500	N/A
Final Drive (rear)	Common w/gearbox	1500	Common w/gearbox
Hydraulic System	Common w/gearbox	1500	Common w/gearbox
Other (steering, ___)	N/A	N/A	N/A

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

	Recommended	Used during test
Engine oil		
. Type:	John Deere; Torq-Gard Supreme SAE 5W30: PLUS-50 SAE 15W40 or 0W40	John Deere; Torq-Gard Supreme SAE 15W40
. Viscosity:	12.5 - 16.3 cSt @ 100 C	Same
. Classifications:	API CF-4; CH - 4; ACEA E2	Same
Transmission oils		
. Type:	John Deere HY-GARD; J20C SAE 10W-30	Same
. Viscosity:	58 cSt at 43 C	Same
. Classifications:	N/A	N/A
Hydraulic fluid		
. Type:	Same as transmission	Same
. Viscosity:		
. Classifications:		
Steering oil		
. Type:	Same as transmission	Same
. Viscosity:		
. Classifications:		

2.7.3 Grease

- Number of lubrication points: MFWD – 22 (as tested)
  ILS – 32

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

- Date and location of tests: 20-Sep-06 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

	Speed			Fuel consumption			Specific
Power	Engine	PTO	Fan	Hourly		Specific	energy
kW	rev/min			kg/h	l/h	g/kWh	kW-h/l
3.1 MAXIMUM POWER - ONE HOUR TEST							
173.38	1800	897	1213	38.96	46.44	225	3.73
3.1.2 POWER AT RATED ENGINE SPEED							
151.87	2100	1047	1165	35.67	42.52	235	3.57
3.1.3 STANDARD POWER TAKE-OFF SPEED (1000 +/- 25 rev/min							
163.82	2005	1000	1187	37.27	44.42	228	3.69
3.1.4 PART LOADS							
3.1.4.1 the torque corresponding to maximum power at rated engine speed							
151.87	2100	1047	1165	35.67	42.52	235	3.57
3.1.4.2 85% of torque obtained in 3.1.4.1							
132.21	2155	1074	1183	32.61	38.87	247	3.40
3.1.4.3 75% of torque defined in 3.1.4.2							
100.05	2166	1080	1181	27.12	32.33	271	3.09
3.1.4.4 50% of torque defined in 3.1.4.2							
66.83	2175	1084	1176	21.45	25.57	321	2.61
3.1.4.5 25% of torque defined in 3.1.4.2							
33.51	2187	1090	1188	16.28	19.41	486	1.73
3.1.4.6 unloaded							
0.93	2195	1095	1192	10.89	12.97	11670	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 at standard PTO speed							
163.82	2005	1000	1187	37.27	44.42	228	3.69
3.1.5.2 85% of torque obtained in 3.1.5.1							
145.71	2102	1048	1139	34.52	41.14	237	3.54
3.1.5.3 75% of torque defined in 3.1.5.2							
108.55	2102	1048	1139	28.21	33.63	260	3.23
3.1.5.4 50% of torque defined in 3.1.5.2							
73.06	2102	1048	1138	22.09	26.33	302	2.77
3.1.5.5 25% of torque defined in 3.1.5.2							
36.16	2102	1048	1136	16.01	19.08	443	1.89
3.1.5.6 unloaded							
0.89	2102	1048	1138	9.80	11.68	10949	0.08

- No load maximum engine speed:	2195	rev/min
- Torque (equivalent crankshaft) at rated speed:		
- At rated engine speed	691	Nm
- At maximum power	920	Nm
- Maximum torque (equivalent crankshaft):	1003	Nm
(engine speed:	1502	rev/min)

Mean atmospheric conditions:		
Dry bulb	24	°C
Pressure	97.3	kPa
Relative Humidity	31	%
Maximum temperatures:		
Coolant	96	°C
Engine oil	117	°C
Fuel	51	°C
Engine air intake	34	°C

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off

- Date and location of tests: 20-Sep-06 Nebraska Tractor Test Laboratory, Lincoln, NE, USA
- Type of dynamometer bench: Eaton

Power	Speed			Fuel consumption			Specific energy
				Hourly		Specific	
kW	Engine	PTO	Fan	kg/h	l/h	g/kWh	kW-h/l
3.1.6 PART LOADS AT DIFFERENT ENGINE SPEEDS							
3.1.6.1 maximum power at rated engine speed							
151.87	2100	1047	1165	35.67	42.52	235	3.57
3.1.6.2 80% of power obtained in 3.1.6.1 at max speed setting							
121.49	2159	1076	1169	30.89	36.82	254	3.30
3.1.6.3 80% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
121.91	1892	943	1028	29.03	34.60	238	3.52
3.1.6.4 40% of power obtained in 3.1.6.1 with governor control set to 90% of rated engine speed							
61.12	1892	943	1023	17.69	21.08	289	2.90
3.1.6.5 60% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
90.85	1263	629	701	20.41	24.33	225	3.73
3.1.6.6 40% of power obtained in 3.1.6.1 with governor control set to 60% of rated engine speed							
60.72	1260	628	693	15.10	18.00	249	3.37

3.2 HYDRAULIC POWER AND LIFTING FORCE

3.2.1 Hydraulic Power Test - 63 cc pump

Date of Test: 21-Sep-06 Location of Test-City-State: Tractor Test Lab, Lincoln, NE, USA

Tractor Model: John Deere 8130 Tapping point used for test: Remote hydraulic outlets

3.2.1.1 Hydraulic Fluid Characteristics

Found in: **2.7.2 Specifications**

Viscosity at 65C - 25 cSt

3.2.1.2 Compulsory Report(Test Results):

	Pressure	Reservoir oil Temperature	Engine Speed	Flow Rate	Power
	MPa	°C	rev/min^{-1}	l/min	kW
Rated Engine Speed: (Manufactures Specification)			2100		
Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: Yes	20.62	61	2194		
Flow rate corresponding to a hydraulic pressure equivalent to 90 percent of the actual relief valve pressure setting and corresponding hydraulic power through two coupler pairs:	18.57	62	2177	129.1	40.0
Maximum available flow from one coupler pair:	5.24	61	2183	154.1	13.5
Maximum available power from one coupler pair:	14.47	63	2174	149.5	36.1
Maximum available flow from coupler pairs operating simultaneously (flow through two or more coupler pairs if required):	3.44	59	2185	179.8	10.3
Maximum power from coupler pairs operating simultaneously (flow through two or more coupler pairs if required):	17.06	61	2171	172.6	49.1

3.2 HYDRAULIC POWER AND LIFTING FORCE

3.2.1 Hydraulic Power Test – 85 cc pump

Date of Test: 21-Sep-06 Location of Test-City-State: Tractor Test Lab, Lincoln, NE, USA

Tractor Model: John Deere 8230 Tapping point used for test: Remote hydraulic outlets

3.2.1.1 Hydraulic Fluid Characteristics

Found in: **2.7.2 Specifications**

Viscosity at 65C - 25 cSt

3.2.1.2 Compulsory Report(Test Results):

	Pressure	Reservoir oil Temperature	Engine Speed	Flow Rate	Power
	MPa	°C	rev/min^{-1}	l/min	kW
Rated Engine Speed: (Manufactures Specification)			2100		
Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: Yes	20.48	76	2196		
Flow rate corresponding to a hydraulic pressure equivalent to 90 percent of the actual relief valve pressure setting and corresponding hydraulic power through two coupler pairs:	18.59	78	2175	159.0	49.3
Maximum available flow from one coupler pair:	4.78	76	2190	148.0	11.8
Maximum available power from one coupler pair:	14.81	76	2177	142.3	35.1
Maximum available flow from coupler pairs operating simultaneously (flow through two or more coupler pairs if required):	4.50	70	2181	240.4	18.0
Maximum power from coupler pairs operating simultaneously (flow through two or more coupler pairs if required):	16.61	78	2165	229.0	63.4

3.2.2 POWER LIFT TEST Category III, Walterscheid lower links with lifting cylinders (2) 100 mm dia.
Date of test: 22 June 2006.

	Hitch points	Frame
Lower hitch points above ground - down position:	230 mm	232 mm
Vertical movement - without load:	836 mm	874 mm
with load:	788 mm	817 mm
Maximum corrected force exerted through full range:	69.3 kN	68.2 kN
Corresponding pressure:	18.4 MPa	18.4 MPa
Moment about rear axle:	94.2 kNm	134.3 kNm
Maximum mast tilt angle	-	*3.0 degrees

Lifting height relative to horizontal position of lower links.

mm	-311	-309	-299	-197	-99	2	100	201	301	401	477	508
Corrected lift forces												
At the Hitch point kN	69.7	--	69.3	71.8	73.9	76.0	77.7	79.5	81.4	83.3	84.6	--
at the frame kN	--	75.1	74.2	73.5	73.2	73.3	73.0	72.5	71.5	70.0	68.8	68.2
Corresponding pressure 18.4 Mpa												

* maximum tilt angle available with settings on tractor

OECD (SI) UNBALLASTED FWA

OECD Drawbar Data (SI)

Date of tests:	26-Sep-06							Fuel density:	0.839 kg/l						
Type of track:	Concrete							Test number:	1885						
3.3.1 Maximum power in tested gears (unballasted, FWA)								Tire pressure:	131 kPa, rear	131 kPa, front		Drawbar Height:	559 mm		
Gear	Gear Designation	Power	Drawbar pull	Speed	Engine speed	Slip of wheels and/or tracks	Fan speed	Fuel		Temperature			Atmospheric conditions		
								Specific fuel consumption	Specific energy	Fuel	Coolant	Oil	Temperature	Relative humidity	Pressure
		kW	kN	km/h	min^{-1}	%	min^{-1}	g/kW.h	kW.h/l	°C	°C	°C	°C	%	kPa
*5	5	107.43	82.89	4.67	2154	10.4	1102	303	2.77	49	81	103	13	89	97.7
*6	6	124.28	85.07	5.26	2108	10.7	1084	286	2.93	49	81	103	12	88	97.7
7	7	134.97	77.95	6.23	2071	7.8	1068	269	3.11	49	82	105	13	89	97.7
8	8	141.19	72.06	7.05	2019	6.5	1010	265	3.17	51	88	109	19	68	97.6
9	9	148.20	67.98	7.85	1928	5.5	926	259	3.24	50	91	112	20	68	97.6
10	10	153.84	64.83	8.54	1805	4.9	949	253	3.32	52	90	109	16	79	97.6
11	11	153.97	55.41	10.00	1801	3.7	947	252	3.33	52	93	113	16	80	97.6
12	12	153.68	47.65	11.61	1801	3.0	1137	254	3.30	54	94	116	22	58	97.5
13	13	153.41	40.14	13.76	1799	2.4	1163	254	3.30	53	94	116	23	52	97.5
* Note: Slip within operating procedures of test station.															
3.3.2 Fuel consumption															
3.3.2.1	In selected gear/speed setting nearest 7.5 km/hr, at maximum power at rated engine speed														
8	8	134.49	64.90	7.46	2101	5.3	1083	268	3.14	51	85	106	18	84	97.6
3.3.2.1.1	75% of pull corresponding to maximum power at rated engine speed														
8	8	105.33	48.67	7.79	2156	3.6	1138	291	2.88	52	87	106	28	52	97.4
3.3.2.1.2	50% of pull corresponding to maximum power at rated engine speed														
8	8	71.54	32.48	7.93	2167	2.4	1141	338	2.48	54	86	106	28	49	97.4
3.3.2.1.3	Highest gear/speed setting at reduced engine speed able to achieve both 3.3.2.1.1 and 3.3.2.1.2; same pull and traveling speed as in 3.3.2.1.1														
10	10	105.30	48.69	7.79	1619	3.6	889	275	3.05	51	95	110	29	51	97.4
3.3.2.1.4	Same gear/speed selection as 3.3.2.1.3 at reduced engine speed; same pull and traveling speed as in 3.3.2.1.2														
10	10	71.41	32.48	7.91	1625	2.4	830	300	2.79	50	87	104	28	50	97.4
3.3.2.2	In selected gear/speed setting nearest between 7 km/hr and 10 km/hr at rated engine speed														
10	10	134.05	47.70	10.12	2101	2.9	1071	266	3.15	50	85	107	14	71	97.7
3.3.2.2.1	75% of pull corresponding to maximum power at rated engine speed														
10	10	103.99	35.73	10.48	2157	2.1	1124	294	2.85	50	88	108	24	46	97.5
3.3.2.2.2	50% of pull corresponding to maximum power at rated engine speed														
10	10	70.18	23.78	10.63	2169	1.4	1123	347	2.42	52	85	107	24	46	97.5
3.3.2.2.3	Highest gear/speed setting at reduced engine speed able to achieve both 3.3.2.2.1 and 3.3.2.2.2; same pull and traveling speed as in 3.3.2.2.1														
12	12	104.02	35.75	10.48	1610	2.9	807	276	3.04	48	94	108	26	39	97.5
3.3.2.2.4	Same gear/speed setting 3.3.2.2.3 at reduced engine speed; same pull and traveling speed as in 3.3.2.2.2														
12	12	70.31	23.89	10.60	1616	1.4	799	305	2.75	48	86	103	25	44	97.5

OECD (SI) UNBALLASTED FWA

OECD Drawbar Data (SI)

Date of tests:	26-Sep-2006							Fuel density:	0.839 kg/l						
Type of track:	Concrete							Test number:	1885						
4.1 Maximum power in tested gears (unballasted, FWA)								Tire pressure:	131 kPa, rear	131 kPa, front			Drawbar Height:	559 mm	
Gear	Gear Designation	Power	Drawbar pull	Speed	Engine speed	Slip of wheels and/or tracks	Fan speed	Fuel		Temperature			Atmospheric conditions		
								Specific fuel consumption	Specific energy	Fuel	Coolant	Oil	Temperature	Relative humidity	Pressure
		kW	kN	km/h	min^{-1}	%	min^{-1}	g/kW.h	kW.h/l	°C	°C	°C	°C	%	kPa
*5	5	106.53	82.67	4.64	2153	11.0	1098	304	2.76	50	81	103	13	89	97.7
6	6	123.56	84.46	5.27	2114	10.6	1077	289	2.91	49	81	104	12	88	97.7
7	7	130.90	74.67	6.31	2104	8.7	1081	275	3.05	48	87	108	21	65	97.6
8	8	134.49	64.90	7.46	2101	7.6	1083	268	3.14	51	85	106	18	71	97.6
9	9	134.38	55.48	8.72	2106	4.0	1087	269	3.12	49	88	110	21	65	97.6
10	10	134.05	47.70	10.12	2101	2.9	1071	266	3.15	50	85	107	14	84	97.7
11	11	132.27	40.28	11.82	2102	2.6	1089	269	3.12	51	86	110	17	75	97.6
12	12	132.15	34.76	13.68	2102	2.8	1083	272	3.09	50	91	111	22	61	97.6

* Note: Slip within operating procedures of test station.

OECD (SI) BALLASTED FWA

OECD Drawbar Data (SI)

Date of tests:	**04-Oct-06**					**Fuel density:**	**0.839 kg/l**							
Type of track:	**Concrete**					**Test number:**	**1885**							
4.2 Maximum power in tested gears (ballasted, FWA)							**Tire pressure:**	**90 kPa, rear**	**145 kPa, front**			**Drawbar Height:**	**559 mm**	
Gear Number and range	**Power**	**Drawbar pull**	**Speed**	**Engine speed**	**Slip of wheels and/or tracks**	**Fan speed**	**Fuel**		**Temperature**			**Atmospheric conditions**		
							Specific fuel consumption	**Specific energy**	**Fuel**	**Coolant**	**Oil**	**Temperature**	**Relative humidity**	**Pressure**
	kW	**kN**	**km/h**	**min^{-1}**	**%**	**min^{-1}**	**g/kW.h**	**kW.h/l**	**°C**	**°C**	**°C**	**°C**	**%**	**kPa**
4*	**123.64**	**109.63**	**4.06**	**2095**	**9.6**	**889**	**292**	**2.88**	**48**	**85**	**106**	**18**	**76**	**98.2**
5	**131.67**	**104.26**	**4.55**	**2053**	**7.9**	**881**	**280**	**3.00**	**49**	**86**	**107**	**17**	**75**	**98.3**
6	**141.86**	**99.97**	**5.11**	**1967**	**6.3**	**846**	**266**	**3.15**	**49**	**86**	**106**	**17**	**75**	**98.3**
7	**149.15**	**96.37**	**5.57**	**1834**	**5.6**	**806**	**262**	**3.20**	**50**	**92**	**112**	**16**	**79**	**98.3**
8	**151.91**	**85.45**	**6.40**	**1800**	**4.2**	**806**	**257**	**3.27**	**50**	**94**	**114**	**16**	**75**	**98.3**
9	**156.09**	**75.13**	**7.48**	**1802**	**3.2**	**792**	**251**	**3.34**	**49**	**91**	**109**	**16**	**79**	**98.4**
10	**155.95**	**64.74**	**8.67**	**1802**	**2.6**	**796**	**251**	**3.34**	**51**	**93**	**114**	**16**	**79**	**98.4**
11	**154.63**	**55.07**	**10.11**	**1800**	**2.1**	**796**	**252**	**3.33**	**49**	**91**	**111**	**16**	**79**	**98.4**
12	**153.93**	**47.31**	**11.71**	**1803**	**1.8**	**798**	**254**	**3.31**	**50**	**92**	**111**	**16**	**79**	**98.5**
13	**152.56**	**39.72**	**13.83**	**1800**	**1.5**	**796**	**256**	**3.27**	**51**	**96**	**117**	**16**	**79**	**98.5**

*** Note: Slip limited to avoid excessive bouncing.**

4.3 Measurement of External Noise Level – John Deere 8230

-- Date of Test	September 22, 2006
-- 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 km/h
-- Noise Level	87.2 dB(A)

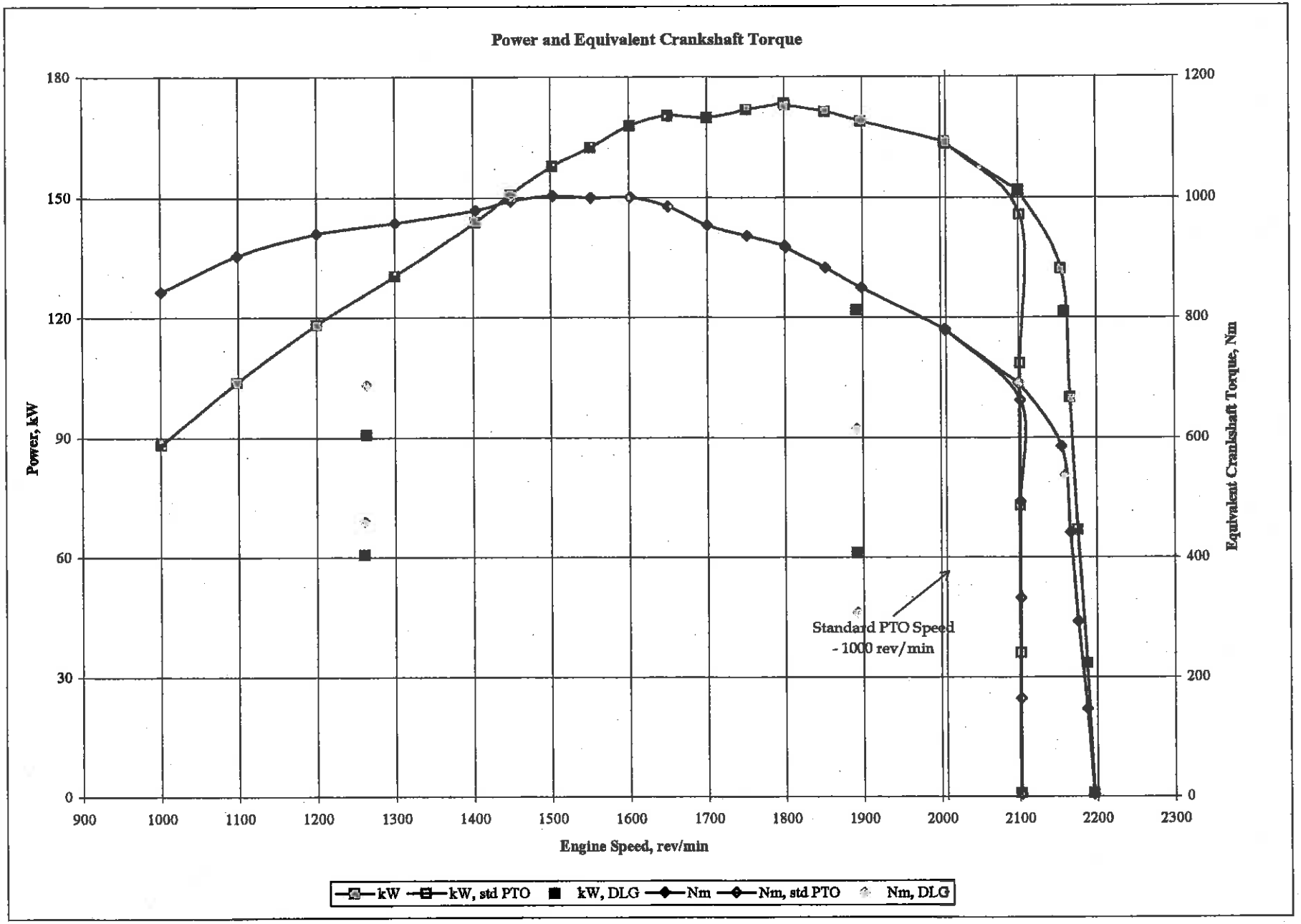
4.4 Measurement of Noise Level at Operator's Ear*

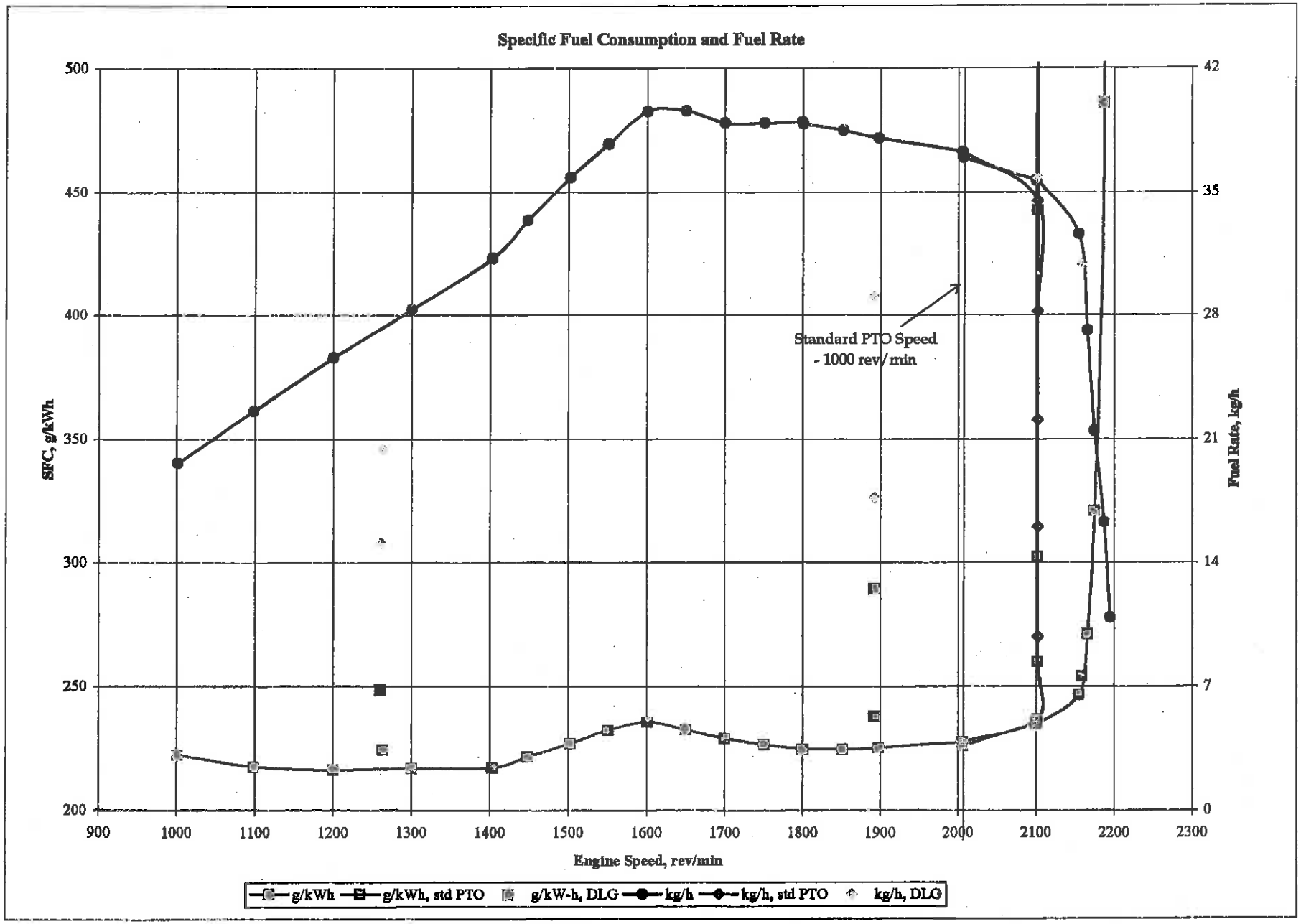
-- Date of Test	September 22, 2006
-- Location of Test	Nebraska Tractor Test Laboratory
-- Sound Level Meter	Bruel and Kjaer 2236
-- Type of Track	Concrete Oval
-- Gear Number	8
-- Drawbar Load	None
-- Noise at Operator Ear	72.0 dB(A) - front wheel drive engaged
	72.0 dB(A) - front wheel drive disengaged

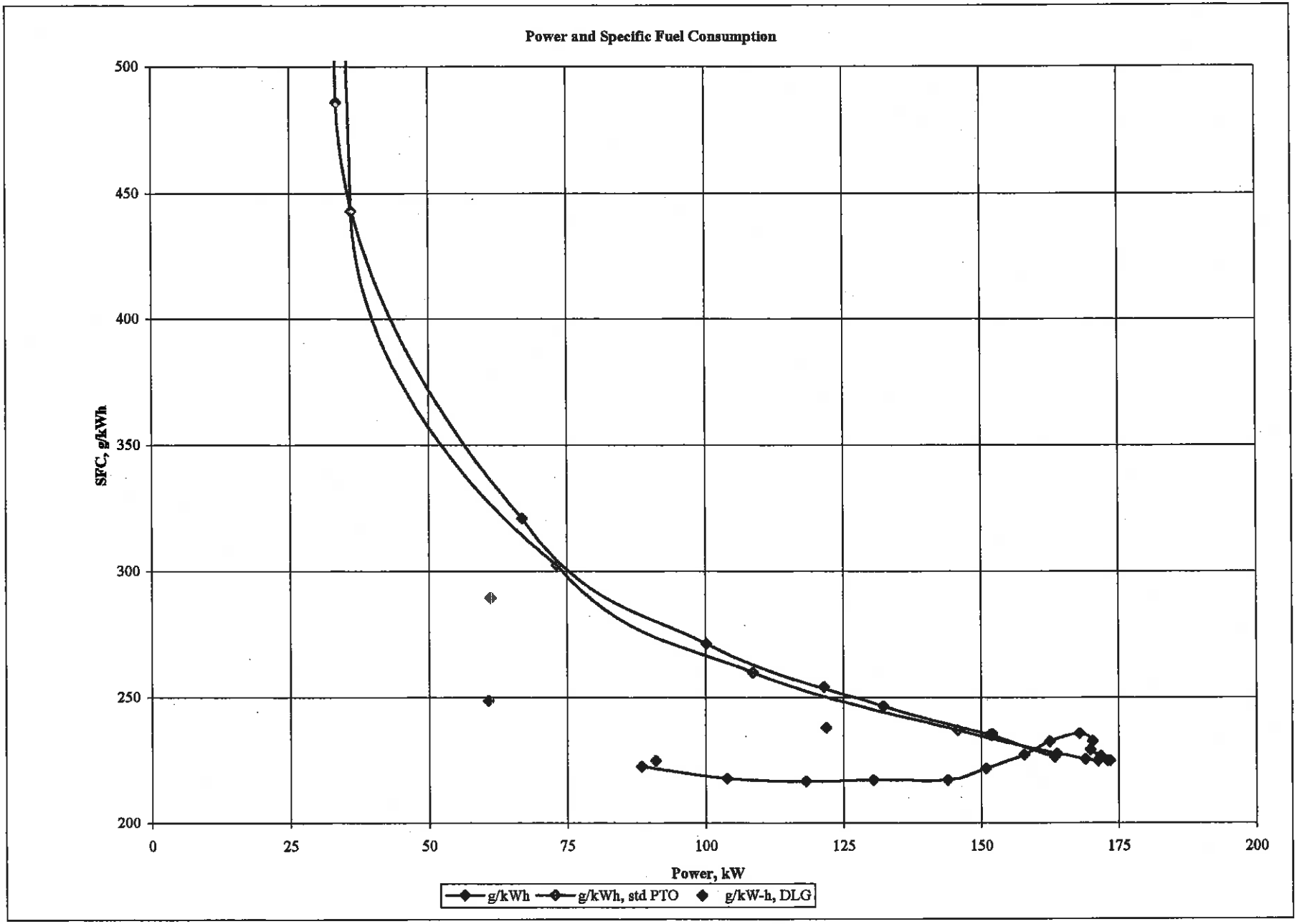
* Note: Nebraska tractor test station guidelines. Not covered by OECD approval

5. Repairs and Adjustments: None

6. Remarks: None


Power and Equivalent Crankshaft Torque
Power, kW
Equivalent Crankshaft Torque, Nm
Engine Speed, rev/min
180
150
120
90
60
30
0
1200
1000
800
600
400
200
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
Standard PTO Speed
- 1000 rev/min
kW
kW, std PTO
kW, DLG
Nm
Nm, std PTO
Nm, DLG


Specific Fuel Consumption and Fuel Rate
SFC, g/kWh
Fuel Rate, kg/h
Engine Speed, rev/min
Standard PTO Speed
- 1000 rev/min
500
450
400
350
300
250
200
42
35
28
21
14
7
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
g/kWh
g/kWh, std PTO
g/kW-h, DLG
kg/h
kg/h, std PTO
kg/h, DLG


Power and Specific Fuel Consumption
SFC, g/kWh
500
450
400
350
300
250
200
0
25
50
75
100
125
150
175
200
Power, kW
g/kWh
g/kWh, std PTO
g/kW-h, DLG