2.

Prüfstelle für Landmaschinen



REPORT on test in accordance with OECD No. 2/1833
OECD STANDARD CODE 2 for the *15th July 1999*
Official Testing of Agricultural Tractor Performance

Agricultural Tractor

John Deere 6110 NA PowrQuad (4WD)
Manufacturer
DEERE & COMPANY
Moline, Illinois, USA

This is a report on a tractor test in accordance with OECD STANDARD CODE for the Official Testing of Agricultural Tractor Performance "Yellow Code", January 1998, Code 2 (Restricted Code).

It does not contain an evaluation of the tractor on practical work.

Duration of tests: October 1998 till February 1999

DLG-Testing Station for Agricultural Machinery, Max-Eyth-Weg 1,
D-64823 Groß-Umstadt

This report has been approved by the OECD Co-Ordinating Centre (CEMAGREF, France)
as being in accordance with the OECD STANDARD CODE.

Date of approval: 15th July 1999 OECD No. 2/1833

In this report all performance characteristics are given corresponding to the International System of Units.

The reference to the former used Technical System of Units is given by the following relations:

Forces	1 kN	=	1000 N	=	102 kp
Powers			1 kW	=	1,36 PS
Pressures	1 MPa	=	10 bar	=	10,2 kp/cm^2
	100 kPa	=	1000 mbar	=	750,10 mm Hg

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DLG-No. 308

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JOHN DEERE 6110 PowrQuad (4WD) **DLG-Test No 98-323**

Tractor manufacturer:	DEERE & COMPANY Moline, Illinois, USA
Location of tractor assembly:	D-68163 Mannheim
Submitted for test by:	JOHN DEERE Werke Mannheim D-68163 Mannheim
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Mannheim and Groß-Umstadt
Duration of running-in:	engine 33 h, tractor 7 h
Location of test:	DLG-Testing Station, D-64823 Groß-Umstadt

1 SPECIFICATION OF TRACTOR

1.1 Identification

- Make/Model/Type:	JOHN DEERE / M / 6110 A / wheel tractor, full frame design
- Type denomination:	JOHN DEERE 6110 NA PowrQuad (4WD)
- Number of driving-wheels:	4
- Serial No.:	226165
- 1st serial No.:	202409

1.2 Engine

Make/Model/Type:	JOHN DEERE / 4045TL054 water-cooled 4-stroke Diesel-engine, direct injection, supercharged, antivibration mounted
Serial no.:	531808

1.2.1 Cylinders

Number/disposition:	4 / in line
Bore/stroke:	106.5 / 127 mm
Capacity:	4525 cm^3
Compression ratio:	16.9 : 1
Arrangement of valves:	Overhead valves
Cylinder liners:	Wet

1.2.2 Supercharging

- Make/Model/Type:	GARRETT / MOD T 300 / exhaust driven supercharger
- Pressure	65 ± 1 kPa

1.2.3	Fuel system	
	- Fuel feed system:	VDO electrical vane type fuel supply pump
	- Fuel filter	
	Make:	JOHN DEERE
	Type :	1 replaceable paper element filter
	- Capacity of fuel tank:	164 dm³
	- Injection pump	
	Make/Model:	LUCAS / 8920A731W (JD No. RE 501 222)
	Type :	DP 201, distributor injection pump
	Serial no.:	07596 FRG
	Manufacturer's production setting:	60.2 - 65.4 mm³/stroke at full load and rated speed;
	Flow rate:	16.6 - 18.1 dm³/h at 2300 min^{-1} and full load
	Timing:	Static 0°, dynamic 4° before TDC
	- Injectors	
	Make/Model:	STANADYNE / 28485
	Type :	Multi hole
	Injection pressure:	24.5 ± 0.5 MPa
1.2.4	Governor	
	- Make/Model/Type:	LUCAS / - / centrifugal variable speed governor
	- Governed range of engine speed:	850 ± 25 to 2460 ± 50 min^{-1}
	- Rated engine speed:	2300 min^{-1}
1.2.5	Air cleaner	
	- Pre-cleaner	
	Make/Model:	MANN & HUMMEL
	Type:	Cyclone type, incorporated in housing of main cleaner
	Location of air intake:	In front of engine, below bonnet
	- Main cleaner	
	Make/Model:	MANN & HUMMEL / PIKLON
	Type:	Dry paper element filter with safety cartridge
	- Maintenance indicator:	Warning light on dashboard
1.2.6	Lubrication system:	Pressure lubrication with engine oil/cooling water heat exchanger in engine block
	- Type of feed pump:	Gear pump
	- Type of filter:	Full flow
	- Number of filter:	1

1.2.7	Cooling system	
	- Type of coolant:	Water cooling
	- Type of pump:	Impeller pump
	- Specification of fan	
	Number of fan blades:	7
	Fan diameter:	550 mm
	- Coolant capacity:	17,5 dm³
	- Type of temperature control:	Thermostat and by-pass circuit, EATON viscous drive fan model 610, belt driven, variable fan speed controlled by air flow temperature
	- Superpressure system:	70 ± 20 kPa
1.2.8	Starting system	
	- Make/Model/Type:	BOSCH / IF / electrical, solenoid pre-engaged drive starter motor 3.0 kW
	- Cold starting aid:	Heating spiral in air intake manifold
	- Safety device:	Forward/reverse lever in neutral position at engine shut off
1.2.9	Electrical system	
	- Voltage:	12 V
	- Generator	
	Make/Model/Type:	BOSCH / 14V KC 45-90 A / 3-phase alternator
	Power:	1260 W
	- Battery:	1 lead acid battery, 154 Ah at 20 hours rating
1.2.10	Exhaust system	
	- Make/Model/Type:	EBERSPÄCHER / AL82411 / single-chamber absorption type
	- Location:	Above engine, below bonnet, mouth showing downward / to the right
1.2.11	Operating hours meter	Electronic, counts real hours when engine is running
1.3	**Transmission**	Universally-jointed propeller shaft between engine and gearbox
1.3.1	Clutch (travel alone)	
	- Make/Model/Type:	JOHN DEERE / - / wet multi-plate
	- Diameter of discs:	225 mm
	- Method of operation:	By pedal, mechanically, additionally assisted by low pressure hydraulic circuit

1.3.2 Gear box

- Make/Model/Type: JOHN DEERE / PowrQuad, 30 km/h / mechanical
- Description: Power shifted speed change gear with 4 speeds, synchronized range gear with 4 ranges (A, B, C, D) and power shifted forward/reverse gear
- Number of gears:

	forward	reverse
no. of gears	4	4
no. of ranges	4	4
total	16	16

3 levers

- Available options: PowrQuad (28/28) 30 km/h
with creeper gear (range D is locked)
PowrQuad (24/24) 40 km/h
identical with PowrQuad (16/16) 30 km/h, but 6 speed range gear without creeper gear,
or with creeper gear (36/36),ranges D, E and F are locked
SyncroPlus (12/4) 30 km/h
synchronized speed change gear with 3 forward speeds and 1 reverse speed
synchronized range gear with 4 ranges (A,B, C, D) without creeper gear
or with creeper gear (21/7), range D is locked
- Lubrication: Forced-feed lubrication, oil cooler in front of engine's water cooler

1.3.3 Rear axle and final drives

- Make/Model/Type: JOHN DEERE / - / bevel gear drive with bevel gear differential and planetary final drives
- Differential lock
  - Type: Multi-plate
  - Engagement: By foot switch
  - Disengagement: By pedal of service brake

1.3.4 Front axle and final drives

- Make/Model/Type: ZF / APL 2025 / bevel gear drive with bevel gear differential and planetary final drives, driven by wet multi plate clutch and propeller shaft in tractor's median plane, clutch electro-hydraulically operated by toggle switch through low pressure hydraulic circuit
- Differential lock
  - Type: Limited slip multi-plate type
  - Engagement: Automatic
  - Disengagement: Automatic

1.3.5 Total ratios and travelling speeds

Range	Gear	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed*) at rated engine speed 2300 min^{-1} km/h
Forward Speeds			
A	1	289.04	2.31
	2	240.02	2.78
	3	200.41	3.33
	4	163.60	4.08
B	1	143.95	4.64
	2	119.54	5.59
	3	99.81	6.69
	4	81.47	8.19
C	1	88.29	7.56
	2	73.31	9.09
	3	61.22	10.91
	4	49.97	13.36
D	1	41.06	16.26
	2	34.10	19.59
	3	28.47	23.45
	4	23.24	28.73
Reverse speeds			
A	1	243.71	2.74
	2	202.38	3.30
	3	168.98	3.95
	4	137.94	4.84
B	1	121.37	5.50
	2	100.79	6.63
	3	84.16	7.93
	4	68.70	9.72
C	1	74.44	8.97
	2	61.81	10.81
	3	51.62	12.93
	4	42.13	15.85
D	1	34.62	19.28
	2	28.75	23.23
	3	24.01	27.81
	4	19.60	34.07

*) calculated with the radius index (ISO 4251-1:1992) 770 mm

Number of revolutions of front wheels for one revolution of rear wheels: 1.3477

1.4 Power take-off

1.4.1 Main power take-off

- Type: Independent
- Method of engagement: Driven by wet multi-plate clutch with 197 mm dia; electrically-hydraulically operated by rotary switch through control valve, response of valve automatically controlled;
- Number of shafts: 1
- Method of changing power take-off shaft ends and speeds: None

1.4.1.1 Power take-off proportional to engine speed, 540 min^{-1}

- Location: At rear of tractor
- Diameter of p.t.o. shaft end: 35 mm
- Number of splines: 6, in conformity with ISO 500:1991, type 1
- Height above ground: 690 mm
- Distance from the median plane of the tractor: 0 mm
- Distance behind rear-wheel axis: 530 mm

p.t.o. type	p.t.o. transmission ratio	p.t.o. speed min^{-1}	Engine Speed min^{-1}	Power restriction kW
540	3.9333	540 585	2124 2300	-

- Direction of rotation (viewed from behind tractor): Clockwise

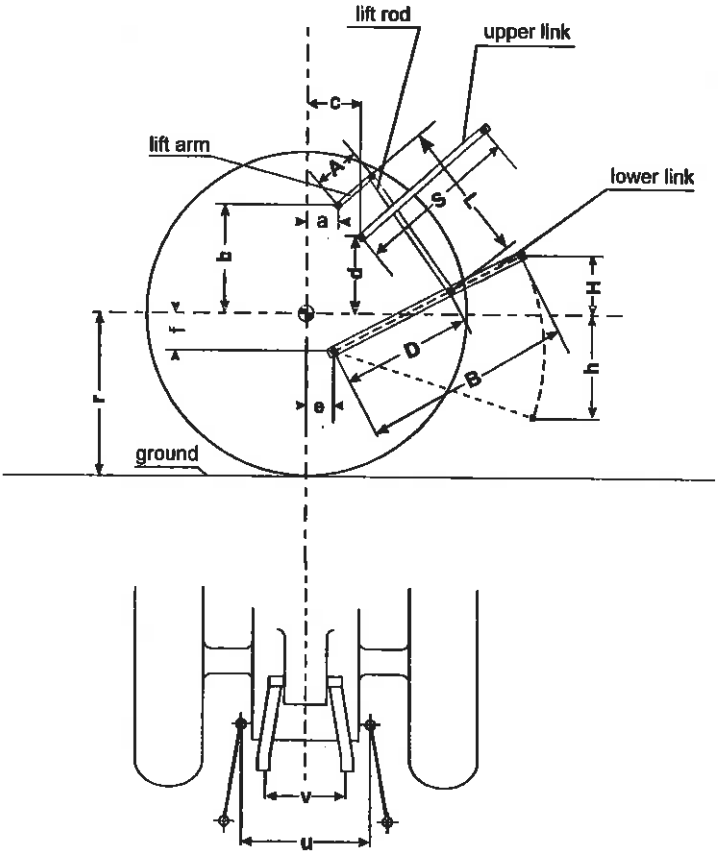
1.4.1.2 Power take-off proportional to ground speed: None

1.5 Hydraulic power lift

- Make/Model/Type:	JOHN DEERE / - / electronically controlled-hydraulic power lift; lower link sensing
- Type of hydraulic system:	Closed center, load sensing pressure and flow compensated system
- Type and Number of cylinders:	2 external cylinders, single acting, 65 mm bore, 175 mm stroke
- Type of linkage lock for transport:	Hydraulic, lock of valve lever
- Relief valve pressure setting:	19.2 to 20.7 MPa
- Opening pressure of cylinder safety valve:	No safety valve
- Lift pump type:	VICKERS PVE 19 variable displacement axial-piston pump with 96 dm^3/min delivery at rated speed, optionally available: axial-piston pump with 60 dm^3/min delivery at rated speed
- Transmission between pump and engine:	Gear driven by transmission
- Type and number of filters:	2 filters, 1 in feed line of hydraulic pump, 1 on transmission housing
- Site of oil reservoir:	Transmission housing
- Type, number and location of tapping points:	2, double acting, quick-action couplers at rear of tractor
- Maximum volume of oil available to external cylinders:	20 dm^3 stationary 10 dm^3 driving

1.6 Three-point linkage:

- Category: 2, in conformity with category 2 of ISO 730-1/1994, lower links extendable
- Category adapter: None



Dimensions of rear implement linkage			projected lengths in mm dimensions (general)	test-dimensions page 25
Rear tyres 18.4 R 34 Front tyres 14.9 – 24		(r) *) (r') *)	770 590	
Length of lift arms		(A)	305	305
Length of lower links		(B)	945	945
Distance of lift arm pivot points from rear wheel axis	horizontal vertical	(a) (b)	170 475	170 475
Horizontal distance between lower link pivot points		(u)	478	478
Horizontal distance between lift arm end points		(v)	535	535
Length of upper link		(S)	530 to 725	650
Distance of upper link pivot point from rear wheel axis	horizontal vertical	(c) (d)	460 188	460 188
Distance of lower link pivot points from rear wheel axis	horizontal vertical	(e) (f)	135 225	135 225
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	503	503
Length of lift rods		(L)	705 to 865	795

Heights (h, H, H') of lower link hitch points relative to rear wheel axis (situated 770 mm above ground), at different adjustments of L

These data are valid for unloaded power lift

Length of lift rods	(L)	705	795	865
Linkage distance of lift rods	(D)	503		
Lowest position	(h)	398	570	727
Highest position	(H)	225	75	-40
Transport position	(H')	225	75	-40

*) Assuming r resp. r' = tyre dynamic radius index of ISO 4251-1:1992

1.7 Swinging drawbar

- Type:	Longitudinally adjustable	
- Height above ground:		460 mm
- Type of height adjustment:	None	
- Distance of hitch point from rear-wheel axle		780, 880, 930, 1080 mm
- Distance of hitch point from power take-off shaft end		
Vertically		240 mm
Horizontally		250, 350, 400, 550 mm
- Lateral adjustment (centre of clevis)		
Right hand:		187 to 259 mm
Left hand:		187 to 259 mm
- Distance of pivot point from rear wheel axis, horizontally		0 mm
- Drawbar pin hole diameter		33 mm
- Maximum vertically permissible load (drawbar fully pushed in)		22.5 kN

1.8 Trailer hitch None

1.9 Holed drawbar None

1.10	**Steering**	
	- Make/Model/Type:	JOHN DEERE and DANFOSS / - / hydrostatic
	- Method of operation	
	Pump:	Steering system connected to main hydraulic circuit
	Ram:	1 integrated cylinder of symmetrical design; 224 mm stroke, 70 mm bore, 36 mm piston rod
	- Working pressure:	18.5 MPa
1.11	**Brakes**	
1.11.1	Service brake:	
	- Make/Model/Type:	JOHN DEERE / - / muscle power braking system, with hydraulic transmission
	- Method of operation:	Pedal operated, acting on rear wheels, front axle drive is automatically engaged when braking, oil-immersed disc brake with 1 ring-piston on each differential half shaft, disc 313 mm dia
	- Trailer braking take-off:	None
1.11.2	Parking brake	
	- Type:	Parking lock of transmission
	- Method of operation:	Range gear lever in "P"-position

1.12 Wheels

- Number

  Front: 2, driving and steering
  Rear. 2, driving

- Wheelbase: 2400 mm

- Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1520	2010	adjustable rims
Rear	1616	1912	adjustable rims

1.12.1 - Possible combinations of tyres sizes

Front	Rear
13.6 – 38 (D)	13.6 – 46 (D)
12.4 – 28 (R)	18.4 – 38 (D/R)
13.6 – 28 (D/R) 12.4 – 28 (R) 14.9 – 24 (D/R)	16.9 – 38 (D/R)
14.9 – 24 (D/R) 13.6 – 24 (D/R) 12.4 – 28 (R) 12.4 - 24 (D)	18.4 – 34 (D/R)
11.2 – 28 (D)	12.4 – 42 (D)
13.6 – 24 (D)	15.5 – 38 (D)
12.4 – 24 (D)	18.4 – 30 (D)
13.6 – 24 (D/R)	16.9 – 34 (D/R)
11.2 – 28 (D)	13 6 – 38 (D)
12.4 - 24 (D)	16.9 - 30 (D)

D: diagonal type, R: radial type

1.13 Protective structure

- Make/Model/Type:	JOHN DEERE / SG 048 (1997) / safety cab with integrated safety frame RG 017	
- Manufacturer's name and address:	DEERE & COMPANY, Moline, Illinois, USA	
- Protective device:	Cab, mounted by antivibration silent-blocks, for service (repair) by separate device tiltable to the side	
- OECD approval		
Approval number:	4/0452/1	
Date of approval:	8th February 1999	
- Noise reduction materials		
Roof:	Foam with perforated vinyl-coating on carrier board	23 mm
Steering column and instrument panel:	Moulded plastics and sheet metal	
A-posts,C-posts and upper part of rear wall:	Vinyl foam foil with hard foam substrate	9 mm
B-posts:	Plastics	6 mm
Rear wall, sheet metal:	Composite material and sound barrier	9 mm
Floor:	Moulded rubber mat partially	35 mm 8 mm
Seat support:	Moulded rubber mat	8 mm
Bulk head (engine side):	Foam with alu-foil	10 mm
Left hand fender:	Foam with vinyl-coating plus substrate	5 mm
Right hand fender:	Foam with vinyl-coating	25 mm
- Heating/ventilation	Combined heating/ventilation system with air conditioner and 4-step blower, cooling-water heat exchanger below cab's floor, air intake at left and right above side windows air outlet jets and defroster louvers in the steering console, 2 recirculation louvers behind the seat	

1.14 Seat

1.14.1 Driver's seat

- Make/Model:	Grammer / MSG 95/731	
- Type:	Upholstered seat with backrest	
- Seat and steering wheel reversible:	No	
- Type of suspension:	Pneumatic suspension	
- Type of damping:	Hydraulic	
- Range of adjustment		
Longitudinally:		195 mm
Vertically:	above platform	380 to 565 mm
- Safety belt:	Yes	

1.14.2 Optional driver's seats: Available

1.14.3 Passenger seat: No

1.15 Lighting

Electrical, 12 Volt

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1300	162x101	225
Additional upper worklights, 2 pairs	2610	135x50	440, 280
Sidelights	-	-	-
Rearlights	1750	210x48	884
Reflectors	SMV-sign		

2. TEST CONDITIONS

2.1 Overall dimensions

Length	Width	Height at top of	
		protective structure	exhaust silencer pipe
mm	mm	mm	mm
4160	2200	2670	-

2.2 Ground clearance 380 mm

- Clearance-limiting part: Bracket of swinging drawbar

2.3 Tractor mass Unballasted (with cab)

	Without driver kg	With driver kg
Front	1630	1645
Rear	2670	2730
Total	4300	4375

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	FIRESTONE	FIRESTONE
dimensions	14.9 - 24	18.4 R 34
ply rating/load index speed index	6 ply	139 A8
type	diagonal ply	radial ply
maximum load (tyre manufacturer's)	13.60 kN	26.00 kN
at travelling speed	30 km/h	30 km/h
at tyre inflation pressure	190 kPa	120 kPa
radius index (ISO 4251-1/1992)	590 mm	770 mm
Chosen track width:	1620 mm	1716 mm
Technically permissible axle load:	30 kN	56 kN
Technically permissible total weight:	70 kN	

2.6 Fuel

- Type: ARAL-Diesel-fuel, in conformity with DIN 51601
- Density at 15°C: At p.t.o. power tests 0.843 g/cm³
  at drawbar power tests 0.837 g/dm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity dm³	Oil change h	Filter-change h
Engine	12	250	250
Gear box, rear axle, hydraulic system and steering	49	1500	750
Front axle	5	1500	-
Final drives at front, each	0.8	1500	-

2.7.2 Specifications:

	Recommended	Used during test
Engine oil:		
Type	engine oil	FUCHS TITAN
Viscosity	20W40, 15W40, 10W40, 5W30, 0W40	0W40
Classification	API CG-4 or CF-4	API CF-4
Transmission oil:		
Used in gearbox, rear axle, hydraulic- and steering system		
Type	Transmission oil	JOHN DEERE
Viscosity	SAE 75	HY-GARD
Classification	JDM J 20 C or J 20 D	J 20 C
used in front axle and front final drives		
Type	Transmission oil	JOHN DEERE
Viscosity	SAE 80W/90	HY-GARD
Classification	JDM J 20 C or J 20 D	J 20 C

2.7.3 Grease

- number of lubrication points: 18

3 COMPULSORY TESTS

3.1. MAIN POWER TAKE OFF PERFORMANCE (540 min^{-1})

Date of tests: 22nd October 1998
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fuel consumption hourly dm³/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/dm³
Maximum power						
3.1.1 At 2-hour test						
53.0	1800	458	15.17	12.79	242	3.56
3.1.2 At rated speed						
50.5	2300	585	16.98	14.31	284	2.97
3.1.3 At standard p.t.o. speed						
51.8	2124	540	16.16	13.62	263	3.20
3.1.4 Part loads, the governor hand lever in the position corresponding to maximum power at full load (curve a)						
3.1.4.1 the torque corresponding to maximum power at rated speed						
50.5	2300	585	16.98	14.31	284	2.97
3.1.4.2 85% of the torque obtained in 3.1.4.1						
44.3	2371	603	16.16	13.62	308	2.74
3.1.4.3 75% of the torque defined in 3.1.4.2						
33.4	2387	607	13.87	11.69	350	2.41
3.1.4.4 50% of the torque defined in 3.1.4.2						
22.4	2407	612	11.39	9.60	428	1.97
3.1.4.5 25% of the torque defined in 3.1.4.2						
11.3	2426	617	8.75	7.38	652	1.29
3.1.4.6 unloaded						
-	2443	621	6.27	5.28	-	-

P.T.O. Test

Power kW	Speed Engine min⁻¹	Speed P.t.o. min⁻¹	Fuel consumption hourly dm³/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/dm³
3.1.5 Part loads, the governor hand lever in the position corresponding to standard p.t.o. speed at full load (curve b)						
3.1.5.1 the torque corresponding to maximum power						
51.8	2124	540	16.16	13.62	263	3.20
3.1..2 85% of the torque obtained in 3.1.5.1						
45.2	2179	554	14.90	12.56	278	3.03
3.1.5.3 75% of the torque defined in 3.1.5.2						
34.4	2206	561	12.70	10.71	312	2.71
3.1.5.4 50% of the torque defined in 3.1.5.2						
23.1	2226	566	10.65	8.98	390	2.16
3.1.5.5 25% of the torque defined in 3.1.5.2						
11.7	2253	573	7.81	6.58	562	1.50
3.1.5.6 unloaded						
-	2274	578	5.54	4.67	-	-

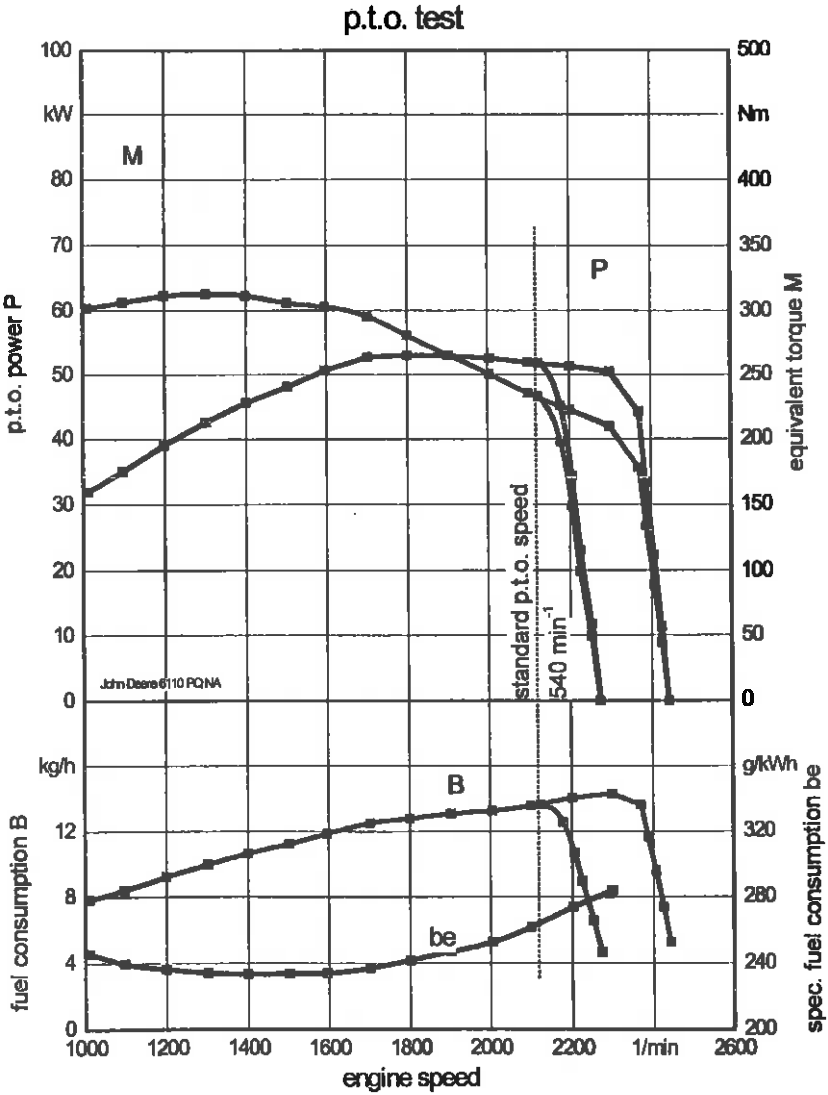
No load maximum engine speed:	2443 min⁻¹
Equivalent flywheel torque at rated engine speed:	209 Nm
Equivalent flywheel torque at 2-hour test:	281 Nm
at engine speed:	1800 min⁻¹
Maximum equivalent flywheel torque:	313 Nm
at engine speed:	1301 min⁻¹

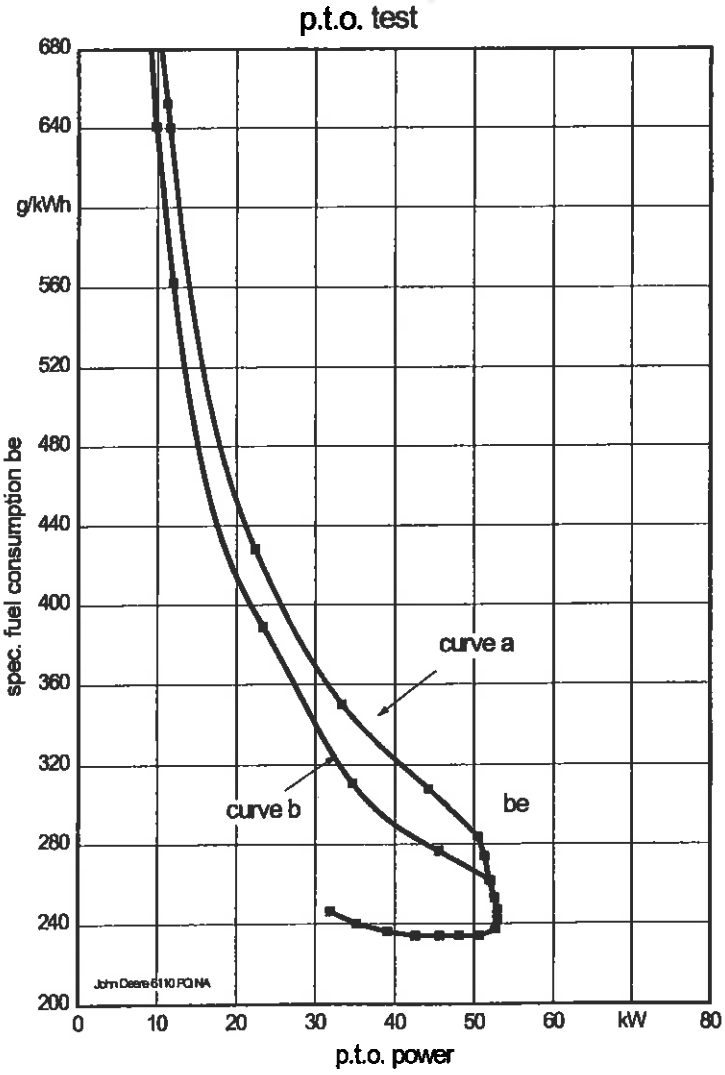
Mean atmospheric conditions

temperature:	19 °C
pressure:	1004 hPa
relative humidity:	51 %

Maximum temperatures

coolant:	85 °C
oil:	94 °C
fuel:	62 °C
air intake:	19 °C


p.t.o. test
p.t.o. power P
kW
M
P
equivalent torque M
Nm
standard p.t.o. speed
540 min-1
John Deere 6110 PQ NA
fuel consumption B
kg/h
B
be
spec. fuel consumption be
g/kWh
engine speed
1/min
100
80
70
60
50
40
30
20
10
0
500
400
350
300
250
200
150
100
50
0
12
8
4
320
280
240
200
1000
1200
1400
1600
1800
2000
2200
2600


p.t.o. test
680
640
g/kWh
560
520
480
440
400
360
320
280
240
200
spec. fuel consumption be
curve a
curve b
be
John Deere 6110 PQ NA
0
10
20
30
40
50
60
kW
80
p.t.o. power

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 12th February 1999

3.2.1 Hydraulic power test

- Sustained pressure with relief valve open 20.0 MPa
- Pump delivery rate at minimum pressure 103.3 dm^3/min

	Hydraulic power kW	Flow rate dm^3/min	Pressure MPa	Oil Temperature °C
At 90% of the actual relief valve setting	18.9	62.8	18.0	65
Maximum	25.2	96.0	16.0	65

- Tapping point used for test: At rear of tractor

3.2.2 Power lift test

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	200 mm	
Vertical movement without lifting forces with lifting forces	645 mm 602 mm	845 mm 775 mm
Max. corrected force exerted through full range	20.95 kN	18.10 kN
Corresponding pressure	18.6 MPa*)	
Moment about rear axle	-	30.59 kNm
Max. tilt angle of mast from vertical		11

Lifting heights relative to horizontal lower links

mm	-420	-400	-345	-300	-200	-100	0	100	200	257	300	355
Lifting forces at hitch points. Corrected to 18.6 MPa												
kN			20.95	22.60	25.85	28.40	30.55	32.40	34.05	34.70		
Lifting forces at standard frame. corrected to 18.6 MPa												
kN	18.10	18.65		20.50	21.60	22.50	22.70	22.70	22.65		22.20	21.60

*)max. pressure in lifting cylinders: 20.7 MPa

3.3 DRAWBAR PERFORMANCE

- Date of test: 2nd till 4th December 1998
- Type of track:: Concrete

Gear number and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption
	kW	kN	km/h	min^{-1}	%	g/kWh
3.3.1	MAXIMUM POWER IN TESTED GEARS (unballasted tractor)					
3 A	37.9	46.55	2.93	2344	15.0	369
4 A	39.9	45.13	3.18	2054	15.1	339
1 B	43.0	34.65	4.46	2295	5.4	332
2 B	45.5	40.02	4.09	1805	7.9	282
3 B	46.0	33.06	5.01	1803	6.2	277
1 C	45.7	28.85	5.70	1802	4.6	279
4 B	45.6	26.19	6.27	1796	4.1	279
2 C	46.1	23.80	6.98	1801	3.5	276
3 C	45.8	19.58	8.42	1804	2.9	277
4 C	45.1	15.54	10.45	1802	2.3	284
3.3.2	FUEL CONSUMPTION					
3.3.2.1	in selected gear, at maximum power at rated speed					
2 C	42.7	16.95	9.06	2305	2.3	337
3.3.2.1.1	75 % of pull at maximum power at rated speed					
2 C	33.2	12.72	9.40	2378	1.6	378
3.3.2.1.2	50 % of pull at maximum power at rated speed					
2 C	22.3	8.46	9.51	2397	1.0	478
3.3.2.1.3	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1					
3 C	33.2	12.78	9.36	1974	1.7	320
3.3.2.1.4	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2					
3 C	22.1	8.41	9.46	1990	1.4	423
3.3.2.2	in selected gear nearest to 7.5 km/h					
1 C	43.6	21.07	7.45	2300	3.2	329
3.3.2.2.1	75 % of pull at maximum power at rated speed					
1 C	34.2	15.89	7.75	2376	2.3	377
3.3.2.2.2	50 % of pull at maximum power at rated speed					
1 C	23.1	10.53	7.89	2396	1.5	456
3.3.2.2.3	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1					
4 B	34.1	15.82	7.76	2195	1.9	347
3.3.2.2.4	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2					
4 B	23.1	10.53	7.90	2217	1.1	437

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
unballasted	450 mm	80 kPa	80 kPa

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/dm³	°C	°C	°C	°C	%	kPa
2.26	62	85	94	6	90	100.4
2.47	62	81	93	7	90	100.4
2.52	52	84	91	6	90	100.4
2.97	61	86	92	6	90	100.4
3.02	64	85	91	8	90	100.4
3.00	64	85	91	5	90	100.4
3.00	63	85	91	4	90	100.4
3.03	64	86	91	5	90	100.4
3.02	63	85	91	3	90	100.4
2.94	60	85	91	3	90	100.4
2.49	55	85	92	5	80	100.2
2.21	61	83	92	7	80	100.2
1.75	62	82	92	5	80	100.2
2.61	58	84	88	6	80	100.2
1.98	57	82	86	4	80	100.2
2.54	62	85	94	6	80	100.2
2.22	64	83	93	7	80	100.2
1.83	62	81	91	7	80	100.2
2.41	58	82	91	4	80	100.2
1.92	59	81	89	3	90	100.2

4 ADDITIONAL TESTS under the responsibility of the DLG Testing Station

Noise test at the driver's ear level (measured acc. to OECD Code 5)

4.1 Results of sound level test - "Under load" procedure

Date of test: 7th December 1998
Type of track: Concrete
Type of sound level meter: BRÜEL & KJAER model 2233

Gear number	Drawbar pull	Engine Speed	Measured travelling speed	Number of driving wheels	Sound level
	kN	min^{-1}	km/h	no	dB(A)
4.1.1 Test with the drawbar pull for which the tractor gives the maximum sound level (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))					
4.1.1.1 All openings closed					
1 C	20.93	2298	7.45	4	73.0
2 C	17.19	2299	9.01	4	74.0
3 B	26.17	2306	6.55	4	74.0
1 C	19.79	2306	7.20	2	73.0
4 B	18.64	2305	8.01	2	74.0
4.1.1.2 All openings open					
1 C	20.09	2302	7.45	4	81.0
2 C	18.14	2305	9.07	4	82.0
3 C	14.80	2302	10.83	4	82.5
4 C	10.81	2312	13.45	4	82.5
1 C	21.68	2313	7.35	2	80.5
4 B	19.14	2299	7.96	2	81.5
2 C	17.96	2303	8.91	2	81.5
3 C	14.65	2314	10.77	2	82.0
4 C	12.36	2303	13.30	2	82.0
1 D	9.92	2296	16.12	2	82.5

4.1.2 **Unloaded test in the gear giving the forward speed nearest to 7.5 km/h**

4.1.2.1 All openings closed

Gear number	Drawbar pull	Engine Speed	Measured travelling speed	Number of driving wheels	Sound level
	kN	min^{-1}	km/h	no	dB(A)
1 C	0	2440	8.16	4	72.0
1 C	0	2447	8.21	2	72.0

4.1.2.2. All openings open

1 C	0	2447	8.16	4	80.0
1 C	0	2445	8.11	2	79.0

4.1.3 Unloaded test in the gear giving the maximum forward speed

4.1.3.1 All openings closed

4 D	0	high idle	30.08	2	74.0

4.1.3.2 All openings open

4 D	0	high idle	30.08	2	82.0

5	**REPAIRS**	**None**
6	**REMARKS**	**None**

Head of tractor test section

Dipl.-Ing. Manfred Lober

Date: 30th August 1999

Deutsche Landwirtschafts-Gesellschaft

Test carried out by

Dipl.-Landw. Friedrich Uhlig



Impulse für den Fortschritt

Deutsche Landwirtschafts-Gesellschaft e.V.
Prüfstelle für Landmaschinen
Max-Eyth-Weg 1, D-64823 Groß-Umstadt
Telefon: 06078 / 96 35 0 Fax: 06078 / 96 35 90
E-mail: Tech@DLG-Frankfurt.de, internet: http://www.dlg-frankfurt.de