Prüfstelle für Landmaschinen



REPORT on test in accordance with OECD STANDARD CODE 2 for the Official Testing of Agricultural Tractor Performance

OECD No. 2/1883
4th February 2000

Agricultural Tractor

John Deere 6910-140 PS AutoQuad(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: July 1998 till September 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: 4th February 2000

OECD No. 2/1883
Restricted Code

This is a report on a retest on the tractor JOHN DEERE 6910 AutoQuad (4WD), OECD approved with No. 2/1824 of 29th April 1999. The originally tested tractor (serial no. 217615 was fitted with an engine of higher power setting. With this modified engine a retest was made.

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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JOHN DEERE 6910-140 PS AutoQuad (4WD) **DLG-Test No 99-219**

Tractor manufacturer:	DEERE & COMPANY Moline, Illinois, USA
Location of tractor assembly:	D-68163 Mannheim
Submitted for test by:	JOHN DEERE Werke Mannheim D-68163Mannheim
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Mannheim and Groß-Umstadt
Duration of running-in:	engine 55 h, tractor 129 h
Location of test:	DLG-Testing Station, D-64823 Groß-Umstadt

1 SPECIFICATION OF TRACTOR

1.1 Identification

- Make/Model/Type:	JOHN DEERE / M / 6910 A-140 PS / wheel tractor, full frame design
- Type denomination:	JOHN DEERE 6910 A-140 PS AutoQuad (4WD)
- Number of driving- wheels:	4
- Serial No.:	217615
- 1st serial No.:	254824

1.2 Engine

Make/Model/Type:	JOHN DEERE / 6068TL054 water-cooled 4-stroke Diesel-engine, direct injection, supercharged, antivibration mounted
Serial no.:	546479

1.2.1 Cylinders

Number/disposition:	6 / in line
Bore/stroke:	106.5 / 127 mm
Capacity:	6788 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 35004 / exhaust driven supercharger
- Pressure	74 ± 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:	250 dm³
	- Injection pump	
	Make/Model:	LUCAS / 8921A840W (JD No. RE 502 414)
	Type :	DP 201, distributor injection pump
	Serial no.:	45898LRG
	Manufacturer's production setting:	70.5 - 77.6 mm³/stroke at full load and rated speed;
	Flow rate:	26.5 - 29.3 dm³/h at full load and rated speed
	Timing:	Static 5.5° ± 5°, dynamic 6.0° before TDC
	- Injectors	
	Make/Model:	STANADYNE / 28485
	Type :	Multi hole
	Injection pressure:	25.5 ± 0.5 MPa
1.2.4	Governor	
	- Make/Model/Type:	LUCAS / - / electronically controlled variable speed governor with "cruise control", supercharge pressure compensating device
	- Governed range of engine speed:	850 ± 25 to 2240 ± 50 min^{-1}
	- Rated engine speed:	2100 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:	15.5 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:	1680 W
	- Battery:	1 lead acid battery, 154 Ah at 20 hours rating
1.2.10	Exhaust system	
	- Make/Model/Type:	ROTH / AL113911 / single-chamber absorption ty
	- Location:	Above engine, below bonnet, vertical stack, mout showing upwards/forward
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 / AutoQuad, 40 km/h / mechanical
- Description: Power shifted speed change gear with 4 speeds, automatic shifting selectable, synchronized range gear with 5 ranges (A, B, C, D, E) and power shifted forward/reverse gear ("power reverser")
- Number of gears:

	forward	reverse
no. of gears	4	4
no. of ranges	5	5
total	20	20

1 range shift lever with 2 buttons for powershift, 1additional rocker switch for alternative power shifting, 1 rocker switch for automatic speed shift, 1 lever for power reverser left of steering wheel

- Available options: PowrQuad (16/16) 30 km/h with creeper gear (range D, E is locked)
- Lubrication: Forced-feed lubrication, oil cooler in front of engine's water cooler, 2 filters

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 foot pedal of service brake

1.3.4 Front axle and final drives

- Make/Model/Type: SPICER / off highway axle SPA / JD S 20 / bevel gear drive with bevel gear differential and planetary final drives, hydropneumatic suspension, 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 2100 min^{-1} km/h
Forward Speeds			
A	1	270.03	2.51
	2	224.10	3.02
	3	187.23	3.62
	4	152.84	4.43
B	1	127.40	5.31
	2	105.73	6.40
	3	88.34	7.66
	4	72.11	9.39
C	1	80.06	8.46
	2	66.44	10.19
	3	55.51	12.19
	4	45.31	14.94
D	1	43.24	15.65
	2	35.89	18.86
	3	29.98	22.58
	4	24.47	27.66
E	1	29.19	23.19
	2	24.22	27.94
	3	20.24	33.45
	4	16.52	40.97
Reverse speeds			
A	1	227.68	2.97
	2	188.96	3.58
	3	157.87	4.29
	4	128.87	5.25
B	1	107.42	6.30
	2	89.15	7.59
	3	74.48	9.09
	4	60.80	11.13
C	1	67.50	10.03
	2	56.02	12.08
	3	46.80	14.46
	4	38.21	17.72
D	1	36.46	18.57
	2	30.26	22.37
	3	25.28	26.78
	4	20.64	32.80
E	1	24.61	27.50
	2	20.42	33.14
	3	17.06	39.67
	4	13.93	48.59

*) calculated with the radius index (ISO 4251-1:1992) 855 mm

Number of revolutions of front wheels for one revolution of rear wheels: 1.3452

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: Reversible shaft with 2 different stubs, speed shiftable by separate lever

1.4.1.1 Power take-off proportional to engine speed, 540, 540 E and 1000 min^{-1}

- Location: At rear of tractor
- Diameter of p.t.o. shaft end: 35 mm
- Number of splines: 6 (540 min^{-1}) , type 1
  21 (1000 min^{-1}), type 2
- Height above ground: 787 mm
- Distance from the median plane of the tractor: 0 mm
- Distance behind rear-wheel axis: 587 mm

p.t.o. type	p.t.o. transmission ratio	p.t.o. speed min^{-1}	engine speed min^{-1}	power restriction kW
540	3.6944	540 568	1995 2100	-
540 E*)	3.2278	540 651	1743 2100	
1000	2.0000	1000 1050	2000 2100	-

*) "economic speed"

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

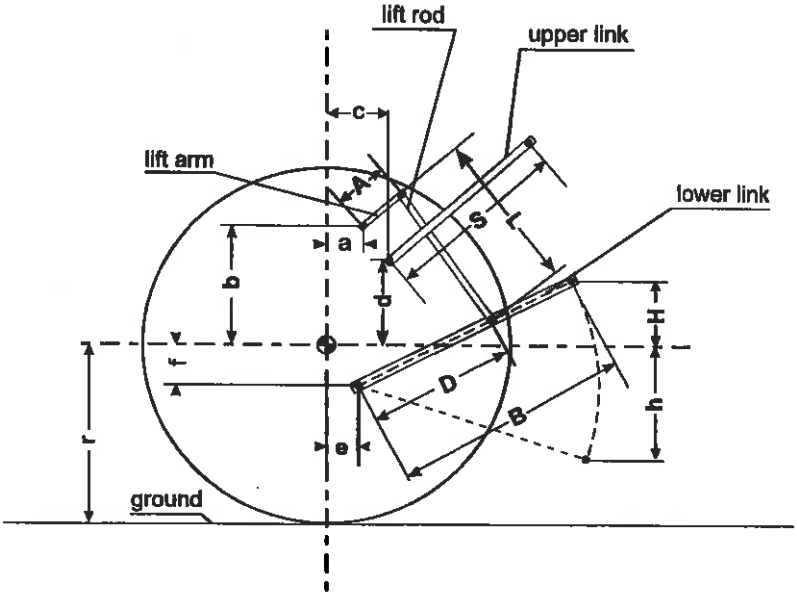
1.4.1.2 Power take-off proportional to ground speed: None

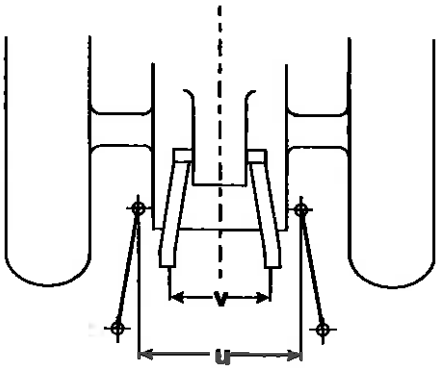
1.5 Hydraulic power lift

- Make/Model/Type:	JOHN DEERE / - / electronic-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, 80 mm bore, 226.5 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:	20.8 to 22.2 MPa
- Lift pump type:	VICKERS PVE 12 variable displacement axial-piston pump with 60 dm^3/min delivery at rated speed; optionally available: axial-piston pump with 96 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 feeding 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:	25 dm^3 stationary 15 dm^3 driving

1.6 Three-point linkage:

- Category: 3, In conformity with category 3 of ISO 730-1/1994, WALTERSCHEID quick couplers
- Category adapter: None





Dimensions of rear implement linkage			projected lengths in mm dimensions (general)	test-dimensions page 25	page 3
Rear tyres 650/65 R 38 Front tyres 540/65 R 28		(r) *) (r') *)	855 670		
Length of lift arms		(A)	400	400	400
Length of lower links		(B)	960	960	96
Distance of lift arm pivot points from rear wheel axis	horizontal vertical	(a) (b)	185 535	185 535	185 535
Horizontal distance between lower link pivot points		(u)	510	510	510
Horizontal distance between lift arm end points		(v)	644	644	644
Length of upper link		(S)	585 to 782	670	650
Distance of upper link pivot point from rear wheel axis	horizontal vertical	(c) (d)	465 222, 276, 342	465 276	465 342
Distance of lower link pivot points from rear wheel axis	horizontal vertical	(e) (f)	160 245	160 245	160 245
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	553, 660	553	660
Length of lift rods		(L)	885 to 1024	955	885

Heights (h, H, H') of lower link hitch points relative to rear wheel axis (situated 855 mm above ground), at different adjustments of L and D

These data are valid for unloaded power lift

Length of lift rods	(L)	885	955	1024	885
Linkage distance of lift rods	(D)	553			660
Lowest position	(h)	495	625	740	412
Highest position	(H)	195	85	-20	195
Transport position	(H')	195	85	-20	195

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

1.7	**Swinging drawbar**	None, available
1.8	**Trailer hitch**	
	Make/Model/Type	ROCKINGER / 850 R / automatic, remote control
	Pin diameter:	30 mm
	- Height above ground:	Centre of clevis adjustable in 9 steps to 495/540/590/655/710/830/885/940/1000 mm
	- Distance of hitch point from rear-wheel axis, horizontal:	780 mm
	- Distance of hitch point from power take-off shaft end	
	Vertical	below 292/247/197/132/77 mm above 43/98/153/213 mm
	Horizontal	193 mm
	- Maximum vertically permissible load:	20.0 kN
1.9	**Holed drawbar**	None, available

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; 270 mm stroke, 80 mm bore, 42 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 335 mm dia
- Trailer braking take-off:	Compressed air braking system, one line and two line system couplings at rear of tractor WABCO compressor , belt driven by engine crankshaft

1.11.2 Parking brake

- Type:	Parking lock of transmission
- Method of operation:	Range gear lever in „P"-position
and	
- Type:	Mechanical, separate band brake in gear box
- Method of operation:	Hand lever with ratchet

1.12 Wheels

- Number

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

- Wheelbase: 2650 mm

- Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1814	2110	adjustable bowl wheels and spacers
Rear	1824	2028	

1.12.1 - Possible combinations of tyres sizes

Front	Rear
16.9 R 28 420/85 R 28	20.8 R 38
420/85 R 28 480/70 R 28 420/70 R 28	520/85 R 38
480/70 R 28	580/70 R 38
420/70 R 28 14.9 R 28	18.4 R 38
420/70 R 28 14.9 R 28	460/85 R 38
480/65 R 28	600/65 R 38
420/70 R 28	520/70 R 38
540/65 R 28	650/65 R 38

1.13 Protective structure

- Make/Model/Type:	JOHN DEERE / SG 049 (1997) with integrated safety frame RG 023 / safety cab	
- 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:	4/0453/1	
Date of approval:	18th March 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 substrat	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 back rest	
- 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: optionally available with or without suspension on left mudguard

Capacity: 1

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	1393	150x90	217
Additional upper headlights	2005	135x75	875
Sidelights	1857	110x35	870
Rearlights	1880	210x48	888
Reflectors 1st pair	1880	214x48	888
Reflectors 2nd pair	915	Ø 75	520

2. TEST CONDITIONS

2.1 Overall dimensions

Length	Width	Height at top of	
		protective structure	exhaust silencer pipe
mm	mm	mm	mm
4590	2440	2887	2876

2.2 Ground clearance 480 mm

- Clearance-limiting part: Bracket of trailer hitch

2.3 Tractor mass Unballasted (with cab)

	Without driver kg	With driver kg
Front	2480	2500
Rear	3640	3695
Total	6120	6195

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	MICHELIN	MICHELIN
dimensions	540/65 R 28	650/65 R 38
load index speed index	137 A8	154 A8
type	radial ply	radial ply
maximum load (tyre manufacturer's)	23.00 kN	37.50 kN
at travelling speed	40 km/h	40 km/h
at tyre inflation pressure	120 kPa	140 kPa
radius index (ISO 4251-1/1992)	670 mm	855 mm
Chosen track width:	1925 mm	1825 mm
Technically permissible axle load:	44 kN	78 kN
Technically permissible total weight:	100 kN	

2.6 Fuel

- Type:	ARAL-Diesel-fuel, in conformity with DIN 51601	
- Density at 15°C:	At p.t.o. power tests	0,844 g/cm³
	At drawbar power tests	0.842 g/cm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity dm³	Oil change h	Filter-change h
Engine	17	250	250
Gear box, rear axle, hydraulic system and steering	56	1500	750
Front axle	10.6	1500	-
Final drives at front, each	1.8	1500	-

2.7.2 Specifications:

	Recommended	Used during test
Engine oil:		
Type	engine oil	FUCHS TITAN
Viscosity	SAE 20W40, 15W40, 10W40, 5W30, 0W40	SAE 15W40
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	
Viscosity	SAE 80W/90	SAE80W/90
Classification	JDM J 20 C or J 20 D	

2.7.3 Grease

- number of lubrication points: 13

3 COMPULSORY TESTS

3.1 MAIN POWER TAKE OFF PERFORMANCE (1000 min^{-1})

Date of tests: 11th August 1999
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						
98.0	1900	950	25.80	21.77	222	3.80
3.1.2 At rated speed						
95.7	2100	1050	26.62	22.47	235	3.59
3.1.3 At standard p.t.o. speed						
96.7	2000	1000	26.33	22.22	230	3.67
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						
95.7	2100	1050	26.62	22.47	235	3.59
3.1.4.2 85% of the torque obtained in 3.1.4.1						
85.4	2206	1103	25.12	21.20	248	3.40
3.1.4.3 75% of the torque defined in 3.1.4.2						
65.0	2236	1118	21.30	17.98	277	3.05
3.1.4.4 50% of the torque defined in 3.1.4.2						
43.5	2248	1124	16.67	14.07	323	2.61
3.1.4.5 25% of the torque defined in 3.1.4.2						
21.8	2248	1124	11.24	9.49	436	1.94
3.1.4.6 unloaded						
-	2248	1124	7.01	5.92	-	-

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fuel consumption hourly dm^3/h	Fuel consumption hourly kg/h	Fuel consumption specific g/kWh	Specific energy kWh/dm^3
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						
96.7	2000	1000	26.33	22.22	230	3.67
3.1.5.2 85% of the torque obtained in 3.1.5.1						
85.2	2072	1036	23.57	19.89	234	3.62
3.1.5.3 75% of the torque defined in 3.1.5.2						
64.5	2092	1046	19.56	16.51	256	3.29
3.1.5.4 50% of the torque defined in 3.1.5.2						
43.4	2112	1056	15.45	13.04	300	2.81
3.1.5.5 25% of the torque defined in 3.1.5.2						
22.0	2134	1067	10.46	8.83	402	2.10
3.1.5.6 unloaded						
-	2150	1075	6.66	5.62	-	-

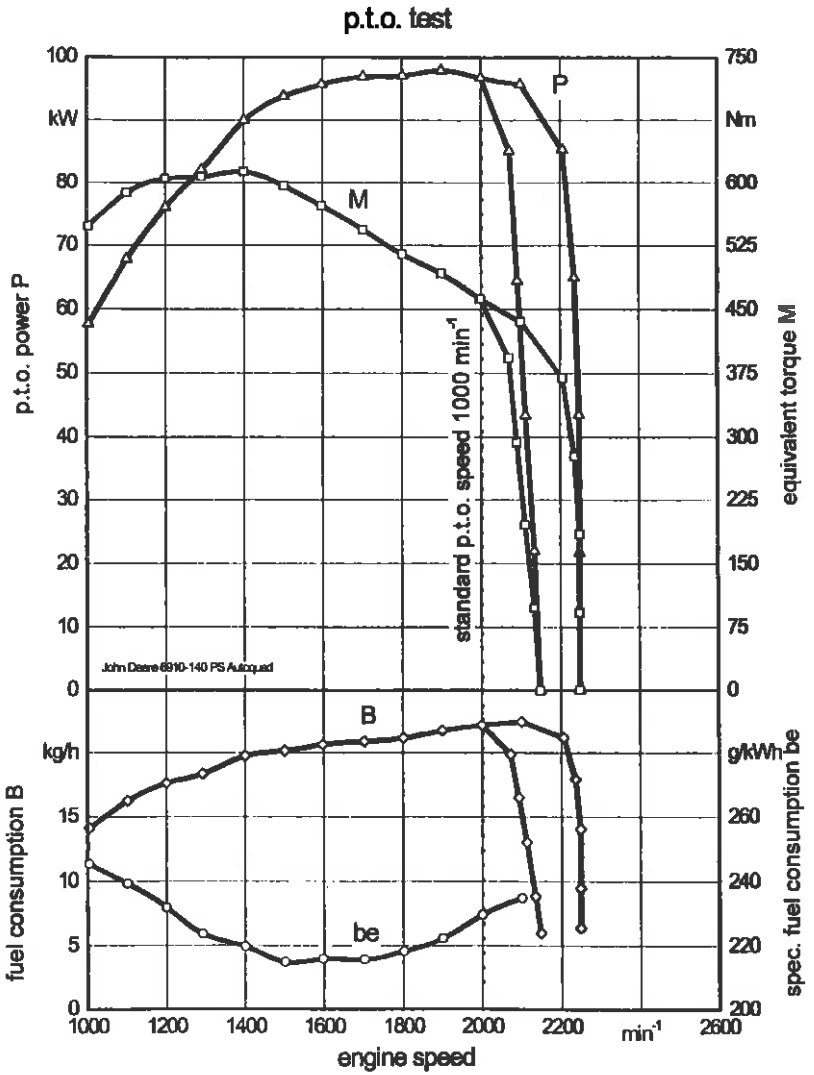
No load maximum engine speed:	2248 min^{-1}
Equivalent flywheel torque at rated engine speed:	435 Nm
Equivalent flywheel torque at 2-hour test:	492 Nm
at engine speed:	1900 min^{-1}
Maximum equivalent flywheel torque:	614 Nm
at engine speed:	1400 min^{-1}

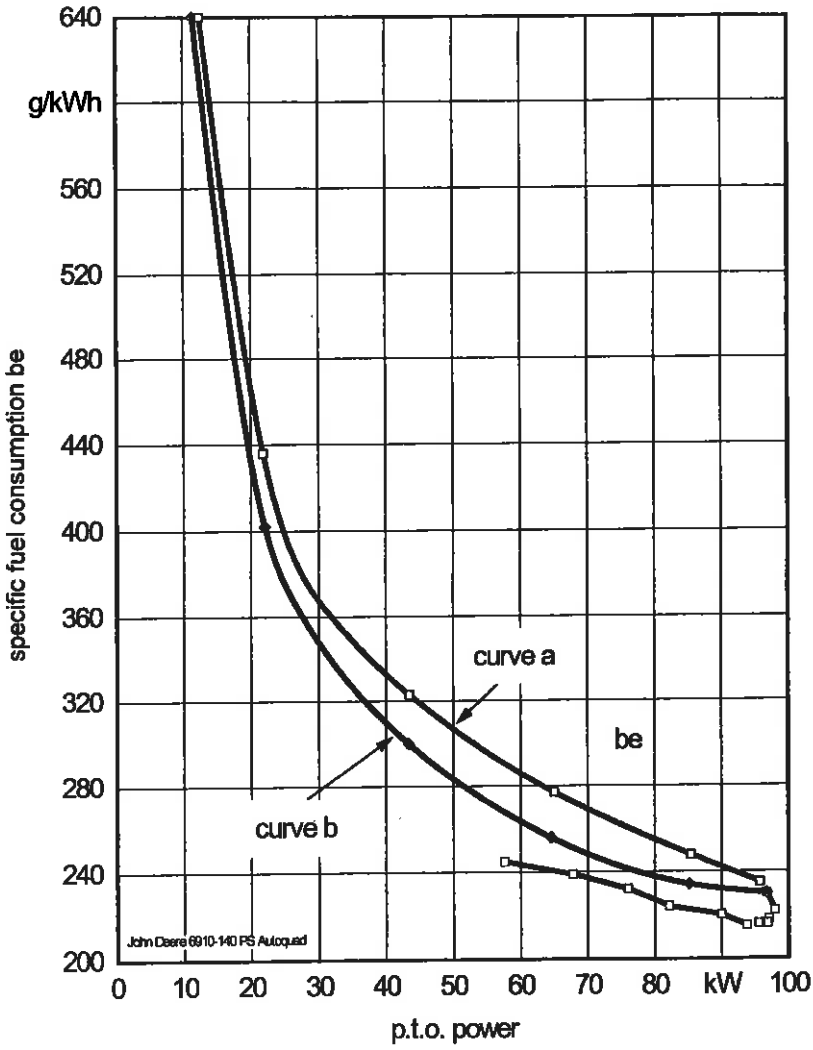
Mean atmospheric conditions

temperature:	21 °C
pressure:	1000 hPa
relative humidity:	70 %

Maximum temperatures

coolant:	85 °C
oil:	94 °C
fuel:	58 °C
air intake:	21 °C


p.t.o. test
p.t.o. power P
kW
equivalent torque M
Nm
standard p.t.o. speed 1000 min-1
P
M
B
be
John Deere 6910-140 PS Autoquad
fuel consumption B
kg/h
spec. fuel consumption be
g/kWh
engine speed
min-1
100
80
70
60
50
40
30
20
10
0
750
600
525
450
375
300
225
150
75
0
15
5
260
240
220
200
1000
1200
1400
1600
1800
2000
2200
2600


640
g/kWh
560
520
480
440
400
360
320
280
240
200
specific fuel consumption be
curve a
be
curve b
John Deere 6910-140 PS Autoquad
0
10
20
30
40
50
60
70
80
kW
100
p.t.o. power

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 21st July 1998

3.2.1 Hydraulic power test

- Sustained pressure with relief valve open 19.8 MPa
- Pump delivery rate at minimum pressure 66.9 dm³/min

	Hydraulic power kW	Flow rate dm³/min	Pressure MPa	Oil Temperature °C
At 90% of the actual relief valve setting	17.3	58.5	17.8	65
Maximum	18.6	63.9	17.5	65

- Tapping point used for test: at rear of tractor
- Opening and closing pressure of unloading valve: not applicable

3.2.2 Power lift test

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	230 mm	
Vertical movement without lifting forces with lifting forces	710 mm 694 mm	880 mm 856 mm
Max. corrected force exerted through full range	55.35 kN	40.50 kN
Corresponding pressure	17.8 MPa	
Moment about rear axle	-	70.06 kNm
Max. tilt angle of mast from vertical		11°

Lifting heights relative to horizontal lower links

mm	-432	-400	-380	-300	-200	-100	0	+100	+200	+300	+314	+400	+417
Lifting forces at hitch points. Corrected to 17.8MPa													
kN			55.35	55.35	55.58	56.03	57.15	58.50	59.18	59.04	58.95		
Lifting forces at standard frame. corrected to 17.8 MPa													
kN	47.25	47.48		47.70	47.61	47.25	46.35	45.50	44.33	42.75		40.95	40.50

3.3 DRAWBAR PERFORMANCE

- Date of test: 19th till 23rd August 1999
- 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)					
2 A	51.2	66.68	2.76	2225	15.2	360
3 A	61.4	66.84	3.31	2210	15.0	336
4 A	73.1	65.88	3.99	2102	12.0	305
1 B	79.1	64.35	4.43	1897	10.1	276
2 B	82.2	53.41	5.54	1901	6.4	265
3 B	82.4	44.00	6.74	1902	4.6	264
1 C	81.0	39.01	7.47	1898	4.0	268
4 B	81.8	35.35	8.33	1900	3.9	266
2 C	81.6	32.45	9.05	1899	3.4	267
3 C	80.4	26.55	10.90	1898	2.8	272
3.3.2	FUEL CONSUMPTION					
3.3.2.1	in selected gear, at maximum power at rated speed, identical with gear					
3 B	80.4	38.80	7.46	2099	4.3	278
3.3.2.1.1	75 % of pull at maximum power at rated speed					
3 B	64.7	29.21	7.97	2215	3.4	314
3.3.2.1.2	50 % of pull at maximum power at rated speed					
3 B	43.9	19.36	8.17	2250	2.5	375
3.3.2.1.3	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1					
1 C	65.1	29.20	8.03	2030	3.5	292
3.3.2.1.4	next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2					
1 C	43.9	19.37	8.16	2038	2.4	346
3.3.2.2	in selected gear					
1 C	78.4	34.06	8.29	2097	3.6	285
3.3.2.2.1	75 % of pull at maximum power at rated speed					
1 C	63.0	25.63	8.85	2217	2.8	317
3.3.2.2.2	50 % of pull at maximum power at rated speed					
1 C	43.1	17.16	9.04	2250	2.1	384
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	62.7	25.78	8.76	1980	2.8	290
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	42.5	17.14	8.92	1997	2.0	342

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
unballasted	480 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
2.34	67	85	95	15	65	99.5
2.51	59	85	89	20	60	99.5
2.76	69	87	97	19	60	99.5
3.05	67	86	96	10	60	99.5
3.17	68	86	96	19	60	99.5
3.20	65	86	95	19	60	99.5
3.14	68	86	97	18	56	99.5
3.17	67	86	95	20	56	99.5
3.16	65	85	93	19	56	99.5
3.10	66	86	94	19	56	99.5
nearest to 7.50 km/h at rated speed						
3.02	68	86	97	22	60	99.5
2.68	68	85	96	23	60	99.5
2.25	67	83	93	21	60	99.5
2.88	65	85	91	21	60	99.5
2.44	60	83	88	22	60	99.5
2.95	66	86	96	17	65	99.5
2.66	66	84	94	17	65	99.5
2.19	65	82	91	17	65	99.5
2.91	65	84	92	17	65	99.5
2.46	63	80	87	18	65	99.5

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: 24th August 1999
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**				
3 B	34.95	2200	7.85	4	72.0
3 B	35.63	2193	7.71	2	72.5
4.1.1.2	**All openings open**				
3 B	35.83	2196	7.91	4	81.5
3 C	21.13	2193	12.64	4	84.0
4 C	16.65	2198	15.66	4	83.5
1 D	14.98	2197	16.47	4	83.0
3 B	35.98	2193	7.66	2	81.5
3 C	21.63	2180	12.44	2	82.5
4 C	16.85	2190	15.21	2	82.5
1 D	15.90	2193	16.11	2	82.5

Gear number	Drawbar pull	Engine Speed	Measured travelling speed	Number of driving wheels	Sound level
	kN	min^{-1}	km/h	no	dB(A)
4.1.2	**Unloaded test in the gear giving the forward speed nearest to 7.5 km/h**				
4.1.2.1	**All openings closed**				
3 B	0	2250	8.36	4	70.5
3 B	0	2250	8.21	2	71.0
4.1.2.2.	All openings open				
3 B	0	2251	8.36	4	80.0
3 B	0	2250	8.21	2	79.0
4.1.3	Unloaded test in the gear giving the maximum forward speed				
4.1.3.1	All openings closed				
4 E	0	high idle	44.9	2	73.0
4.1.3.2	All openings open				
4 E	0	high idle	44.9	2	83.0

4.2 Results of lifting force test with modified linkage settings

(dimensions see page 12)

Date of tests: 23rd July 1998

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	443 mm	
Vertical movement without lifting forces	607 mm	760 mm
with lifting forces	585 mm	715 mm
Max. corrected force exerted through full range	63.45 kN	45.00 kN
Corresponding pressure	17.8 MPa	
Moment about rear axle	-	77.85 kNm
Max. tilt angle of mast from vertical		12°

Lifting heights relative to horizontal lower links

mm	-190	-167	-100	0	+100	+200	+300	+400	+418	+500	+525
Lifting forces at hitch points. Corrected to 17.8MPa											
kN		61.65	63.00	65.25	66.15	67.05	67.50	67.50	67.50		
Lifting forces at standard frame. corrected to 17.8 MPa											
kN	57.60		57.15	56.15	55.00	53.55	51.50	49.05		45.90	45.00

4.3 Determination of turning area and turning circle according to OECD Standard Code 1

Date of test: 25th August 1999

Turning area and turning circle

	Rear wheel drive		Four wheel drive	
	Right-hand	Left-hand	Right-hand	Left-hand
	m	m	m	m
Radius of turning area	5,97	5,99	6,28	6,30
Radius of turning circle	5,54	5,55	5,85	5,86

5 REPAIRS **None**

6 REMARKS **None**

Head of tractor test section

Dipl.-Ing. Manfred Lober

Date: 23rd February 2000

Deutsche Landwirtschafts-Gesellschaft

Test carried out by

Dipl.-Landw. Friedrich Uhlig