Report on test in accordance with O.E.C.D STANDARD CODE

Restricted Code **O.E.C.D. No.** **1097**



Agricultural Tractor JOHN DEERE 2555 CS (2WD)

Manufacturer
John Deere Werke Mannheim
D-6800 Mannheim

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This bulletin is based on engineering tests in accordance with the O.E.C.D. RESTRICTED STANDARD CODE for the Official Testing of Agricultural Tractor Performance, C (84) 163 (Final), Appendix IV.

Duration of Tests: May till August 1987
DLG-Testing-Station for Agricultural Machinery, Max-Eyth-Weg 1,
D-6114 Groß-Umstadt

This report has been approved by the O.E.C.D. Coordinating Centre (C.E.M.A.G.R.E.F., France) as being in accordance with the O.E.C.D. STANDARD CODE.

Date of Approval: 20th October 1987

Restricted Code
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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 daN = 10 N	=	1,02 kp	or 1 kp	= 0,981 daN
Powers	1 kw	=	1,36 PS	or 1 PS	= 0,376 kW
Pressure	1 bar	=	1.02 kp/cm^2	or 1 kp/cm^2	= 0,981 bar
	1000 mbar	=	750.10 mm Hg		

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PRÜFUNGS-ABTEILUNG
JOHN DEERE 2555 CS

Test No. 87-96

Tractor manufacturer:	John Deere Werke Mannheim D-6800 Mannheim
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Mannheim and Groß-Umstadt
Duration of running-in:	Engine appr. 50 hours tractor appr. 20 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	JOHN DEERE
Trade denomination:	2555 CS
Type:	Wheel tractor, unit construction, 2WD
Serial No.:	610 777
Start of series:	600 001

Engine

Make:	JOHN DEERE
Model:	4.239 DL 008
Type:	Watercooled 4-stroke Diesel-engine with direct injection
Serial No.:	CD 4.239 D 718 940
Cylinders:	4, vertical in line, bore 106,5 mm, stroke 110 mm, displacement 3920 cm^3; compression ratio 17,8:1; wet cylinder liners, replaceable
Valves:	Overhead
Fuel system:	SOFABEX fuel supply pump; CAV-ROTO DIESEL distributor pump RE 16055/DPA R 3448 F230, serial no. 237 330 FDF,with injection timing device; manufacturer's production setting 51±2 mm^3 per stroke at rated engine speed and full load; injection timing 13+7° before TDC; STANADYNE multihole injection nozzles 27333, injection pressure 210±3 bar; STANADYNE fuel filter with replaceable two-stage paper element; fuel tank with 84 l capacity

Governor:	CAV-ROTO DIESEL centrifugal variable speed governor, governed range of engine speed 800 to 2630 r/min, rated engine speed 2500 r/min
Air cleaner:	Cyclone precleaner, incorporated in main cleaner, PUROLATOR dry paper element filter with main cartridge AZ 20623 and safety cartridge AF 3588; maintenance indicator lamp; air intake below bonnet
Exhaust silencer:	EBERSPÄCHER, AL 31492 multi-chamber absorption-expansion type, 160x220 mm oval, 383 mm long, below bonnet; mouth showing upwards, 2620 mm above ground
Lubrication system:	Forced-feed lubrication with gear pump, PUROLATOR oil filter T 19044 in full flow, replaceable; oil capacity 10 l, specified oil quality MIL-L-2104 C resp. API-CD, specified oil viscosities: winter SAE 10W/30; summer SAE 15W/40; tropics SAE 20W/40 or SAE 40 oil and filter change every 200 operating hours; engine oil-cooling water heat exchanger between oil filter and filter socket
Cooling system:	Water cooling with impeller pump, overpressure relief valve set to 0,6±0,1 bar, cooling circuit with thermostat and by-pass; V-belt driven fan, 455 mm dia, 5 blades; water capacity 13 l
Starting system:	Electrical; BOSCH solenoid pre-engaged-drive starting motor 2,7 kW; BERU heating spiral in intake pipe; range gear shift lever in neutral position as safety device

Electrical equipment:	12 Volt, negative earth, BOSCH 3-phase alternator K1-14V 23/55 A, 770 W; 2 lead acid batteries, 55 Ah each at 20 hours rating

Transmission

Clutch:	LUK dry single-plate clutch for travel drive, 328 mm dia, mechanically actuated by pedal
Gear box:	JOHN DEERE, model CST; collar shifted speed change gear with 4 speeds; collar shifted range gear with 2 forward ranges (I and II) and 1 reverse range (R); total 8 forward and 4 reverse speeds, 2 shift levers
Rear axle with final drives:	JOHN DEERE bevel gear, bevel gear differential with lever or pedal operated lock, self-disengaging; planetary final drives
Front axle:	JOHN DEERE, not propelled
Lubrication:	Gear box, rear axle, rear final drives and hydraulic system have oil in common; transmission with forced feed lubrication; internal-gear pump within gear box, 2 oil filters, oil radiator in front of water radiator; filter change every 600 hours

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Transmission oils:

	Oil quality API MIL-L-	Oil viscosity SAE	Oil volume l	Change interval h
Gear box, rear axle, hydraulic system, rear final drives	JOHN DEERE specif. J 20 A	75	43	1200

Total ratios and speeds

Range	Gear	Total ratio engine : driving wheel	Nominal travelling speed *) at rated engine speed km/h
I	1	244,36	2,78
	2	171,05	3,97
	3	115,28	5,89
	4	82,47	8,23
II	1	69,33	9,79
	2	48,53	13,98
	3	32,71	20,75
	4	23,40	29,00
R	1	210,29	3,23
	2	147,20	4,61
	3	99,20	6,84
	4	70,97	9,56

*) calculated with the radius index 720 mm

Main p.t.o.

Independent,
driven by wet multi-plate clutch with 133 mm dia, hydraulically operated by lever and control valve, hydraulically operating p.t.o. brake;
1 p.t.o. shaft at rear of tractor, 649 mm above ground, 25 mm to the left of tractor's median plane;
direction of rotation clockwise, viewed facing tractor's rear;
p.t.o. 422 mm behind rear wheel centre line, 35 mm dia, 6 splines, DIN 9611/ISO 500 type 1

P.t.o. type	P.t.o. speed r/min	Engine speed r/min	Ratio engine : P.t.o.	Power restriction kW
540	540	2382	4,4118	-
	567	2500		

Power lift

JOHN DEERE
hydraulic power lift, unit construction;
draft- and position-control, both mixable in steps, floating position;
lowering throttle; lower link sensing

Hydraulic system:

Closed centre system;
JOHN DEERE RP 2023 COE 0100
variable-capacity radial-piston pump, directly driven by engine, feeds power lift and steering system,
max. delivery 51 l/min at rated engine speed;
the transmission oil pump (see page 6) offers hydraulic pressure for actuating of p.t.o. clutch and feeds the radial-piston pump;

JOHN DEERE control valve,
relief valve pressure setting 160±3 bar;
single acting cylinder with 126 mm stroke and 100 mm bore;
safety valve set to 230 bar

1 double acting JOHN DEERE additional control valve with 2 couplings at tractor's rear;
up to 10 l oil may be taken off working travelling and 14 l stationary

Hydraulic oil: In common with gear box, see page 6

Implement linkage: See pages 10 and 11

Pull attachments

Trailer hitch: Not fitted

Holed drawbar: Not fitted

Swinging drawbar:

Shiftable and turnable	
height above ground	425 or 555 mm
pivot point before rear wheel centre line	51 mm
hitch point behind rear wheel centre line	634,782 or 824 mm
behind p.t.o. shaft	212,360 or 402 mm
swingable to both sides about max.	290 mm
hitch hole diameter	33 mm
max. permissible vertical load (fully retracted)	1000 kg

Towing hitch: Not fitted

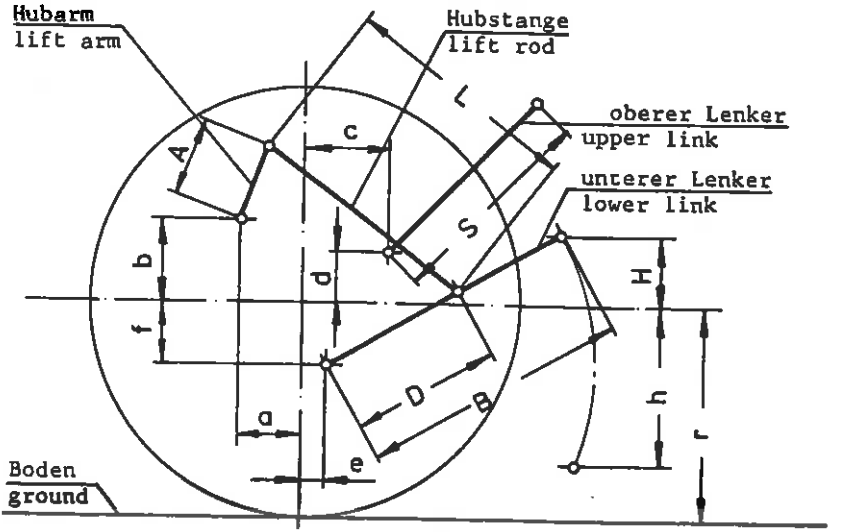
Steering

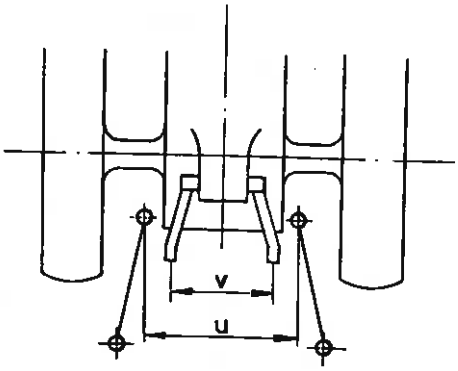
JOHN DEERE, POWER STEERING
mechanically acting,
hydraulically assisted;
connected by sequence valve to the hydraulic system of the tractor;
max. pressure 160±3 bar

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Implement linkage: Three point linkage
couplers category 2 acc. to ISO 730/I
DIN 9674, category 1 is possible by
turning the lower links





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Dimensions of rear implement linkage (projected lengths in mm, underlined dimensions are valid for power lift measurements p. 19)

Rear tyres Front tyres	radius index static radius	(r) (r')	720 378
Length of lift arms		(A)	254
Length of lower links		(B)	858
Distance of lift arm pivot points from rear axle centre	horizontal vertical	(a) (b)	-7 277
Horizontal distance between lower link pivot points		(u)	395
Horizontal distance between lift arm end points		(v)	495
Length of upper link		(S)	540 to 780, <u>664</u>
Distance of upper link pivot point from rear axle centre	horizontal vertical	(c) (d)	321 163
Distance of lower link pivot point from rear axle centre	horizontal vertical	(e) (f)	115 200
Distance of lower link pivot points from lift rod pivot points on lower links		(D)	465
Length of lift rods		(L)	566 to <u>684</u>,

Height of lower link hitch points relative to rear axle centre line (situated 720 mm above ground), these data are valid for unloaded power lift:

Length of lift rods	(L)	566	<u>684</u>
Linkage distance of lift rods	(D)	465	
Lowest position	(h)	265	520
Highest position	(H)	275	90
Transport position	(H')	275	90

Type of transport lock: Lowering throttle and latching of control valve lever

Brakes

Service brake:	JOHN DEERE pedal operated muscle power brake with hydraulic transmission, using oil from gear box, acting on rear wheels; oil-immersed disc brake with 1 ring-piston on each differential half shaft, self readjusting; disc diameter 304 mm
Parking brake:	Mechanical wet V-band brake, acting on bevel wheel of differential, drum diameter 238 mm, width 20 mm, operated by lever with ratchet
Steering brake:	Divided pedal of service brake, for normal use locked together
Trailer braking take-off:	Not provided

Wheels

Steered wheels:	At front, 2 cross-ply tyres 11L-15 6ply GOODYEAR; max. permissible load per tyre 870 kg at 2,2 bar and 30 km/h; track width 1500 mm, adjustable from 1500 to 1900 mm in steps of 50 mm each by extending telescopic front axle and reversing the wheels; rims 10 x 15 LB
Driving wheels:	At rear, 2 cross-ply tyres 18.4-30 8ply FIRESTONE; max. permissible load per tyre 2415 kg at 1,4 bar and 30 km/h; track width 1660 mm, infinitely adjustable by rack-and-pinion axle and reversing the rims or the wheel discs, from 1520 mm to 2440 mm; rims DW 15 x 30
Wheel base:	2279 mm

Protective frame: JOHN DEERE, model ROLL-GARD
2 post frame, not O.E.C.D. tested

Seat: GRAMMER, model DS 44/2H-4
upholstered seat with back rest and integral arm rests, adjustable spring suspension and hydraulic shock absorber; driver's platform 790 mm above ground, height of unloaded seat above platform steplessly adjustable from 480 to 570 mm, longitudinal adjustment 150 mm
1 step, 530 mm above ground;

Lighting equipment: Electrical, 12 Volt,
as per US legislation

	Dimensions mm	Height above ground of centre mm	Distance from outside edge of tractor to centre mm
Headlights	100 dia	1565	455
Side-(Warning) lights	100 dia	1715	520
Rearlights *)	100 dia	1525	760
Reflectors (ring-shaped)	135/100 dia	1715	520

additional SMV-sign

*) only 1 rearlight on the left hand side

Running time meter: Electronic, counts real operating hours if engine is running

Overall dimensions

Total length: 3683 mm

Total width: 2270 mm

Total height: 2335 mm to top of frame
2620 mm to top of exhaust

Ground clearance: 410 mm below side stabilizers of lower links

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Permissible tyre combinations

x permissible - unauthorized

Rear tyres	Front tyres					
	27/9.5-15	9.5L-15	11L-15	6.50-16	7.50-16	10.00-16
18.4-16.1	x	-	-	-	-	-
21.5L-16.1	x	-	-	-	-	-
14.9-24	x	x	x	x	x	-
16.9-24	x	x	x	x	x	-
18.4-26	x	x	x	x	x	-
14.9-28	-	x	x	x	x	-
16.9-28	x	x	x	x	x	-
16.9-30	x	x	x	x	x	-
18.4-30	-	x	x	x	x	-
16.9-34	-	x	x	-	x	x
13.6-38	-	x	x	-	x	x
15.5-38	-	x	x	-	x	x

TEST CONDITIONS

Track setting: 1500 mm at front, 1660 mm at rear

Weights

	without driver	with driver
front	1020 kg	1025 kg
rear	2205 kg	2285 kg
total	3225 kg	3310 kg

Fuels and lubricants used in tests

Fuel:	ARAL Diesel-fuel DIN 51601 density at 15°C at p.t.o. tests 0,836 kg/l at drawbar tests 0,827 kg/l
Engine	FUCHS TITAN-UNIVERSAL SAE 15W/40
Transmission, rear axle and hydraulic system:	JOHN DEERE RENOGEAR HYDRO J 20A
Grease:	Multi-purpose grease
Number of grease points:	13
Repairs and remarks	None

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COMPULSORY TESTS

(1) MAIN POWER TAKE OFF PERFORMANCE (540 r/min)

Date of tests: 3rd August 1987
Location of tests: DLG-Testing Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power kW	speed engine r/min	speed p.t.o. r/min	fuel consumption hourly l/h	fuel consumption hourly kg/h	fuel consumption specific g/kWh	specific energy kWh/l
Maximum power						
At 2-hour test						
49,2	2500	567	15,25	12,75	259	3,23
At rated speed						
49,2	2500	567	15,25	12,75	259	3,23
At standard p.t.o. speed						
48,3	2382	540	14,85	12,41	257	3,25
Part loads, the governor hand lever in the position corresponding to maximum power at full load (curve a)						
(i) the torque corresponding to maximum power at rated speed						
49,2	2500	567	15,25	12,75	259	3,23
(ii) 85% of the torque obtained in (i)						
42,5	2536	575	13,19	11,03	260	3,22
(iii) 75% of the torque defined in (ii)						
32,2	2562	581	10,83	9,05	281	2,97
(iv) 50% of the torque defined in (ii)						
21,7	2583	585	8,70	7,27	336	2,49
(v) 25% of the torque defined in (ii)						
10,9	2602	590	6,65	5,56	509	1,64
(vi) unloaded						
-	2620	594	4,52	3,77	-	-

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Power kW	speed engine r/min	speed p.t.o. r/min	fuel consumption hourly l/h	fuel consumption hourly kg/h	fuel consumption specific g/kWh	specific energy kWh/l
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (curve b)						
(i) the torque corresponding to maximum power						
48,3	2382	540	14,85	12,41	257	3,25
(ii) 85% of the torque obtained in (i)						
41,5	2405	545	12,70	10,62	256	3,27
(iii) 75% of the torque defined in (ii)						
31,5	2431	551	10,33	8,63	274	3,05
(iv) 50% of the torque defined in (ii)						
21,2	2455	557	8,20	6,86	323	2,59
(v) 25% of the torque defined in (ii)						
10,7	2476	561	6,20	5,18	486	1,72
(vi) unloaded						
-	2504	568	4,24	3,55	-	-

Standard specific fuel consumption (g/kWh): 260/336/256/323

No load maximum engine speed: 2620 r/min
Equivalent flywheel torque at rated engine speed: 188 Nm
Maximum equivalent flywheel torque: 222 Nm at 1405 r/min of the engine

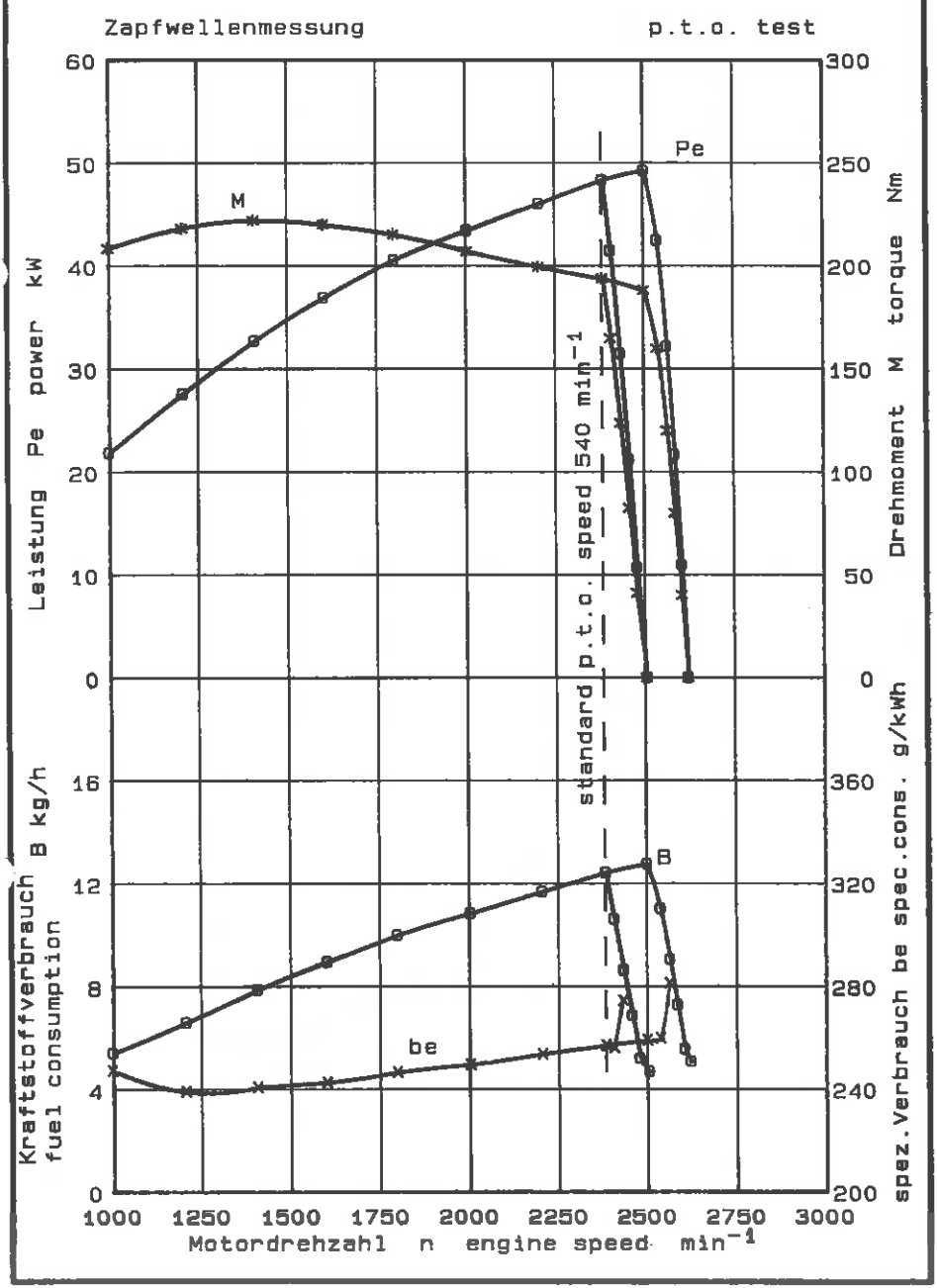
Mean atmospheric conditions

temperature	23 °C
pressure	992 mbar
rel. humidity	60 %

Maximum temperatures

coolant	89 °C
oil	108 °C
fuel	23 °C
air intake	23 °C

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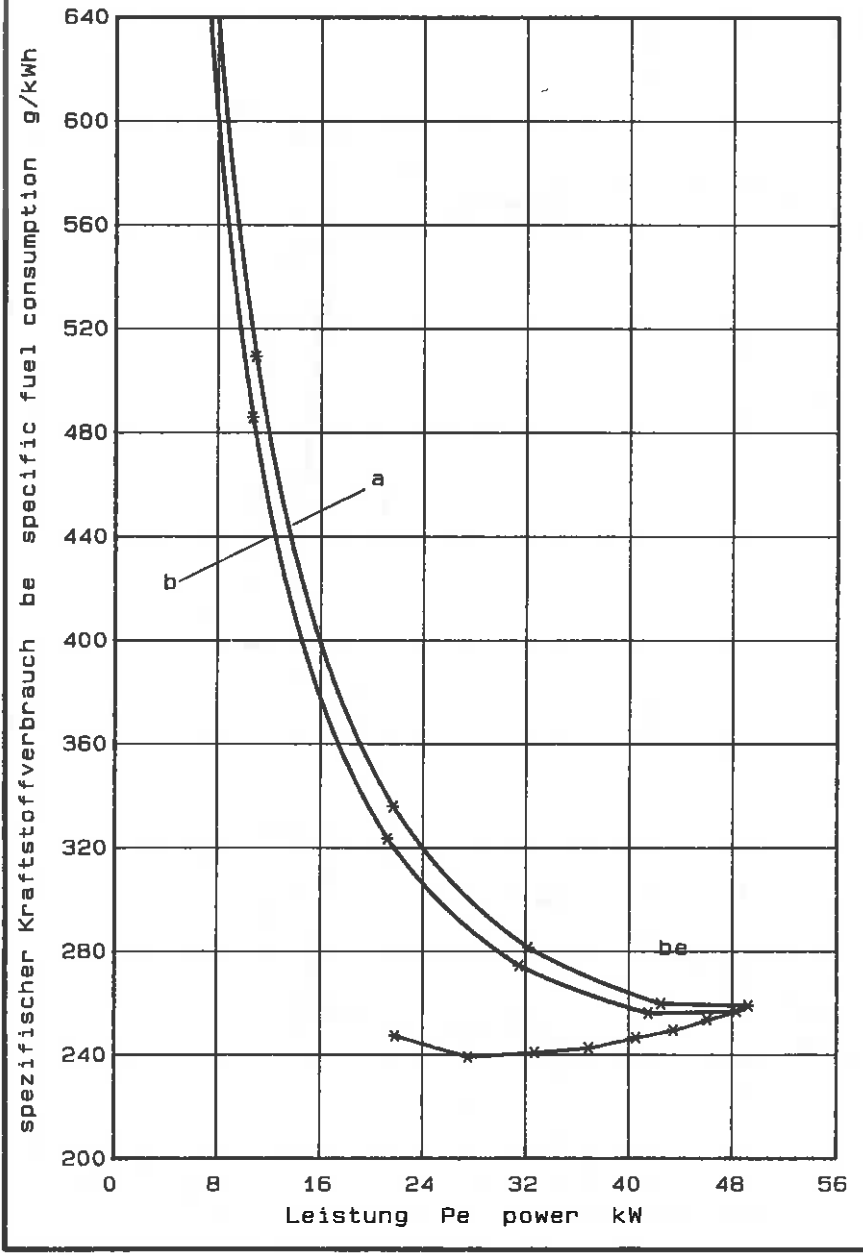


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Zapfwellenmessung

p.t.o. test



(2) LIFTING FORCES AND HYDRAULIC POWER

Date of tests: 4th August 1987

Lifting Forces (Linkage dimensions: see pages 10 and 11)

	Height of lower hitch points above ground in down pos. mm	Vertical movement mm	Max. force exerted through full range daN	Corresp. pressure of hydraul. fluid bar	Moment about rear axle daNm	Max. tilt angle of mast over range of lift degrees
At hitch points	200	590	1650	137	-	-
On the frame	200	715	1480	137	2343	12

Temperature of hydraulic fluid at start of test 65 °C

Lifting heights relative to horizontal lower links

mm	-365	-320	-300	-200	-100	0	+100	+200	+270	+300	+350
Lifting forces at hitch points											
daN		1650	1710	1980	2140	2250	2350	2410	2370		
Lifting forces at test frame											
daN	1480		1620	1750	1810	1830	1830	1810		1750	1660

Hydraulic Power

Sustained pressure with pump stalled 162 bar
Pump delivery rate at minimum pressure 55,5 l/min

	Hydraulic power kW	Flow rate l/min	Pressure bar	Oil temperature °C
at 90% of the actual relief valve setting	7,6	31,3	146	65
maximum	11,7	51,3	137	65

Tapping point used for test: At rear of tractor
Return: At gear oil filter housing
(supply into pressure line of transmission oil pump)

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(3) DRAWBAR POWER AND FUEL CONSUMPTION (unballasted tractor)

Date of tests: 5th August 1987
Type of tests: Concrete
Height of drawbar above ground: 550 mm

Gear	Driving speed km/h	Power kW	Drawbar pull daN	Engine speed r/min	Slip of wheels %
1 MAXIMUM POWER IN TESTED GEARS					
1 I	2,46	20,9	3064	2576	14,9
2 I	3,50	29,9	3074	2559	14,9
3 I	5,14	39,7	2779	2499	13,4
4 I	7,54	41,4	1977	2501	9,4
1 II	9,11	42,1	1662	2497	7,8
2 II	13,43	42,0	1125	2499	5,2
2 FUEL CONSUMPTION					
2.1 In selected gear at maximum power					
1 II	9,11	42,1	1662	2497	7,8
2.1.1 75% of pull at maximum power					
1 II	9,54	33,0	1244	2561	5,9
2.1.2 50% of pull at maximum power					
1 II	9,84	22,8	834	2588	3,9
2.1.3 Next higher gear at reduced engine speed; same pull and					
2 II	9,59	33,1	1241	1798	5,9
2.1.4 Next higher gear at reduced engine speed; same pull and					
2 II	9,89	22,8	830	1815	3,9
2.2 In selected gear nearest to 7,5 km/h					
4 I	7,54	41,4	1977	2501	9,4
2.2.1 75% of pull at maximum power					
4 I	7,88	32,3	1476	2548	7,0
2.2.2 50% of pull at maximum power					
4 I	8,17	22,4	988	2574	4,6
2.2.3 Next higher gear at reduced engine speed; same pull and					
1 II	7,82	32,1	1479	2124	7,0
2.2.4 Next higher gear at reduced engine speed; same pull and					
1 II	8,17	22,5	993	2164	4,6

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	Tyre size	Inflation pressure
Front:	11L-15	1,8 bar
Rear:	18.4-30	1,1 bar

Tread bar height at the beginning of drawbar tests:
rear tyres: 91% of the value when new

Specific fuel consumpt. g/kWh	Specific energy kWh/l	Temperatures Fuel °C	Coolant °C	Engine-oil °C	Atmospheric conditions Tempe-rature °C	Relative humidity %	Pressure mbar
388	2,13	22	80	90	17	79	1000
348	2,38	20	80	91	16	79	1000
322	2,57	23	81	99	20	72	1000
307	2,69	23	80	99	20	74	1000
303	2,73	24	82	96	20	72	1000
303	2,73	25	81	99	20	72	1000
303	2,73	24	82	96	20	72	1000
317	2,61	27	80	94	20	64	1000
354	2,34	27	80	94	20	64	1000
travelling speed as in 2.1.1							
283	2,93	26	79	90	20	68	1000
travelling speed as in 2.1.2							
300	2,75	26	79	90	20	68	1000
307	2,69	23	80	99	20	74	1000
310	2,67	26	80	95	19	66	1000
350	2,36	26	80	95	19	66	1000
travelling speed as in 2.2.1							
294	2,81	26	79	92	20	68	1000
travelling speed as in 2.2.2							
320	2,59	26	79	92	20	68	1000

ADDITIONAL TESTS

(4) NOISE AT THE DRIVER'S EAR

Date of tests: 5th August 1987
Type of track: Concrete
Type of sound level meter: BRÜEL & KJAER model 2209

Tractor fitted with JOHN DEERE protective frame ROLL GARD

Results of tests

Gear	Drawbar pull at which the tractor develops the maximum sound level daN	Travelling speed nominal km/h	Travelling speed effective km/h	Sound level dB(A)
1 I	2769	2,78	2,39	93,5
2 I	2712	3,97	3,44	94,0
3 I	2796	5,89	5,11	96,5
4 I +)	1994	8,23	7,43	97,0
4 I +)	light load	8,23	8,77	92,5
1 II	1658	9,79	9,08	96,0
2 II	1124	13,98	13,40	96,5
4 II	light load	29,00	30,73	94,0

+) The 4 I gear corresponds to the nominal speed nearest to 7,5 km/h

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