Prüfstelle für Landmaschinen



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

OECD No. 2/2032
10th January 2003

Agricultural Tractor

John Deere 6420S 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 (C(2001)5(FINAL) "Blue Code", Code 2).

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

Duration of tests: March till July 2002

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) being in accordance with the OECD STANDARD CODE.

Date of approval: 10th January 2003 OECD No. 2/2032

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John Deere 6420S AutoQuad (4WD) **DLG-Test No. 2002-094**

Tractor manufacturer's name and address:	DEERE & COMPANY, Moline, Illinois, USA
Location of tractor assembly:	JOHN DEERE Werke Mannheim, D-68163 Mannheim
Submitted for test by:	Manufacturer
Selected for test by:	Manufacturer with agreement by DLG
Place of running-in:	Mannheim and Gross-Umstadt
Duration of running-in:	Engine 55h, tractor 60h
Location of test:	DLG-Testing Station, D-64823 Gross-Umstadt

1 SPECIFICATIONS OF TRACTOR

1.1 Identification

1.1.1	- Make:	JOHN DEERE
	- Model:	6420S
	- Type:	4WD, full frame design
1.1.2	Numbers	
	- 1st serial No.:	316456 (1st September 2001)
	- Serial No.:	321776
1.1.3	Other specifications	
	- Transmission version:	AutoQuad, 40 km/h

1.2 Engine

	Make/Model/Type:	JOHN DEERE / 4045HLA73 (DD20010) / water-cooled 4-stroke Diesel-engine,direct injection, supercharged and intercooler, antivibration mounted
	Serial No.:	662979
1.2.1	Cylinders	
	Number/disposition:	4 / vertical in line
	Bore/stroke:	106.5 mm / 127 mm
	Capacity:	4525 cm^3
	Compression ratio:	16.9 ± 0.5 : 1
	Arrangement of valves:	Overhead valves, 2 per cylinder
	Cylinder liners:	Wet

1.2.2	Supercharging	
	- Make / Model / Type:	CZECH / K27 37 (RE507544) / exhaust driven supercharger with SAMSUNG water cooled intercooler (by low temperature section of water cooler)
	- Pressure:	Max. 91 kPa, resp. 98 kPa in "transport/PTO mode"
1.2.3	Fuel system	
	- Fuel feed system:	Electrical vane type fuel supply pump
	- Fuel filter	
	Make/Model:	JOHN DEERE / -
	Type :	1 replaceable paper element filter
	- Capacity of fuel tank:	185 dm^3
	- Injection pump	
	Make/Model:	BOSCH/L4(RE501274)
	Type :	VP44 distributor injection pump with timing device
	Serial no.:	1830583480
	Manufacturer's production setting*):	Draft mode 80 ± 3 (transport/PTO mode 88 ± 3) mm^3/stroke at full load and rated speed
	Flow rate:	Draft mode 22.08 ± 0.8 (transport/PTO mode 24.29 ± 0.8) dm^3/h at full load and rated speed
	Timing:	Commencement of delivery: Static 5.5° ± 0.5°, dynamic 5.5° before TDC
	- Injectors	
	Make/Model:	STANADYNE / -
	Type :	Multi hole
	Injection pressure:	25.5 ± 0.5 MPa
1.2.4	Governor	
	- Make/Model/Type:	JOHN DEERE/RE 506664/electric control unit
	- Governed range of engine speed:	850 ± 50 to 2460 ± 50 min^{-1}
	- Rated engine speed:	2300 min^{-1}

*) See Remark on page 34

1.2.5	Air cleaner	
	- Pre-cleaner	
	Make/Model:	DONALDSON / 991220
	Type:	Vacuum aspirated (cooling fan) cyclone type pre-cleaner integrated in front cover of main cleaner housing
	Location of air intake:	Above water cooler, below bonnet
	- Main cleaner	
	Make/Model:	DONALDSON / 991220 /
	Type:	Dry paper element filter with additional 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, replaceable cartridge
	- Number of filters:	1
1.2.7	Cooling system	Water cooling (high temperature section of water cooler)
	- Type of coolant:	Water-anti-freeze mixture
	- Type of pump:	Impeller pump
	- Specification of fan	
	Number of fan blades:	8
	Fan diameter:	600 mm
	- Coolant capacity:	24 dm^3
	- Type of temperature control:	Thermostat and by-pass circuit, BEHR viscous drive fan, belt driven; variable fan speed controlled by air flow temperature
	- Superpressure system:	70 ± 20 kPa

1.2.8	Starting system	
	- Make/Model/Type:	BOSCH / 12V / 0 001 230 003 (RE506589) IF electrical, solenoid pre-engaged drive starter motor
	- Starter motor power rating:	3 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 / 14 V / 45 - 90 A / 3-phase alternator
	Power:	1.3 kW
	- Battery:	1 lead acid battery, 12 V / 110 Ah at 20 hours rating
1.2.10	Exhaust system	
	- Make/Model/Type:	EBERSPÄCHER / AL82411 / single-chamber absorption type, oval 175 mm x 275 mm / 215 mm long
	- Location:	Under bonnet, vertical stack at right A-post of cab, mouth showing upward / forward
1.2.11	Operating hours meter:	Electronic, counts real hours when engine is running
1.3	**Transmission**	
1.3.1	Clutch	
	- Make/Model/Type:	JOHN DEERE / - / wet multi-plate
	- Number of plates:	4
	- Diameter of plates:	225 mm
	- Method of operation:	By pedal and reverse lever, hydraulically, by low pressure hydraulic circuit, operated by valve

1.3.2 Gear box

- Make/Model/Type: JOHN DEERE / AutoQuad, 40km/h / mechanical, 40 km/h version
- Description: Speed change gear with 6 ranges (A, B, C, D, E, F; synchronized), 4 step power shift (1, 2, 3, 4), automatic power shift selectable, power shifted reversing gear

	Forward	Reverse
No. of gears	4	4
No. of ranges	6	6
Total	24	24

2 levers, 2 buttons and 1 rocker switch for alternative power shifting, 1 rocker switch for automatic speed shifting when ECO- or Power-Mode is selected

- Available options (not fitted): AutoQuad (36/36) 40km/h with creeper gear; PowrQuad (16/16) 30km/h without creeper gear; PowrQuad (28/28) 30km/h with creeper gear
- Lubrication: Forced-feed lubrication, oil cooler (ring cooler) at the rear end of engine block (low temperature section of 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: Wet multi-plate
  - Engagement: Electro-hydraulically by foot switch
  - Disengagement: By pedal of service brake

1.3.4 Front axle and final drives

- Make/Model/Type: ZF/ APL2035 / swing axle, driving and steering; axle driven through wet multi plate clutch, shaft in median plane of tractor, bevel gear; clutch electro-hydraulically operated by rocker switch (two positions: engaged / engaged by service brake operation); planetary final drives; hydropneumatic suspension
- 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 of 2300 min^{-1} km/h
Forward Speeds			
A	1	450.59	1.58
	2	374.30	1.90
	3	312.56	2.27
	4	255.15	2.79
B	1	184.57	3.85
	2	153.32	4.64
	3	128.03	5.55
	4	104.52	6.80
C	1	113.21	6.28
	2	94.04	7.56
	3	78.53	9.05
	4	64.10	11.09
D	1	68.99	10.31
	2	57.31	12.41
	3	47.85	14.86
	4	39.06	18.20
E	1	42.45	16.75
	2	35.27	20.16
	3	29.45	24.15
	4	24.04	29.58
F	1	31.45	22.61
	2	26.12	27.22
	3	21.81	32.60
	4	17.81	39.93
Reverse Speeds			
A	1	431.67	1.65
	2	358.58	1.98
	3	299.43	2.37
	4	244.43	2.91
B	1	176.82	4.02
	2	146.89	4.84
	3	122.65	5.80
	4	100.13	7.10

C	1	108.45	6.56
	2	90.09	7.89
	3	75.23	9.45
	4	61.41	11.58
D	1	66.09	10.76
	2	54.90	12.95
	3	45.84	15.51
	4	37.42	19.00
E	1	40.67	17.48
	2	33.78	21.05
	3	28.21	25.20
	4	23.03	30.87
F	1	30.13	23.60
	2	25.03	28.41
	3	20.90	34.02
	4	17.06	41.68

*) Calculated with a dynamic radius index of 820 mm
(not in conformity with ISO 4251-1:1998)

- Number of revolutions of front wheels for one revolution of rear wheels: 1.3483

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, electro-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 two different stubs, speed shiftable by separate lever

1.4.1.1 Power take-off proportional to engine speed, 540 min^{-1} or 1000 min^{-1} p.t.o.

- Location: At rear of tractor
- Diameter of p.t.o. shaft end: 35 mm
- Number of splines: 6 (540 min^{-1}) in conformity with ISO 500:1991, type 1
  21(1000 min^{-1}) in conformity with ISO 500:1991, type 2
- Height above ground: 750 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	Max. torque transmissible Nm
540	3.9685	540 580	2143 2300	not specified	
1000	2.2080	1000 1042	2208 2300	not specified	

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

1.4.1.2 Power take-off proportional to ground speed: None

1.4.2 Optional power take-off: Front p.t.o., independent, not fitted to tractor

1.5 Hydraulic power lift

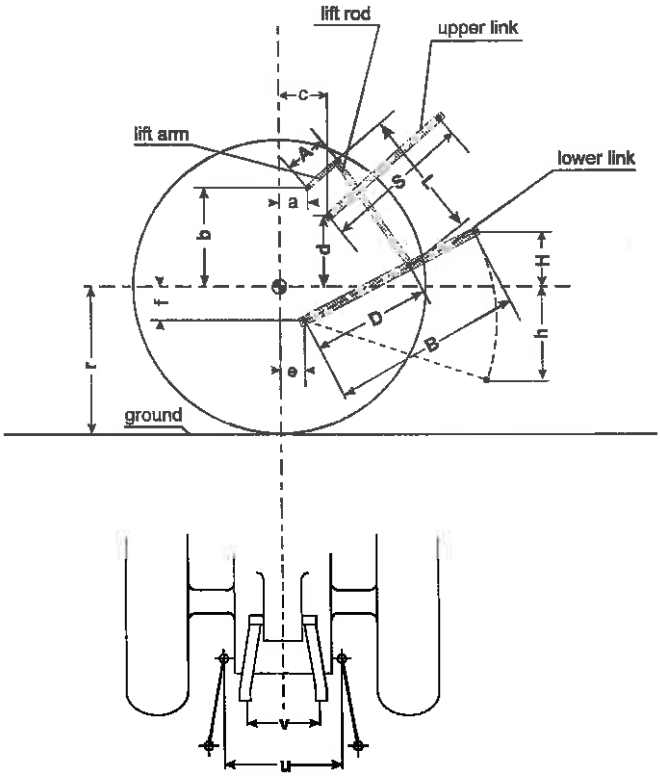
- Make/Model/Type:	JOHN DEERE / - / desintegrated, electronically controlled hydraulic power lift, lower link sensing
- Type of hydraulic system:	Closed center, load sensing pressure and flow compensated system
- Type and number of cylinders:	2 external cylinders, single acting, 80 mm bore, 175 mm stroke,
- 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:	23.5 MPa
- Lift pump	
- Make:	BRÜNINGHAUS HYDROMATIC
- Model:	A10VNO41
- Type:	25 cm^3 axial-piston pump with 60 dm^3/min delivery at rated speed; optional: 41 cm^3 axial-piston pump with 100 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 coupler-pairs at rea of tractor
- Maximum volume of oil available to external cylinders:	Stationary 25 dm^3, driving 15 dm^3
- Oil cooler:	Engine cooling water / transmission-hydraulic oil heat exchanger at the rear end of engine block

John Deere 6420S AutoQuad (4WD) **DLG-Test No. 2002-094**

1.6 Three-point linkage:

1.6.1 Three-point linkage at rear:

- Category: 2, in conformity with ISO 730-1/1994 + Cor. 1:1995
  WALTERSCHEID quick couplers
- Category adapter: None



Dimensions of rear implement linkage			Projected lengths in mm: Dimensions	Projected lengths in mm: Settings used in test-page 25
Rear tyres 600/65 R 38 Front tyres 540/65 R 24		(r) *) (r') *)	820 620	
Length of lift arms		(A)	305	
Length of lower links		(B)	945	
Distance of lift arm pivot points from rear wheel axis	horizontal vertical	(a) (b)	180 475	
Horizontal distance between the 2 lower link pivot points		(u)	480	
Horizontal distance between the 2 lift arm end points		(v)	535	
Length of upper link		(S)	from 550 to 730	660
Distance of upper link pivot point from rear wheel axis	horizontal vertical	(c) (d)	460 185	460 185
Distance of lower link pivot points from rear wheel axis	horizontal vertical	(e) (f)	135 225	
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	505 and 560	505
Length of lift rods		(L)	from 715 to 860	810

Heights (h, H, H') of lower link hitch points relative to rear wheel axis (situated 820 mm above ground), at different adjustments of L

These data are valid for unloaded power lift

Length of lift rods	(L)	810	715	860
Linkage distance of lift rods	(D)	505		
Lowest position	(h)	620	390	720
Highest position	(H)	50	225	-40
Transport position	(H')	50	225	-40

*) Assuming r resp. r' = tyre dynamic radius index (not in conformity with ISO 4251-1:1998)

1.7	**Swinging drawbar**	Optional, not fitted	
1.8	**Trailer hitch**		
	- Make/Model/Type:	ROCKINGER/860 D01/automatic, remote control	
	- Pin diameter:		38 mm
	- Height above ground:	454, 494, 547, 607, 664, 778, 834, 894, 948	mm
	- Distance of hitch point from rear wheel axis horizontally:		720 mm
	- Distance of hitch point from power take-off shaft end		
	vertically:	below	296, 256, 203, 143, 86 mm
		above	28, 84, 144, 198 mm
	horizontally:		190 mm
	- Maximum permissible vertical load:		20.0 kN
1.9	**Holed drawbar**	Optional: short bar, category 2, not fitted	
1.10	**Steering**		
	- Make/Model/Type:	JOHN DEERE and DANFOSS/ / hydrostatic steering, acting on front wheels	
	- Method of operation		
	Pump:	Steering system connected to main hydraulic circuit	
	Ram:	Integrated cylinder of symmetrical design, 224 mm stroke, 70 mm bore, 36 mm dia of 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 with additional power fill, oil-immersed disc brake with 2 acting faces on each differential half shaft, disc 317 mm diameter
- Method of operation: Pedal operated, acting on rear wheels, front axle drive is automatically engaged when braking
- Trailer braking take-off: None

1.11.2 Parking brake

- Type: Parking lock of transmission and mechanical separate band brake in gear box
- Method of operation: Range gear lever in "P" position, resp. hand lever with ratchet

1.12 Wheels

- Number
  - Front: 2, driving and steering
  - Rear: 2, driving
- Wheelbase: 2400 mm
- Track width adjustment:

	Minimum	Maximum	Adjustment method
Front	1810	1810	not adjustable
Rear	1820	1820	not adjustable

1.13 Protective structure

- Make/Model/Type: JOHN DEERE / SG068 / Cab Option 1 (unsuspended)
- Manufacturer's name and address: DEERE & COMPANY, Moline, Illinois, USA
- Protective device
  - Cab: Welded and screwed profile steel tube construction, mounted on silent blocks, for service (repair) with separate device tiltable to the side
  - Tiltable / not tiltable: Not tiltable
- OECD approval
  - Approval number: 4/0 694
  - Date of approval: 11th October 2001

1.14 Seat

1.14.1	Driver's seat	Fitted to tractor
	- Make/Model:	Grammer / MSG 95 AL / 731
	- Type:	Air suspended upholstered seat with backrest and armrests
	- Seat and steering wheel reversible:	No
	- Type of suspension:	Pneumatic
	- Type of damping:	Hydraulic
	- Range of adjustment	
	Longitudinal:	195 mm
	Vertical:	380 to 565 mm
	- Safety belt:	No
1.14.2	Optional driver's seats	
	- Make/Model/Type:	Grammer/MSG 95A; MSG 93; MSG 85 / mechanical suspension or pneumatic suspension
1.14.3	Passenger seat:	Optional, fitted to tractor tested, with mechanical suspension
	- Location:	At left mudguard
	- Capacity:	1

1.15 Lighting

Electrical, 12 Volt, according to German legislation

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1327	162 x 101	200
Side Lights	1704	110 x 35	860
Rearlights	1755	230 x 45	910
Reflectors, 1st pair	1725	160 x 25	865
2nd pair	865	72 ø	561

2. TEST CONDITIONS

2.1 Overall dimensions

	Length mm	Width (track width as in 2.5) mm	Height at top of protective structure mm	Height at top of exhaust silencer pipe mm
Unballasted	4300	2390	2755	2710

2.2 Ground clearance 430 mm

- Clearance-limiting part: Bracket of trailer hitch

2.3 Tractor mass Unballasted (with cab)

	Without driver kg	With driver kg
Front	2060	2085
Rear	3220	3270
Total	5280	5355

2.4 Track specifications Not applicable

2.5 Tyres and track widths specifications

	Front	Rear
Tyres:	PIRELLI TM 800	
- Dimensions	540/65 R 24	600/65 R 38
- Load index speed index	140 A8	153 A8
- Type	radial ply	radial ply
- Maximum load (tyre manufacturer's)	25.00 kN	36.60 kN
- Maximum load (tractor manufacturer's)	20.00 kN	32.50 kN
at travelling speed	40 km/h	40 km/h
at tyre inflation pressure	160 kPa	160 kPa
dynamic radius index	620 mm	820 mm
Chosen track width:	1810 mm	1820 mm

2.6 Fuel

- Type: ARAL-Diesel-fuel, in conformity with DIN 51601
- Density at 15°C: At p.t.o. tests 0.829 g/cm³
  at drawbar power tests 0.838 g/cm³

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity dm³	Oil change h	Filter-change h
Engine	16	500	500
Gear box and rear axle	53	1500	750
Front axle	6	1500	-
Rear axle	in common with gearbox		
Final drives (front each)	0.8	1500	-
Final drives rear (each)	in common with gearbox		
Hydraulic system	in common with gearbox		
Steering	in common with gearbox		

2.7.2 Specifications:

	Recommended	Used during test
Engine oil: Used in engine		Fuchs Titan
Type	engine oil	engine oil
Viscosity	SAE 20W40, 15W40, 10W40, JD PLUS-50, JD TORQ-GARD SUPREME	SAE 15W40
Classification	API CG-4 or CF-4; ACEA - E2 or E3;	API CF-4
Transmission oil: Used in gear box, rear axle, hydraulic system and brake system	John Deere HY-GARD John Deere Low Viscosity HY-GARD, John Deere BIO-HY-GARD	John Deere HY-GARD
Type Viscosity Classification	transmission oil SAE 75 JDM J20C or J20D	transmission oil SAE 75 JDM J20C
Transmission oil: Used in front axle and front final drives	John Deere HY-GARD, John Deere BIO-HY-GARD or transmission oil	Fuchs
Type Viscosity Classification	transmission oil SAE 75 or SAE 80W90 JDM J20C	transmission oil SAE 80W90 JDM J20C

2.7.3 Grease Multi purpose grease GC-LB

- Number of lubrication points: 21

3 COMPULSORY TESTS RESULTS

3.1 Main power take off performance (1000min^{-1}) "Draft mode"

Date of tests: 28th March 2002
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 kg/h	Fuel consumption Hourly dm³/h	Fuel consumption Specific g/kWh	Specific energy kWh/dm³
Maximum power						
3.1.1 At 2-hour test						
82.0	2100	951	19.00	22.92	232	3.58
3.1.2 At rated speed						
72.6	2298	1041	18.00	21.71	247	3.34
3.1.3 At standard p.t.o. speed						
77.7	2210	1001	18.70	22.56	241	3.44
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						
72.6	2298	1041	18.00	21.71	247	3.34
3.1.4.2 85% of the torque obtained in 3.1.4.1						
64.0	2378	1077	16.40	19.78	255	3.24
3.1.4.3 75% of the torque defined in 3.1.4.2						
48.4	2400	1087	13.50	16.28	280	2.97
3.1.4.4 50% of the torque defined in 3.1.4.2						
32.6	2422	1097	10.90	13.15	333	2.48
3.1.4.5 25% of the torque defined in 3.1.4.2						
16.4	2444	1107	8.10	9.77	492	1.68
3.1.4.6 Unloaded						
-	2462	1115	5.53	6.67	-	-

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fuel consumption Hourly kg/h	Fuel consumption Hourly dm^3/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						
77.7	2210	1001	18.70	22.56	241	3.44
3.1.5.2 85% of the torque obtained in 3.1.5.1						
67.7	**2267**	**1027**	**16.90**	**20.39**	**249**	**3.32**
3.1.5.3 75% of the torque defined in 3.1.5.2						
51.2	2290	1037	13.73	16.56	268	3.09
3.1.5.4 50% of the torque defined in 3.1.5.2						
34.5	2311	1047	10.80	13.03	314	2.65
3.1.5.5 25% of the torque defined in 3.1.5.2						
17.4	2333	1057	7.80	9.41	450	1.85
3.1.5.6 Unloaded						
-	2356	1067	5.02	6.05	-	-

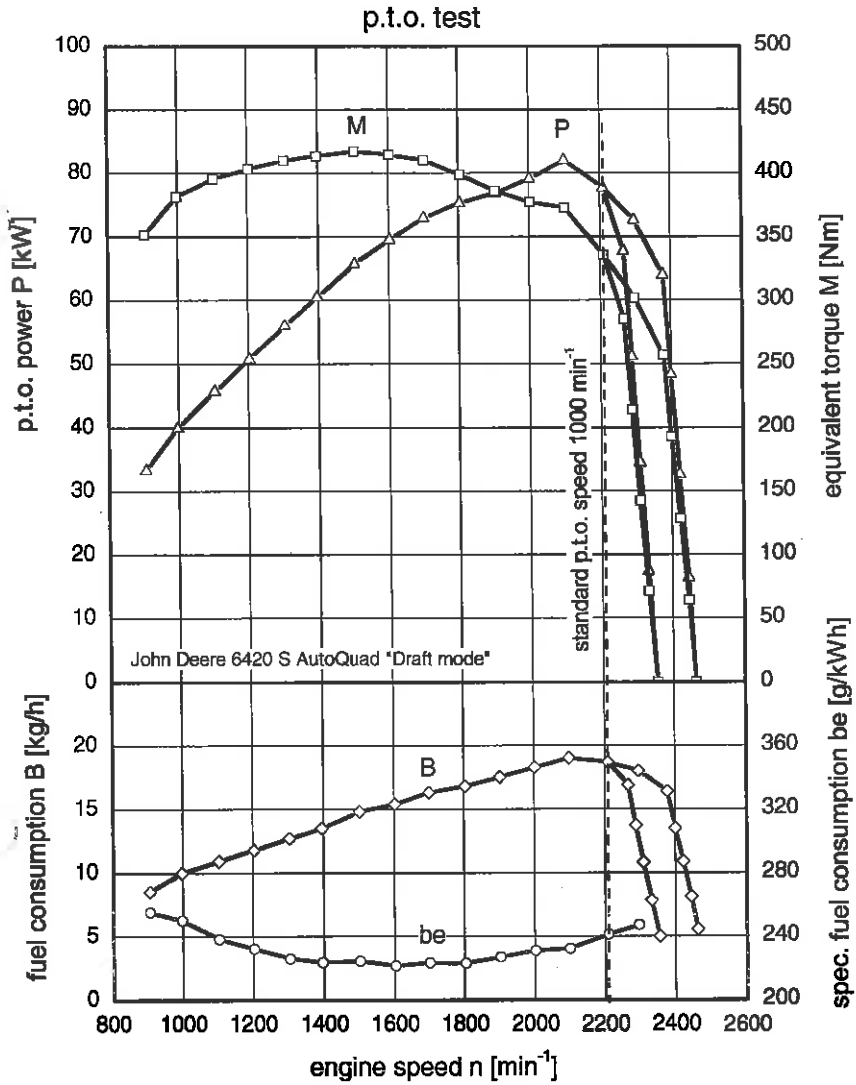
No load maximum engine speed:	2462 min^{-1}
Equivalent flywheel torque at rated engine speed:	302 Nm
Equivalent flywheel torque at 2-hour test:	373 Nm
At engine speed:	2100 min^{-1}
Maximum equivalent flywheel torque:	417 Nm
At engine speed:	1503 min^{-1}

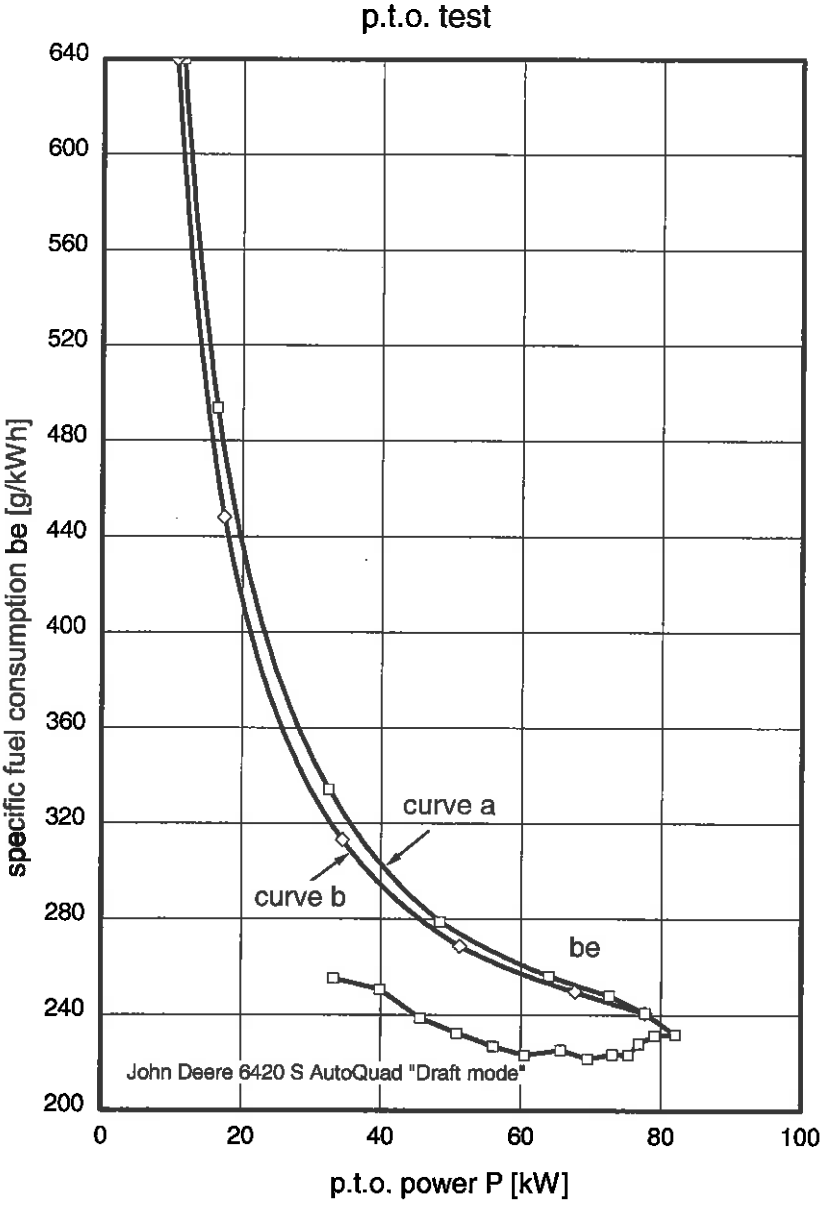
Mean atmospheric conditions

Temperature:	23 °C
Pressure:	101.0 kPa
Relative humidity:	22 %

Maximum temperatures

Coolant:	70 °C
Oil:	108 °C
Fuel:	33 °C
Air intake:	24 °C


p.t.o. test
p.t.o. power P [kW]
equivalent torque M [Nm]
fuel consumption B [kg/h]
spec. fuel consumption be [g/kWh]
engine speed n [min-1]
M
P
B
be
standard p.t.o. speed 1000 min-1
John Deere 6420 S AutoQuad "Draft mode"
100
90
80
70
60
50
40
30
20
10
0
500
450
400
350
300
250
200
150
100
50
0
20
15
10
5
0
360
320
280
240
200
800
1000
1200
1400
1600
1800
2000
2200
2400
2600


p.t.o. test
specific fuel consumption be [g/kWh]
640
600
560
520
480
440
400
360
320
280
240
200
0
20
40
60
80
100
p.t.o. power P [kW]
curve a
curve b
be
John Deere 6420 S AutoQuad "Draft mode"

John Deere 6420S AutoQuad (4WD) **DLG-Test No. 2002-094**

3.2 HYDRAULIC POWER AND LIFTING FORCE

- Date of tests: 24th April and 23rd July 2002

3.2.1 Hydraulic power test

- Sustained pressure with relief valve open 20.5 MPa
- Pump stalled: No
- Pump delivery rate at minimum pressure 71.4 dm³/min [1)]
  71.5 dm³/min [2)]

		Flow rate dm³/min	Pressure MPa	Hydraulic power kW	Oil temperature °C
At 90% of the actual relief valve setting	1)	68.1	18.5	21.0	65
	2)	64.9	18.5	20.0	
Maximum	1)	68.1	18.5	21.0	65
	2)	64.6	19.0	20.5	

- Tapping point used for test: At rear of tractor,

[1)] 1 double acting control valve
[2)] 2 double acting control valves parallel connection

- Opening / closing pressure of unloading valve: Not applicable

3.2.2 Power lift test at rear power lift

	At the hitch points	On the frame
Height of lower hitch points above ground in down position	200 mm	
Vertical movement without lifting forces	670 mm	875 mm
with lifting forces	645 mm	855 mm
Max. corrected force exerted through full range	33.30 kN	28.45 kN
Corresponding pressure	18.5 MPa	
Moment about rear axle	35.96 kNm	48.08 kNm
Max. tilt angle of mast from vertical	-	12°

Lifting heights relative to horizontal lower links

mm	-490	-400	-395	-300	-200	-100	0	+100	+200	+250	+300	+365
Lifting forces at hitch points, corrected to 18.5 MPa												
kN			33.30	38.70	42.75	46.15	49.05	51.55	53.55	54.45		
Lifting forces at standard frame, corrected to 18.5 MPa												
kN	28.45	30.95		33.20	34.55	35.00	35.20	35.20	34.90		34.30	33.30

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of test: 18th till 23rd April 2002
Type of track: Concrete

Gear number and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed min^{-1}	Slip of wheels %
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)					
B1	52.9	55.48	3.43	2370	14.9
B2	59.4	55.75	3.83	2206	15.0
B3	67.0	52.30	4.61	2100	10.1
C1	68.0	45.33	5.40	2101	7.2
B4	68.2	41.45	5.92	2094	5.8
C2	69.4	37.68	6.63	2097	4.8
C3	69.9	31.31	8.04	2102	4.2
D1	70.0	27.43	9.19	2096	3.6
C4	68.1	24.88	9.86	2084	3.3
D2	69.1	22.38	11.11	2089	2.8
D3	68.7	18.43	13.42	2096	2.1
E1	68.1	16.21	15.13	2094	2.0
D4	67.6	14.72	16.54	2102	1.8
E2	67.9	13.43	18.21	2090	1.9
FUEL CONSUMPTION					
3.3.2.1 In selected gear, at maximum power at rated speed					
D1	62.3	22.07	10.16	2300	2.6
3.3.2.1.1 75 % of pull at maximum power at rated speed					
D1	49.0	16.62	10.60	2385	1.9
3.3.2.1.2 50 % of pull at maximum power at rated speed					
D1	33.3	11.11	10.78	2409	1.3
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1					
C4	49.1	16.58	10.66	2227	1.8
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2					
C4	33.2	11.07	10.80	2249	1.4
3.3.2.2 In selected gear nearest to 7.50 km/h at rated speed					
C2	62.6	30.72	7.34	2300	4.2
3.3.2.2.1 75 % of pull at maximum power at rated speed					
C2	49.6	23.10	7.73	2388	2.9
3.3.2.2.2 50 % of pull at maximum power at rated speed					
C2	33.8	15.46	7.87	2413	2.1
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1					
C3	49.5	23.09	7.72	1997	3.1
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2					
C3	33.5	15.28	7.90	2023	2.1

John Deere 6420S AutoQuad (4WD) **DLG-Test No. 2002-094**

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

Specific fuel consumption	Specific energy	Temperature			Atmospheric conditions		
		Fuel	Coolant	Engine oil	Tempe-rature	Relative humidity	Pressure
g/kWh	kWh/dm³	°C	°C	°C	°C	%	kPa
337	2.48	50	65	110	24	40	100.5
325	2.58	50	65	109	24	40	100.5
289	2.90	46	67	108	22	40	100.5
284	2.95	44	66	108	19	45	100.5
283	2.96	44	66	108	18	45	100.5
278	3.02	44	66	109	19	45	100.5
278	3.02	44	66	106	19	45	100.5
277	3.03	45	67	108	22	45	100.5
283	2.96	44	66	106	22	45	100.5
279	3.00	45	67	106	21	60	99.5
281	2.98	41	66	105	15	60	99.5
288	2.91	41	66	107	17	60	99.5
292	2.87	42	66	104	17	60	99.5
295	2.85	41	66	105	16	60	99.5
298	2.81	42	67	107	13	60	100.5
323	2.59	42	67	107	13	60	100.5
383	2.19	42	66	104	13	60	100.5
314	2.67	46	67	105	21	50	100.5
372	2.26	47	67	103	22	50	100.5
295	2.84	46	66	104	23	40	100.5
319	2.62	50	68	108	23	40	100.5
366	2.29	50	66	106	24	40	100.5
286	2.93	47	65	99	24	40	100.5
326	2.57	46	65	98	24	40	100.5

4 ADDITIONAL TESTS under the responsibility of the DLG Testing Station

4.1 Main power take off performance (1000 min^{-1}) "Transport/PTOmode"

Date of tests: 27th March 2002
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 kg/h	Fuel consumption Hourly dm³/h	Fuel consumption Specific g/kWh	Specific energy kWh/dm³
Maximum power						
4.1.1 At 2-hour test						
84.2	2151	974	19.80	23.88	235	3.53
4.1.2 At rated speed						
80.6	2300	1042	19.60	23.64	244	3.41
4.1.3 At standard p.t.o. speed						
83.7	2210	1001	20.00	24.13	239	3.47
4.1.4 Part loads, the governor hand lever in the position corresponding to maximum power at full load (curve a)						
4.1.4.1 The torque corresponding to maximum power at rated speed						
80.6	2300	1042	19.60	23.64	244	3.41
4.1.4.2 85% of the torque obtained in 3.1.4.1						
70.5	2366	1072	17.50	21.11	249	3.34
4.1.4.3 75% of the torque defined in 3.1.4.2						
53.4	2393	1084	14.40	17.37	270	3.07
4.1.4.4 50% of the torque defined in 3.1.4.2						
36.0	2417	1095	11.30	13.63	315	2.64
4.1.4.5 25% of the torque defined in 3.1.4.2						
18.2	2442	1106	8.40	10.13	459	1.80
4.1.4.6 Unloaded						
-	2462	1115	5.43	6.55	-	-

Power kW	Speed Engine min^{-1}	Speed P.t.o. min^{-1}	Fuel consumption Hourly kg/h	Fuel consumption Hourly dm³/h	Fuel consumption Specific g/kWh	Specific energy kWh/dm³
4.1.5 Part loads, the governor hand lever in the position corresponding to standard p.t.o. speed at full load (curve b)						
4.1.5.1 The torque corresponding to maximum power						
83.7	2210	1001	20.00	24.13	239	3.47
4.1.5.2 85% of the torque obtained in 3.1.5.1						
73.2	2267	1027	18.00	21.71	245	3.37
4.1.5.3 75% of the torque defined in 3.1.5.2						
55.4	2291	1038	14.70	17.73	265	3.12
4.1.5.4 50% of the torque defined in 3.1.5.2						
37.4	2313	1048	11.40	13.75	304	2.72
4.1.5.5 25% of the torque defined in 3.1.5.2						
18.9	2333	1057	8.20	9.89	433	1.91
4.1.5.6 Unloaded						
-	2358	1068	5.16	6.23	-	-

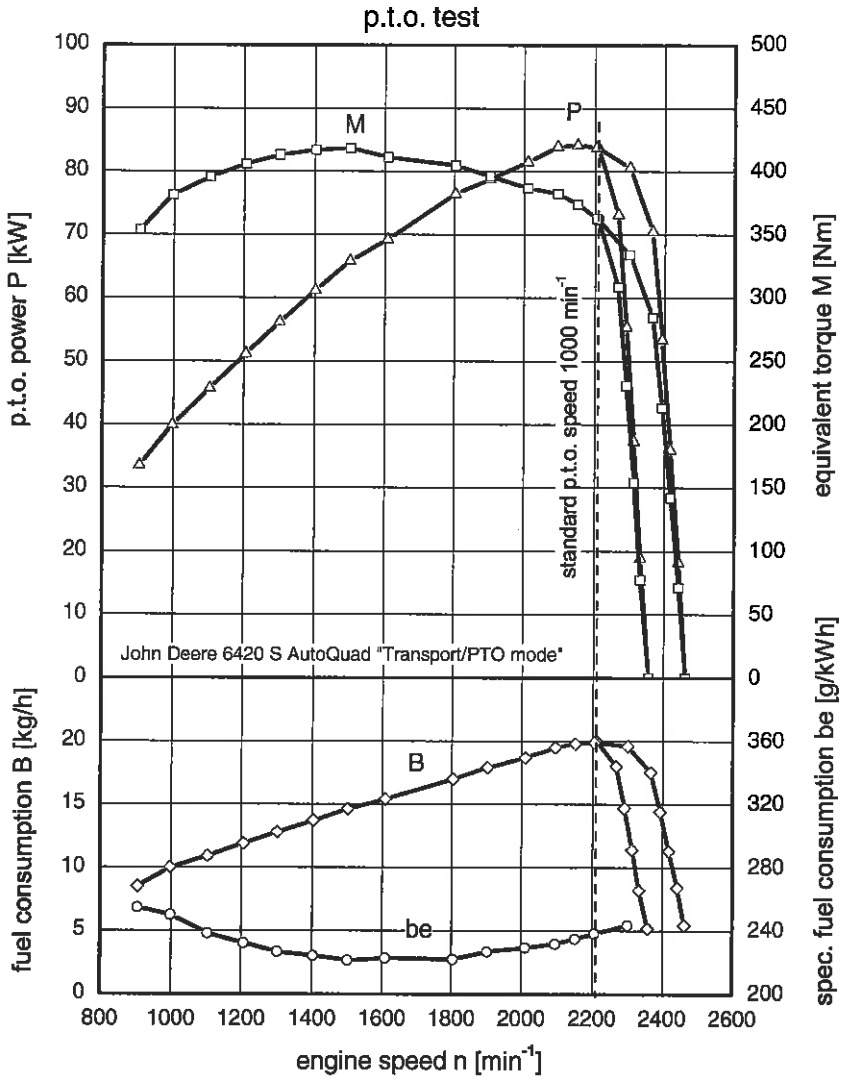
No load maximum engine speed:	2462 min^{-1}
Equivalent flywheel torque at rated engine speed:	334 Nm
Equivalent flywheel torque at 2-hour test:	374 Nm
At engine speed:	2151 min^{-1}
Maximum equivalent flywheel torque:	418 Nm
At engine speed:	1501 min^{-1}

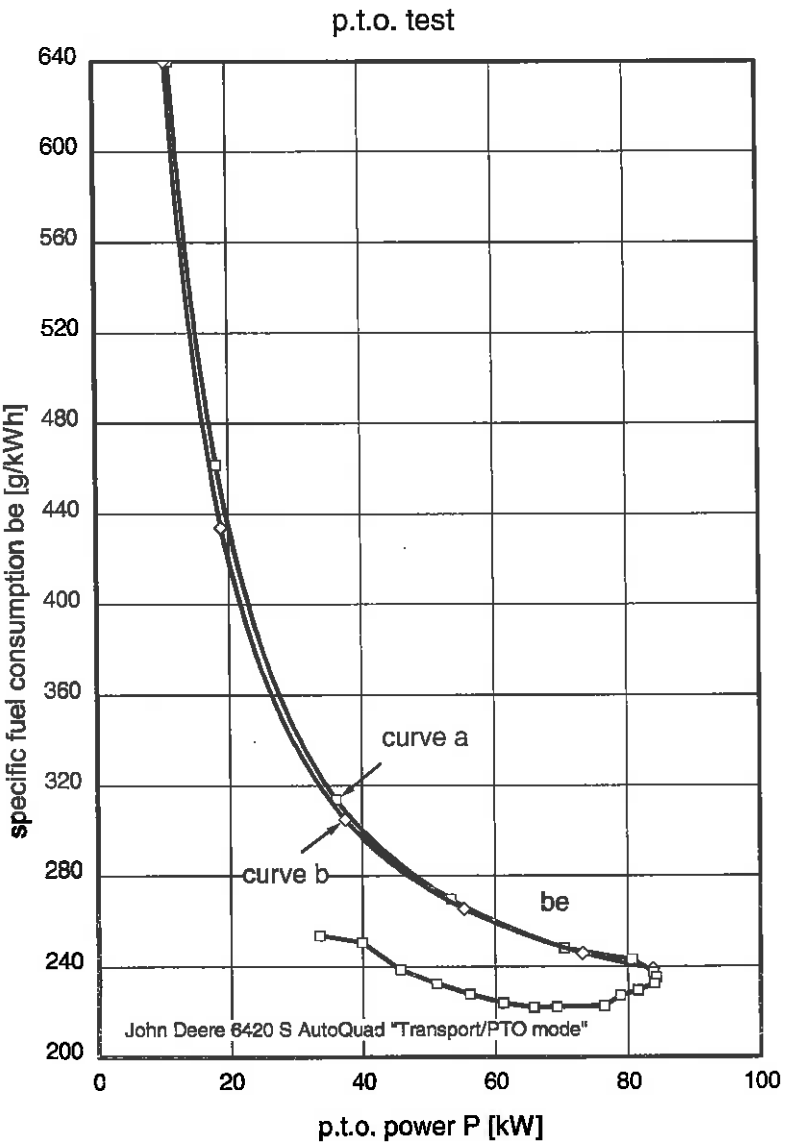
Mean atmospheric conditions

Temperature:	23 °C
Pressure:	99.5 kPa
Relative humidity:	62 %

Maximum temperatures

Coolant:	66 °C
Oil:	108 °C
Fuel:	33 °C
Air intake:	24 °C


p.t.o. test
p.t.o. power P [kW]
equivalent torque M [Nm]
fuel consumption B [kg/h]
spec. fuel consumption be [g/kWh]
engine speed n [min-1]
standard p.t.o. speed 1000 min-1
M
P
B
be
John Deere 6420 S AutoQuad "Transport/PTO mode"
100
90
80
70
60
50
40
30
20
10
0
500
450
400
350
300
250
200
150
100
50
0
20
15
10
5
0
360
320
280
240
200
800
1000
1200
1400
1600
1800
2000
2200
2400
2600


p.t.o. test
640
600
560
520
480
440
400
360
320
280
240
200
specific fuel consumption be [g/kWh]
curve a
curve b
be
John Deere 6420 S AutoQuad "Transport/PTO mode"
0
20
40
60
80
100
p.t.o. power P [kW]

4.2 Measurement of noise at the driving position carried out in accordance with OECD CODE 5

Tractor fitted with John Deere / SG068 / Cab Option 1 (unsuspended)

Results of sound level test - "Under load" procedure

Date of test: 25th and 26th April 2002
Type of track: Concrete
Type of sound level meter: BRÜEL & KJAER model 2233

Gear number and range	Drawbar pull	Engine speed	Measured travelling speed	Number of driving wheels	Sound level
	kN	min^{-1}	km/h		dB(A)
4.2.1	Test with the drawbar pull for which the tractor gives the maximum sound level (gear ratio giving the nearest nominal forward speed to 7.5 km/h and also in any speed settings with a sound level increase of at least 1 dB(A))				
4.2.1.1	All openings closed				
C 2	29.23	2369	7.56	4	74.0
C 2	30.60	2363	7.21	2	72.5
4.2.1.2	All openings open *)				
C2	26.81	2372	7.61	4	82.5
B4	35.49	2300	6.41	4	83.5
D4	11.81	2302	18.87	4	83.5
E2	10.82	2302	20.39	4	83.5
C2	31.72	2300	7.11	2	82.0
B3	42.29	2300	4.46	2	84.0
B4	35.46	2295	6.41	2	83.5
D3	16.05	2297	14.52	2	83.5
E1	14.20	2306	16.12	2	83.5
D4	12.04	2302	18.33	2	83.5
E2	11.07	2318	20.18	2	83.5
4.2.2	Unloaded test in the gear ratio giving the forward speed nearest to 7.5 km/h				
4.2.2.1	All openings closed				
C2	0	2458	8.16	4	73.5
C2	0	2460	8.16	2	72.0

Gear number and range	Drawbar pull	Engine speed	Measured travelling speed	Number of driving wheels	Sound level
	kN	min^{-1}	km/h		dB(A)
4.2.2.2. All openings open *)					
C2	0	2460	8.21	4	78.5
C2	0	2460	8.21	2	78.0
4.2.3 Unloaded test in the gear ratio giving the maximum forward speed 4.2.3.1 All openings closed					
F4	0	2446	42.2	2	73.5
4.2.3.2 All openings open *)					
F4	0	2446	42.2	2	81.5

*) Openings: 2 side windows, rear window

5	**REPAIRS**	**None**
6	**REMARKS**	The engine of the tractor John Deere 6420S AutoQuad has two different injection pump characteristics: - Standard setting, "draft mode", for heavy drawbar work and also for PTO-operation with standing tractor; - Application tailored engine performance setting, "transport/PTO mode", for transport work at forward speeds higher than about 14 km/h and for PTO work at forward speeds higher than about 2 km/h. In this mode the max. fuel injection at high engine speeds is increased. The test of PTO-power for the additional test reported on pages 28 to 31 was provided by a special modification of the electronic control of the injection pump.

Head of Vehicle Technology /

Safety Division
Dipl.-Ing. Winfried Gramatte

Test carried out by

Dipl.-Landw. Friedrich Uhlig

Date: 10th February 2003



Wir setzen Maßstäbe

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