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

O.E.C.D. No. 914

Agricultural Tractor
FENDT FARMER 310 LSA TURBOMATIK
Type denomination FWA 192 S

Manufacturer
X. Fendt & Co., Maschinen- und Schlepperfabrik
D-8952 Marktoberdorf

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This bulletin is based on engineering tests in accordance with the O.E.C.D. STANDARD CODE for the Official Testing of Agricultural Tractor Performance. It does not contain an evaluation of the tractor performance on practical work.

Duration of Tests: July till September 1984
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: 27th November 1984 O.E.C.D. No. 914

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	= 0,736 kW
Pressures	1 bar	=	1,02 kp/cm²	or 1 kp/cm²	= 0,981 bar
	1000 mbar	=	750,10 mm Hg		

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PRÜFUNGS-ABTEILUNG
FENDT FARMER 310 LSA

Test No. 84-162

Tractor manufacturer:	X. FENDT UND CO D-8952 Marktoberdorf
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Marktoberdorf and Groß-Umstadt
Duration of running-in:	Engine and tractor appr. 80 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	FENDT
Trade name:	FARMER 310 LSA TURBOMATIK
Type denomination:	FWA 192 S
Type:	Wheel tractor, unit construction, four wheel driven
Serial No :	192/21/0004
1st serial No:	192/21/0001

Engine

Make:	MWM
Model:	TD-226-4;
Type:	Watercooled 4-stroke Diesel-engine, direct injection, turbo supercharged
Serial-No.:	TD 226.4.2.95501
Cylinders:	4, in line, bore 105 mm, stroke 120 mm, displacement 4156 cm^3, compression ratio 15,5 $\pm$ 0,5 : 1; dry cylinder liners
Valves:	Overhead
Fuel system:	PIERBURG fuel supply pump PE 20136; BOSCH in line injection pump PES 4A 80D 320/3 RS 1301, manufacturer's production setting 66,5 $\pm$ 1 mm^3/ stroke at rated speed and full load, injection timing 30 $\pm$ 0,5° before TDC; BOSCH multihole injection nozzles DLLB 151 S854, injection pressure 180 bar; BOSCH dual fuel filter with replaceable cartridges and water separator; capacity of fuel tank 135 l

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Governor:	BOSCH centrifugal variable speed type governor EP/RSV 325-1500 A 2 B 505 DR; governed range of engine speed 650 to 2500 1/min, rated engine speed 2350 1/min
Supercharger:	Exhaust driven supercharger, KÜHNLE, KOPP UND KAUSCH K 26-2660 GA 8.11, max. supercharge pressure 0,8 bar
Air cleaner:	MANN dry paper element filter with pre-cleaner, replaceable main cartridge and safety cartridge, electrical maintenance indicator; air intake above bonnet, optional air intake with longer pipe and cyclone
Exhaust silencer:	EBERSPÄCHER reflection-absorption-type silencer; 170 mm dia, 595 mm long; on the left hand side of engine, mouth showing rearwards to the left, 540 mm above ground; optional mouth showing upwards
Lubrication system:	Forced feed from gear type pump; strainer in sump; filter in full flow with by-pass valve and replaceable cartridge; oil and cartridge change period 200 operating hours; oil capacity 9,5 l; specified oil quality MIL-L-2104 C

recommended oil viscosities:

over	+ 5°C	SAE 30
over	- 10°C to +10°C	SAE 20W/20
below	- 5°C	SAE 10W

engine oil-cooling water heat exchanger between oil filter and filter socket

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Cooling system:	Watercooling with impeller pump; overpressure valve set to 0,4 bar; cooling circuit with by-pass and thermostat, fan with 7 blades, 455 mm dia; water capacity 17 l; optional cooling system for tropic conditions
Starting system:	Electrical BOSCH solenoid pre engaged-drive starting motor 2,7 kW; depressed pedal of travel clutch as safety device; BERU flame plug in intake manifold
Electrical Equipment:	12 Volt, negative earth BOSCH 3-phase alternator KI 14 V 55A 770W 1 lead acid battery, 135 Ah at 20 hours rating

Transmission

Clutch:	1. VOITH fluid clutch 390 TD for travel and p.t.o. drive 2. FICHTEL UND SACHS dry disc clutch GTF 320 N for travel drive, disc 320 mm dia, hydraulically operated by pedal, self readjusting
Gear box:	FENDT, type 21/6; synchro-mesh gear box with 3 forward speeds and 1 reverse speed; 1 synchro-mesh close stepped range gear with 3 ranges, slow (FL), intermediate (FM) and fast (FS); 1 range gear with collar shifted road range (S) and sliding gear shifted field range (A); 3 independent synchronized overdrive speeds, total 21 forward and 6 reverse speeds; optionally available with creeper range, if creeper range is installed, fast range (FS) and the 1st overdrive must fall away, then total 20 forward and 6 reverse speeds

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Rear axle and final drives: FENDT
portal construction;
bevel gear drive; bevel gear differential with pedal operated lock, not selfdisengaging;
differential lock with pilot lamp;
double spur gear final drives in portals

Front axle and final drives: ZAHNRADFABRIK FRIEDRICHSHAFEN
APL 345
driven by universal joint shaft on the left hand side of gear box, dry multi-disc clutch to be shifted by hand lever under load;
bevel gear drive, multi-plate self locking differential;
planetary final drives

Lubrication:

	oil quality MIL - L -	oil viscosity SAE	oil capacity l	oil change interval operating hours
fluid clutch	46152	10W	7,2	500
gear box	2105	80	32,5	1600 or after 2 years
front axle differential	2105 B	90	6,0	
final drives at front			0,75 each	
final drives at rear			7,5 each	

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Total ratios and speeds (tyres 16.9 - 38)

Range	Close stepped range	Gear	Total ratio engine: driving wheel	Nominal travelling speed*) at rated engine speed km/h
Forward speeds				
A	FL	1	523,44	1,32
		2	327,15	2,11
		3	202,06	3,42
	FM	1	434,30	1,59
		2	271,44	2,54
		3	167,65	4,12
	FS	1	363,19	1,90
		2	226,99	3,04
		3	140,20	4,92
S	FL	1	130,86	5,27
		2	81,79	8,44
		3	50,52	13,66
	FM	1	108,58	6,36
		2	67,86	10,17
		3	41,91	16,47
	FS	1	90,80	7,60
		2	56,75	12,16
		3	35,05	19,69
1st overdrive			29,44	23,44
2nd overdrive			23,65	29,19
3rd overdrive			18,45	37,40
Reverse speeds				
A	FL	R	361,59	1,91
	FM	R	300,01	2,30
	FS	R	250,88	2,75
S	FL	R	90,40	7,64
	FM	R	75,00	9,20
	FS	R	62,72	11,00

*) calculated with the radius index 795 mm and 2% slip of the fluid clutch

Power-take-off

Main p.t.o.: Independent,
optionally shiftable as ground p.t.o.
(not installed on tested tractor);
driven by multi-plate clutch, lever operated,
independent of travel clutch;
discs 168 mm dia;
1 p.t.o. shaft at rear of tractor, in tractor's median plane;
height above ground 740 mm, 400 mm behind rear axle centre line (rear tyres size 16.9 R 38);
35 mm dia, 6 splines ISO 500 / DIN 9611, type 1;
rotation clockwise, viewed to tractor's rear

3 speeds are preselectable by hand lever
(with engaging pilot lamp):

p.t.o. transmission ratio	p.t.o. speed 1/min	engine speed 1/min	slip of fluid clutch in % full load	without load
540	581	2350	*)	0
4,046	540	2185	*)	0
750	744	2350	2,0	-
	759	2350	-	0
3,097	540	1730	3,4	-
1000	1038	2350	2,0	-
	1060	2350	-	0
2,217	1000	2269	2,3	-

*) not tested

Secondary p.t.o.: Optionally available front p.t.o.
1000 or 750 1/min;
(not installed on tested tractor)

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Power lift	FENDT and BOSCH electro-hydraulic power lift FENDT-TRONIC, draft- and position-control both steplessly mixable, floating position; lower link sensing, continuous stroke limiter, lowering throttle
Hydraulic-system:	Open centre system with 2 separated oil circuits; BOSCH tandem gear pump HY ZFFS 11/16 + 14 L directly driven by engine
	hydraulic circuit 1: pump with 40 l/min delivery at rated engine speed; supplies power lift control valve and up to 3 additional control valves; oil filter with replaceable cartridge incorporated in oil reservoir, cartridge changing yearly or after 1000 operating hours
	hydraulic circuit 2: pump with 35 l/min delivery at rated engine speed; supplies steering with priority with constant 9 l/min and optionally an additional control valve (not fitted on tested tractor) with residual oil flow of 26 l/min (creeping operation); oil filter in pressure line, filter changing yearly or after 1000 operating hours; oil tank in common with circuit 1;
	automatic flow valve steers residual oil flow of circuit 2 into circuit 1, with that oil flow 66 l/min at rated engine speed; by opening a shutoff valve, residual oil flow of circuit 2 may be drained directly into oil tank, then oil flow 40 l/min at rated engine speed

BOSCH control valve,
maximum working pressure 175 + 12 bar;
single acting ram with 86 mm bore and
138 mm stroke;
overpressure relief valve in cylinder set
to 210 bar;
2 double acting additional rams with 35 mm bore
and 203 mm stroke;

1 single acting and 1 double acting
additional BOSCH control valve,
couplings and separate return pipe at rear of
tractor and in tractor's middle (between rear
and front axle);
maximum 4 additional control valves with
couplings and separate oil return pipe at rear
and in middle of tractor available;
up to 23 l oil may be taken off by tappings if
tractor is working stationary, up to 15 l
if tractor is travelling

Hydraulic oil:

Hydraulic oil tank with 27 l capacity on the
right hand side at engine;
recommended:
engine oil SAE 20W/20 (tropics SAE 30)
or SAE 20W/30,
MIL-L-46152 or MIL-L-2104 C;
oil change interval 1000 operating hours or
yearly

Lift shaft lubrication:

Own oil reservoir incorporated in power lift
unit, oil level checking interval 200 operating
hours;
specified:
multi purpose gear oil SAE 80,
MIL-L-2105

Implement linkage:

Three point linkage with WALTERSCHEID
quick couplers, joint balls category 2 acc. to
ISO 730/I, DIN 9674;
lower link hitch points in the height above
ground; steplessly hydraulically lockable;
lower link side stabilization by quick
clamping devices with middle centering

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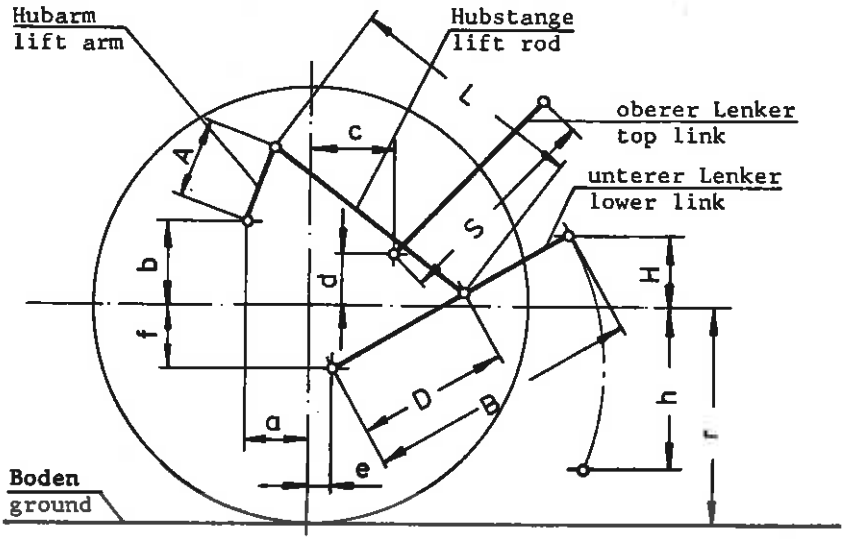
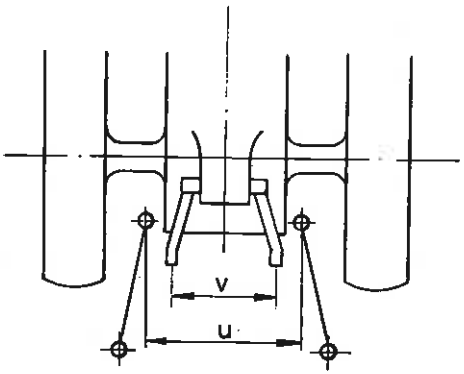
Figures of power lift:





dimensions see on page 13

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dimensions of rear implement linkage (projected lengths, in mm) (underlined dimensions are valid for power lift measurement page 29)

Rear tyres (size 16.9 - 38)	radius index	(r)	795
Front tyres (size 14.9 - 24)	radius index	(r')	590
Length of lift arms		(A)	310
Length of lower links		(B)	954
Distance of lift arm pivot point from rear wheel centre line	horizontally	(a)	-15
	vertically	(b)	303
Horizontal distance between the 2 lower link points		(u)	456
Horizontal distance between the 2 lift arm end points		(v)	530
Length of upper link		(S)	721 to 1021
Distance of upper link pivot point from rear wheel centre line	horizontally	(c)	166, 148 or 130
	vertically	(d)	214, 263 or 312
Distance of lower link pivot point from rear wheel centre	horizontally	(e)	104
	vertically	(f)	261
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	614 or 697
Length of lift rods		(L)	782, 722 to 853

Height of lower link hitch points relative to rear axle centre line (situated 795 mm above ground), these data are valid for unloaded power lift

	Length of lift rods (L)	722		853	
	Linkage distance of lift rods (D)	614	697	614	697
Lowest position	(h)	465	405	774	669
Highest position	(H)	217	167	20	17
Highest transport position	(H')	217	167	20	17

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Implement linkage at front:	Optionally available, not fitted on tested tractor

Pull attachment

Swinging drawbar:	Reversible and shiftable; height above ground 400 or 490 mm (rear tyres size 16.9 R 38) hitch point behind rear axle 729 or 813 mm behind p.t.o. shaft 329 or 413 mm below p.t.o. shaft 340 or 250 mm lateral adjustment about 130 resp. 150 mm to either side; pivot point behind rear axle centre 398 mm hitch hole diameter 33 mm piton fix optionally available
Trailer hitch:	FENDT, AK-001, non-automatical; hitch point above ground 769, 811, 853, 895 or 937 mm behind rear axle 584 mm behind p.t.o. shaft end 184 mm above p.t.o. shaft 29, 71, 113, 155 or 197 mm height adjustable by one-hand quick adjustment, maximum permissible vertical load 1500 kg automatical hitch optionally available
Holed drawbar:	Long bar; total length 1700 mm, length between joint balls 825 mm, thickness 25 mm, width 100 mm; 9 holes between joint balls with 80 mm distance each, outside of joint balls 4 holes on each side with 80 mm distance each; all holes 33 mm dia; height above ground, minimum 21 mm maximum 1012 mm holes centre line behind p.t.o. shaft end / 658 mm

Towing hitch: At front, 760 mm above ground

Steering

FENDT with ZF;
hydrostatic steering model 8492;
oil supply by oil circuit 2 of
hydraulic system (see page 10);
1 double acting ram, directly acting on front
axle, 230 mm stroke, 63 mm dia, piston rod
36 mm dia

Brakes

Parking brake: Internal-expanding-shoe brake;
mechanically acting on 2 brake drums
with 180 mm dia and 30 mm width,
on each differential half shaft;
operated by pulling handle with ratchet

Service brake: FENDT with GIRLING and TEVES;
pedal operated muscle power brake with
hydraulic transmission to 2 dry disc brakes
on the differential half shafts with 2 lining
discs each, with 165 mm dia;
additional caliper disc brake, disc 260 mm dia,
acting on joint shaft to front axle drive

Steering brake: Divided pedal of service brake,
for normal use locked together

Wheels

Steered wheels: At front, 2 pneumatics
14.9 R 24 126 A 8 MICHELIN, radial-ply tyres;
maximum permissible load per tyre 1700 kg
at 1,6 bar inflation pressure and 40 km/h
road speed;
track width 1694 mm, adjustable to 1834 mm
by reversing the wheels;
rims W 12 x 24,
offset lug type rims optionally available

Driving wheels:	At front and at rear; rear driving wheels: 2 pneumatics 16.9 R 38 8 ply CONTINENTAL, radial-ply tyres; maximum permissible load per tyre 2520 kg at 1,7 bar inflation pressure and 40 km/h road speed; track width 1662 mm, adjustable to 1516 mm by reversing the wheels; rims W 14 L x 38, offset lug type rims optionally available
Wheel base:	2355 mm
Cab	FENDT, model 198.500; OECD-tested, approval no. CSS 007/3-a(C); antivibration mounted by 4 silent blocks on tractor, for maintenance tiltable, 1 door and 3 steps each on the left and right; steps 500, 715 and 930 mm, driver's platform 1140 mm above ground; doors optional with setting in ventilation position, front-, rear- and side windows as well as roof hatch tiltable; combined heating and ventilation system with 3-stage blower, heating connected to cooling water circuit; air intake below windscreen, dry air filter; air outlet jets at instrument panel, defroster nozzles, heating by circulating air possible; additional ventilation system with 3-stage blower incorporated in roof (outfit on request), 6 air outlet jets for head room, air intake above windscreen, dry air filter; tinted glass; cab optionally with air conditioner available

noise reduction materials:

floor	ribbed rubber mat with foam	15 mm
	under it bitumen mat	2 mm
roof	phenolic resin bonded cotton fleece with FT-covering fabric	6-16 mm
mudguards	PU-foam coated with imitation leather	15 mm
seat support	ribbed rubber mat	10 mm
	under it bitumen mat	2 mm
rear wall	rubber mat	10 mm
	under it bitumen mat	2 mm
switch box (inside bottom)	foam with imitation leather	20 mm
bulk head	bitumen mat	4 mm
instrument and steering support	inside covered with bitumen mat	5 mm
	inside foam on pedal openings outside foam with imitation leather	20 mm

Seat

GRAMMER, model DS 85 H/50 R;
upholstered seat with integral arm rests and folding back rest (upper part);
adjustable spring with shock absorber;
height of unloaded seat above platform adjustable in 2 steps from 475 to 535 mm;
longitudinal adjustment range 170 mm;
on request available:
seats GRAMMER model DS 85 H/90 AR or
GRAMMER model LS 95 H1/90 (air suspension)

Number of grease points

20

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Dimensions (Tyres: 14.9 R 24 at front, 16.9 R 38 at rear)

Total length:	4110 mm without ballast 4570 mm with ballast
Total width:	2085 mm without ballast 2525 mm with ballast
Total height:	2725 mm to top of cab roof, cab with roof which is 70 mm lower optionally available
Ground clearance:	415 mm below swinging drawbar

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

	Dimensions mm	Height above ground of centre mm	Distance from outside edge of tractor to centre *) mm
Head lights	135 x 115	990	873
Side lights	65 x 20	1570	210
Rear lights	33 x 60	1580	250
Reflectors			
1st pair	115 x 25	1530	250
2nd pair	70 dia	620	650

*) track width: see page - 19 -

Available tyres

Tyre sizes at front	at rear
12.4 - 28 6 ply +) 14.9 - 24 6 ply +)	16.9 R 38 8 ply
13.6 - 24 8 ply +)	14.9 R 38 8 ply
14.9/80 - 24 10 ply 14.9 - 24 8 ply +)	18.4 R 34 8 ply
9.5 - 32 10 ply +)	+) 9.5 - 48 8 ply
14.9 - 26 8 ply +)	18.4 R 38 8 ply

+) also allowed as radial-ply tyres

Running-time meter: Electrical, counts really operating hours, if alternator is working

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TEST CONDITIONS

Track setting: 1694 mm at front
1662 mm at rear

Weights

		without driver kg	with driver kg
Without ballast:	front	1755	1770
	rear	2555	2630
	total	4310	4400
Front ballast:	14 weights, total		553
	water in the tyres		335
Rear ballast:	8 weights per wheel, total		1024
	water in the tyres		688
With ballast:	front	2785	2800
	rear	4125	4200
	total	6910	7000

Fuels and lubricants used in tests

Fuel:	ARAL Diesel-fuel DIN 51601 density at 15°C	
	at engine test	0,848 kg/l
	at p.t.o. test and at drawbar tests	0,844 kg/l
Engine oil:	MOBIL DELVAC 1310 in engine, power lift and steering	SAE 20W/20
	MOBIL DELVAC 1310 in fluid coupling	SAE 10W
Transmission oil:	MOBIL MOBILUBE GX 80 A in gear box,	SAE 80
	MOBIL MOBILUBE HD 90 in front axle differential and in final drives at front and at rear	SAE 90

COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE (1000 rev/min)

Date of tests: 10th August 1984
Location of tests: DLG-Testing-Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power	Speed engine	Speed fl.clutch output	Speed p.t.o.	Fuel consumption hourly		Fuel consumption spec.	Specific energy
kW	rev/min	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
Maximum power							
At 2-hour test							
63.2	2350	2301	1038	18.44	15.56	246	3.43
At rated engine speed							
63.2	2350	2301	1038	18.44	15.56	246	3.43
Part loads, the governor hand lever in the position corresponding to the maximum power at full load (curve a)							
(i) 85% of the torque at maximum power at 2-hour test							
54.8	2384	2349	1059	16.51	13.94	254	3.32
(ii) unloaded							
-	2496	2496	1126	4.88	4.12	-	-
(iii) 50% of the torque defined in (i)							
28.1	2430	2405	1084	10.35	8.73	311	2.71
(iv) maximum power							
63.2	2350	2301	1038	18.44	15.56	246	3.43
(v) 25% of the torque defined in (i)							
14.2	2452	2441	1101	7.45	6.29	441	1.91
(vi) 75% of the torque defined in (i)							
41.6	2406	2376	1071	13.35	11.26	271	3.12

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Power	Speed engine	Speed fl.clutch output	Speed p.t.o.	Fuel consumption hourly		Fuel consumption spec.	Specific energy
kW	rev/min	rev/min	rev/min	l/h	kg/h	g/kWh	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) 85% of the torque at maximum power at standard p.t.o speed							
53.9	2312	2268	1023	16.12	13.61	252	3.35
(ii) unloaded							
-	2412	2412	1088	4.53	3.82	-	-
(iii) 50% of the torque defined in (i)							
27.7	2346	2329	1050	9.96	8.40	304	2.78
(iv) maximum power							
62.4	2269	2217	1000	17.97	15.17	243	3.47
(v) 25% of the torque defined in (i)							
14.0	2386	2362	1065	7.13	6.02	429	1.97
(vi) 75% of the torque defined in (i)							
41.0	2332	2298	1036	12.93	10.91	266	3.17

Standard specific fuel consumption (g/kWh): 254/311/252/304

No load maximum engine speed: 2496 rev/min
Equivalent flywheel torque at maximum power (2 hours): 262 Nm
Maximum equivalent flywheel torque: 336 Nm at 1500 rev/min of the engine

Mean atmospheric conditions:	temperature	23 °C
	pressure	995 mbar
	relative humidity	80 %
Maximum temperatures:	coolant	89 °C
	engine oil	114 °C
	fuel	21 °C
	engine air intake	26 °C

The equivalent flywheel torques are given relative to the output shaft of the fluid clutch

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Zapfwellenleistung

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P.t.o. performance

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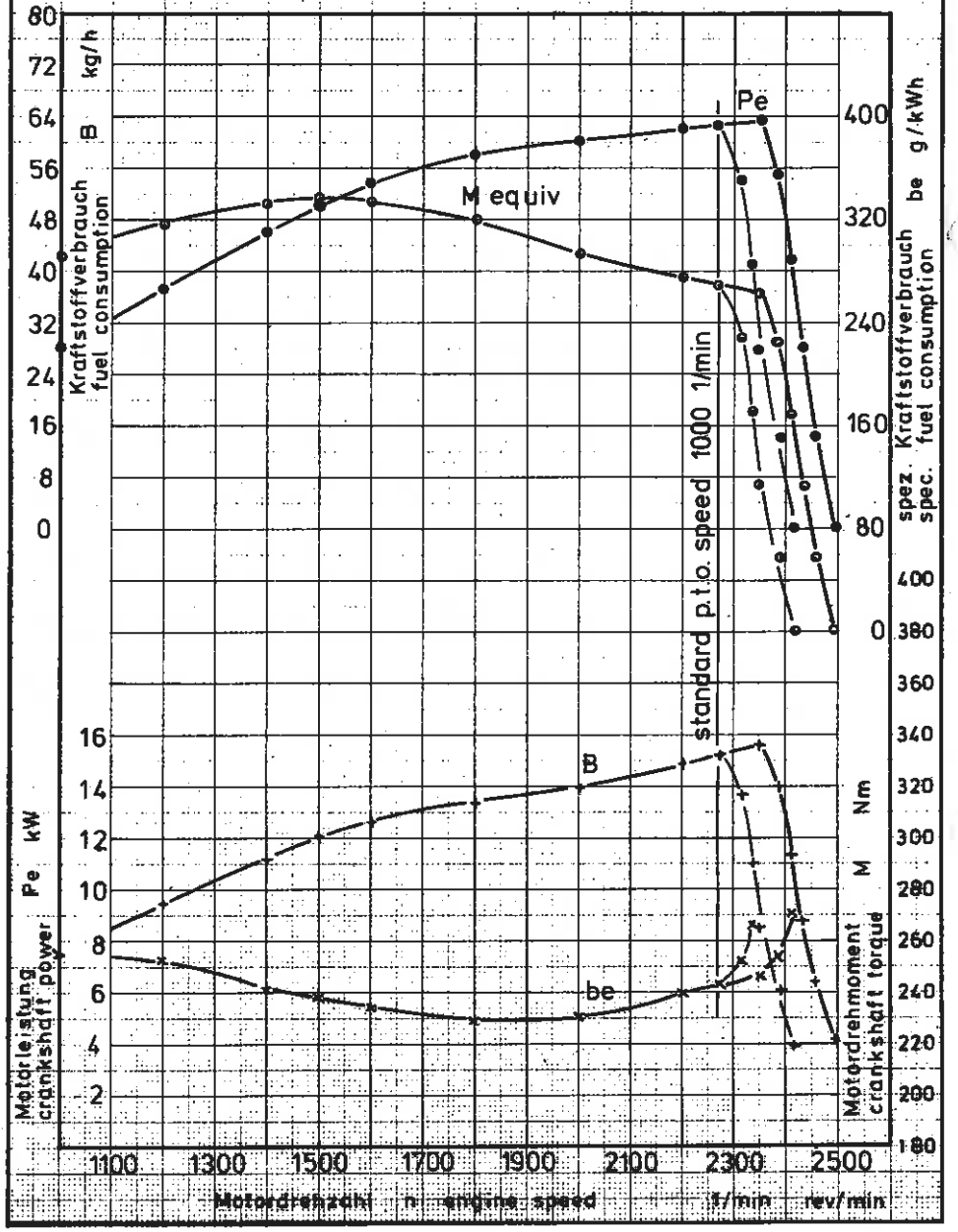

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Zapfwellenleistung

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P.t.o. performance

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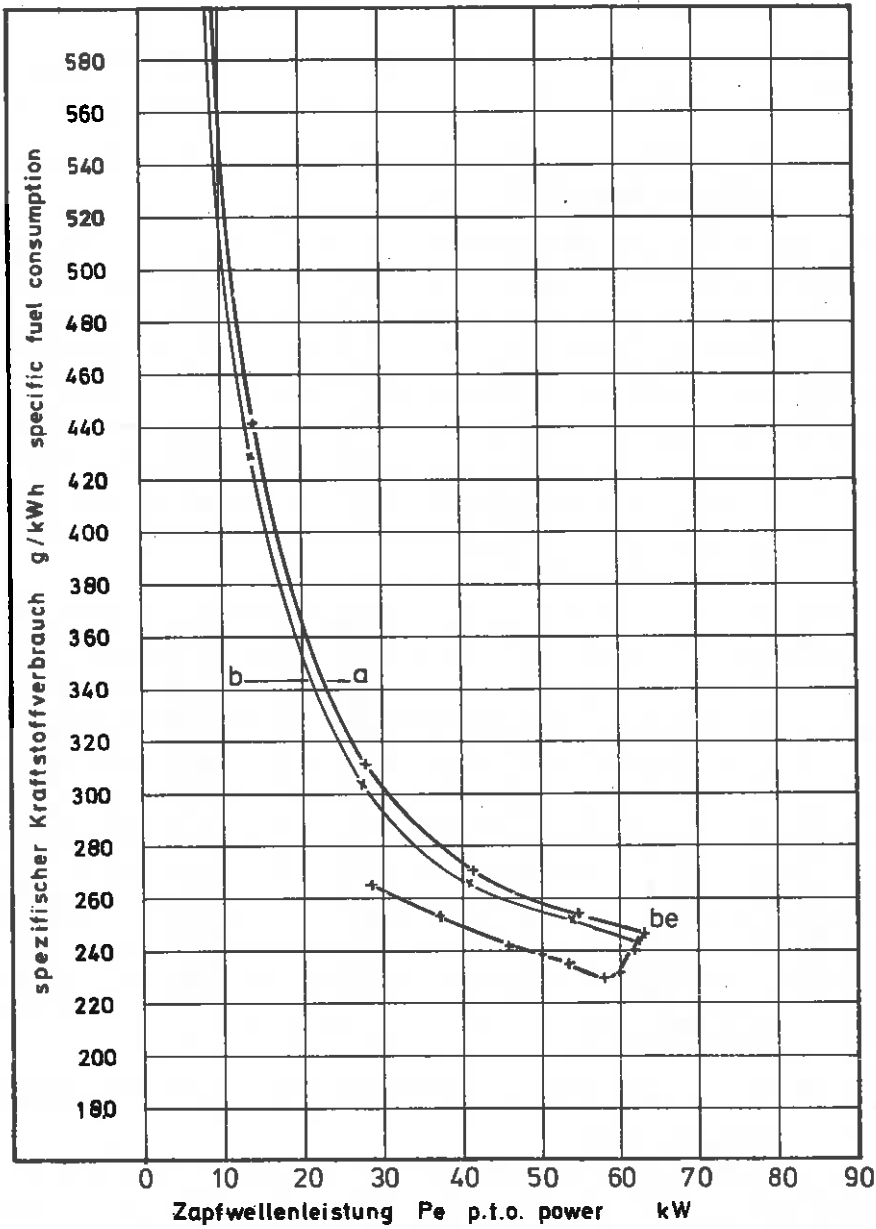

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(2) DRAWBAR PERFORMANCE

Date of tests: 21st till 24th August 1984
Type of track: Concrete

Gear	Driving speed km/h	Power kW	Drawbar pull daN	Engine speed 1/min	Slip of wheels %
(i) MAXIMUM POWER (unballasted) height of drawbar above ground 390 mm					
3 A FL	2,99	38,1	4586	2401	14,9
3 A FM	3,56	45,3	4583	2388	15,1
3 A FS	4,40	52,2	4270	2352	10,9
1 S FL	4,76	54,1	4092	2349	9,9
1 S FM	5,91	55,7	3391	2346	6,7
1 S FS	7,19	56,1	2809	2349	5,3
2 S FL	8,02	56,0	2514	2348	4,6
2 S FM	9,78	55,6	2046	2351	3,5
2 S FS	11,77	55,2	1689	2349	3,0
3 S FL	13,28	54,3	1471	2348	2,4
3 S FM	16,06	52,9	1186	2351	1,9
(ii) MAXIMUM POWER (ballasted) height of drawbar above ground 470 mm					
1 A FL	1,16	22,4	6948	2407	15,1
1 A FM	1,41	27,1	6946	2420	15,0
1 A FS	1,67	32,4	6990	2408	14,9
2 A FL	1,84	35,6	6956	2394	15,0
2 A FM	2,21	42,9	6991	2387	14,9
2 A FS	2,63	50,1	6861	2346	13,4
3 A FL	3,12	51,6	5959	2349	8,3
3 A FM	3,86	53,7	5009	2347	6,1
3 A FS	4,69	54,2	4164	2349	4,5
1 S FL	5,03	55,7	3990	2350	4,3
1 S FM	6,13	55,1	3235	2350	3,3
1 S FS	7,37	54,5	2663	2351	2,7
2 S FL	8,19	55,1	2424	2350	2,3
2 S FM	9,92	53,8	1951	2347	1,8
2 S FS	11,89	52,2	1579	2350	1,4
(iii) FIVE-HOUR-TEST at 75% of pull at maximum power in 1 S FS gear					
1 S FS	7,60	42,2	1997	2397	1,9
(iv) FIVE-HOUR-TEST at pull corresponding to 15% wheel slip in test (ii)					
2 A FM	2,09	40,6	6991	2378	-

Total oil consumption during ten hours duration of tests (iii) and (iv) 28 g/h

PRÜFUNGS-ABTEILUNG

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Tyre size front: 14.9 R 24 126 A8
rear: 16.9 R 38 8 ply

Tread bar height at the beginning of drawbar tests:
98 % at front, 87 % at rear 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
tyre inflation pressure 0,8 bar at front; 1,0 bar at rear							
336	2,52	23	79	100	18	99	1003
325	2,60	23	79	95	15	95	1003
299	2,82	23	78	101	18	98	1003
289	2,92	23	77	103	19	90	1003
280	3,01	23	76	104	19	94	1003
280	3,02	23	76	104	19	93	1003
279	3,02	23	75	103	20	86	1003
282	2,99	23	77	103	20	82	1003
284	2,97	23	77	101	22	76	1003
288	2,93	24	77	102	22	78	1003
293	2,88	24	78	101	22	74	1003
tyre inflation pressure 1,3 bar at front and at rear							
392	2,16	23	75	97	19	86	991
368	2,29	23	75	98	18	86	991
347	2,43	23	73	98	18	90	991
341	2,47	23	74	98	18	89	991
330	2,56	23	76	102	18	85	991
310	2,72	24	76	102	19	86	991
301	2,81	26	78	102	23	74	991
289	2,92	27	78	102	23	72	991
287	2,94	26	78	100	24	70	991
280	3,02	29	78	102	24	68	991
281	3,00	28	78	103	24	67	991
285	2,96	30	78	100	25	63	991
283	2,98	29	79	102	25	61	991
288	2,93	31	78	101	25	64	991
296	2,85	30	77	101	25	60	991
303	2,79	30	79	105	25	77	1001
-	-	28	78	105	25	81	1001

Test (iv) was carried out with additional ballast,
the figures not quoted are therefore irrelevant

PRÜFUNGS-ABTEILUNG
FENDT FARMER 310 LSA

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(3) TURNING SPACE AND TURNING CIRCLE (front wheel drive disengaged)

Wheel equipment front: 14.9 R 24 126 A8
rear: 16.9 R 38 8 ply

Track of wheels front: 1694 mm
rear: 1662 mm

	With brakes		Without brakes	
	left-hand m	right-hand m	left-hand m	right-hand m
Radius of turning space	4,23	4,29	4,95	5,01
Radius of turning circle	3,97	4,03	4,69	4,75

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	987 mm
Distance forward from rear axle centre	949 mm
Distance from tractor's median plane, to the left	2 mm

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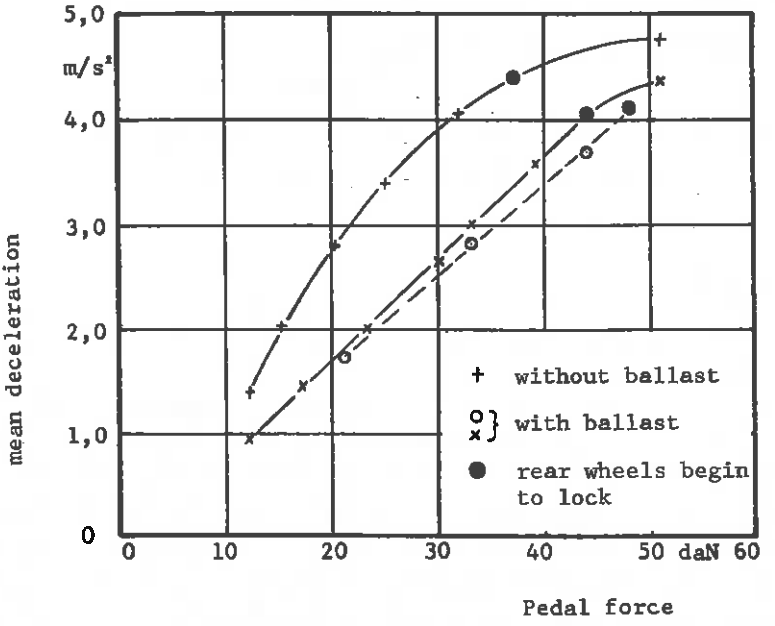
(5) Braking (front wheel drive disengaged)

Date of tests: 22nd and 23rd August 1984

Tractor masses during tests with driver:	front kg	rear kg	total kg
without ballast	1770	2630	4400
with ballast	2800	4200	7000

A) Service brake

Type-0-test (cold brakes) ——, Type-I-(fade)test – – –



Speed before application of brakes, without ballast 38,9 km/h
with ballast 38,6 km/h

The brakes were heated by towing of the tractor for 1 km

No deviation of tractor from original course and no abnormal vibrations

Parking brake

	Ballasted tractor on 18%-slope		Unballasted tractor on 12%-slope with trailer of 3000 kg	
	up	down	up	down
Braking device control force daN	21	25	16	19

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(6) MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of test: 22nd August 1984
Type of track: Concrete
Type of sound level meter: BRÜEL AND KJAER model 2203

Results of test

Gear: 3rd overdrive *)
Travelling speed before acceleration: 29,2 km/h
Sound level: 85,5 dB(A)

(7) NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 21st August 1984
Type of track: Concrete
Type of sound level meter: BRÜEL AND KJAER model 2209

tractor fitted out with FENDT safety cab model 198.500

Results of tests

Gear	Drawbar pull at which the tractor develops the maximum sound level	Travelling speed nominal	Travelling speed effective	Sound level
	daN	km/h	km/h	dB(A)
1 A FL	4324	1,32	1,14	78,0
1 A FM	4388	1,59	1,36	78,0
1 A FS	4345	1,90	1,73	78,5
2 A FL	4387	2,11	1,89	78,5
2 A FM	4412	2,54	2,24	78,5
2 A FS	4330	3,04	2,77	79,0
3 A FL	4282	3,42	3,12	78,5
3 A FM	4312	4,12	3,66	79,5
3 A FS	4048	4,92	4,53	79,5
1 S FL	3912	5,27	4,90	79,0
1 S FM	3149	6,36	6,07	79,5
1 S FS **)	2600	7,60	7,36	79,0
1 S FS **)	light load	7,60	8,17	75,5
2 S FL	2421	8,44	8,19	78,0
2 S FM	1949	10,17	9,88	78,5
2 S FS	1595	12,16	11,88	79,0
3 S FL	1411	13,66	13,35	78,0
3 S FM	1103	16,47	16,09	78,5
3 overdrive	light load	37,40	38,88	78,5

*) front wheel drive disengaged
**) the 1 S FS gear corresponds to the nominal travelling speed nearest to 7,5 km/h

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(8) POWER LIFT AND HYDRAULIC POWER TEST

Date of tests: 4th September 1984

Power Lift Test

	Height of lower hitch point 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	660	3400	161	-	-
On the frame	200	700	2920	161	4866	4,0

Temperature of hydraulic fluid at start of test 65 °C

Lifting heights relative to horizontal lower links

mm	-334	-300	-200	-100	0	+100	+200	+300	+326	+366
Lifting forces at hitch points										
daN	3400	3480	3610	3660	3660	3660	3570	3530	3480	
Lifting forces at test frame										
daN	3440	3480	3480	3440	3390	3310	3220	3050		2920

Hydraulic power test

Measurements at maximum oil flow (see page 10)

Opening pressure of relief valve in remote circuit 161 bar

Sustained pressure with relief valve open 183 bar

Pump delivery rate at minimum pressure and maximum engine speed 69,1 l/min

hydraulic power	kW	flow rate l/min	pressure bar	oil temperature °C
at 90% of the actual relief valve setting	15,9	57,8	165	65
maximum	16,3	60,9	161	65

Tapping point used for test: at rear of tractor

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OPTIONAL TESTS

(9) ENGINE PERFORMANCE

Date of tests: 1st August 1984
Location of tests: DLG-Testing-Station Groß-Umstadt
Type of dynamometer: SCHENCK eddy-current dynamometer W 150

Power kW	Engine speed rev/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					
70.6	2350	18.51	15.69	222	3.81
At standard p.t.o. speed (1000 rev/min)					
69.3	2269	17.97	15.24	220	3.86
At rated engine speed					
70.6	2350	18.51	15.69	222	3.81
Part loads					
(i) 85% of the torque at maximum power at 2-hour test					
60.6	2374	16.30	13.82	228	3.72
(ii) unloaded					
-	2476	3.86	3.27	-	-
(iii) 50% of the torque defined in (i)					
30.8	2417	9.77	8.29	269	3.16
(iv) maximum power					
70.6	2350	18.51	15.69	222	3.81
(v) 25% of the torque defined in (i)					
15.6	2450	6.77	5.74	367	2.31
(vi) 75% of the torque defined in (i)					
45.8	2391	12.96	10.99	240	3.53

Optimum fuel consumption: 209 g/kWh at 54.3 kW and 1645 rev/min
No load maximum engine speed: 2476 rev/min
Torque at maximum power (2 hours): 287 Nm
Maximum torque: 361 Nm at 1508 rev/min of the engine

Mean atmospheric conditions:	temperature	23 °C
	pressure	998 mbar
	relative humidity	89 %
Maximum temperatures:	coolant	85 °C
	engine oil	103 °C
	fuel	25 °C
	engine air intake	25 °C

Motorleistung
Engine performance

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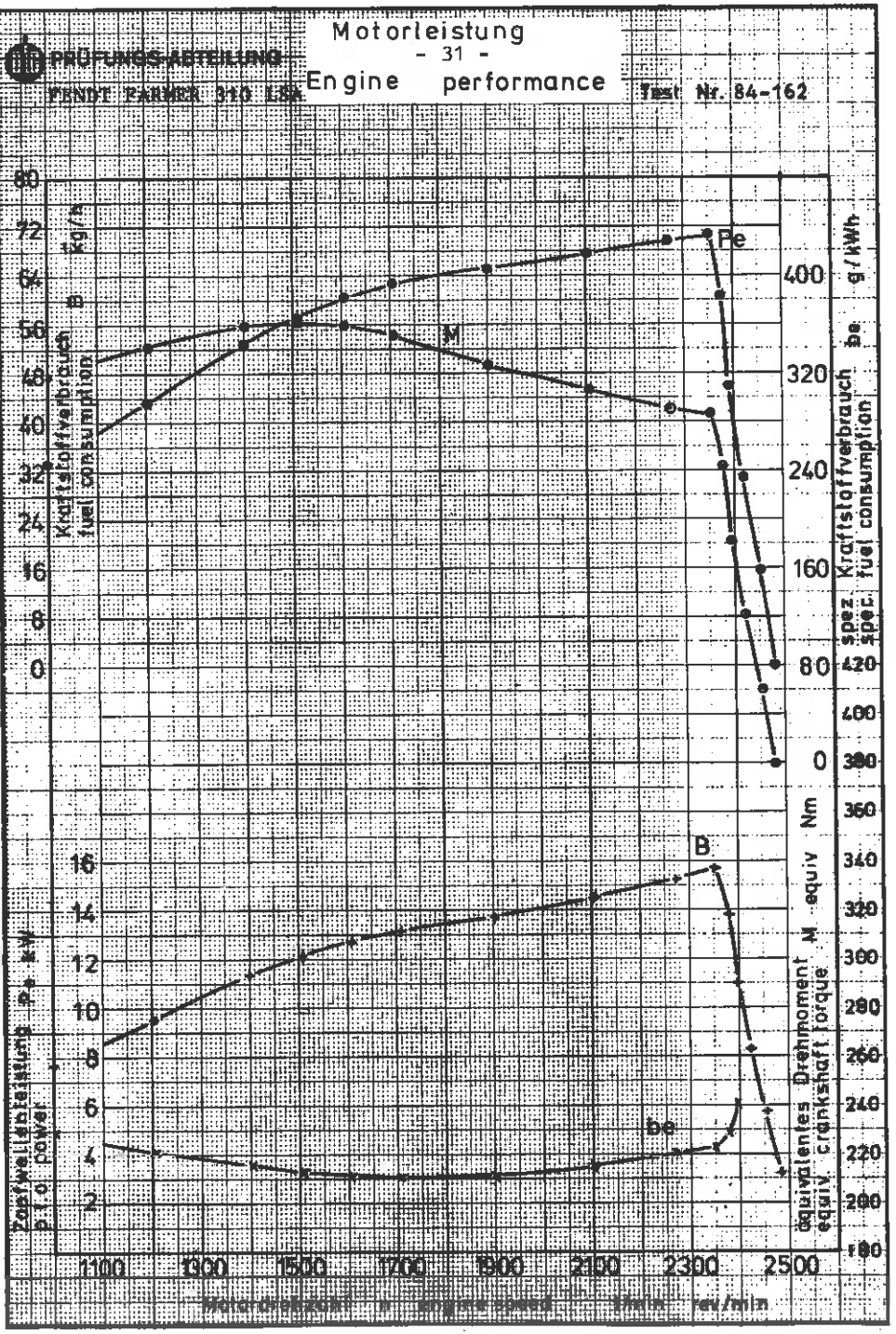
FENDT FARMER 310 LSA

Test Nr. 84-162



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FENDT FARMER 310 LSA

Motorleistung

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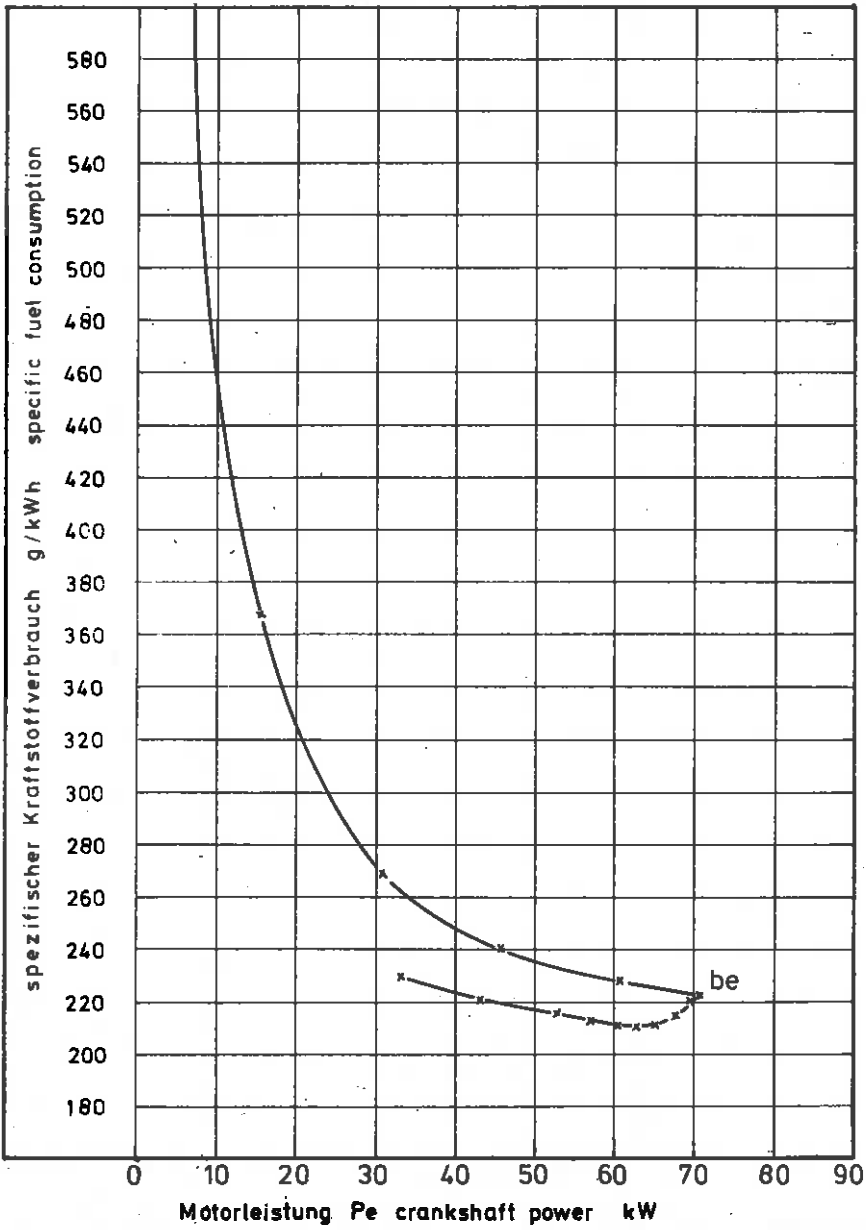
Engine performance

Test Nr. 84-162



PRÜFUNGS-ABTEILUNG

FENDT FARMER 310 LSA

Motorleistung

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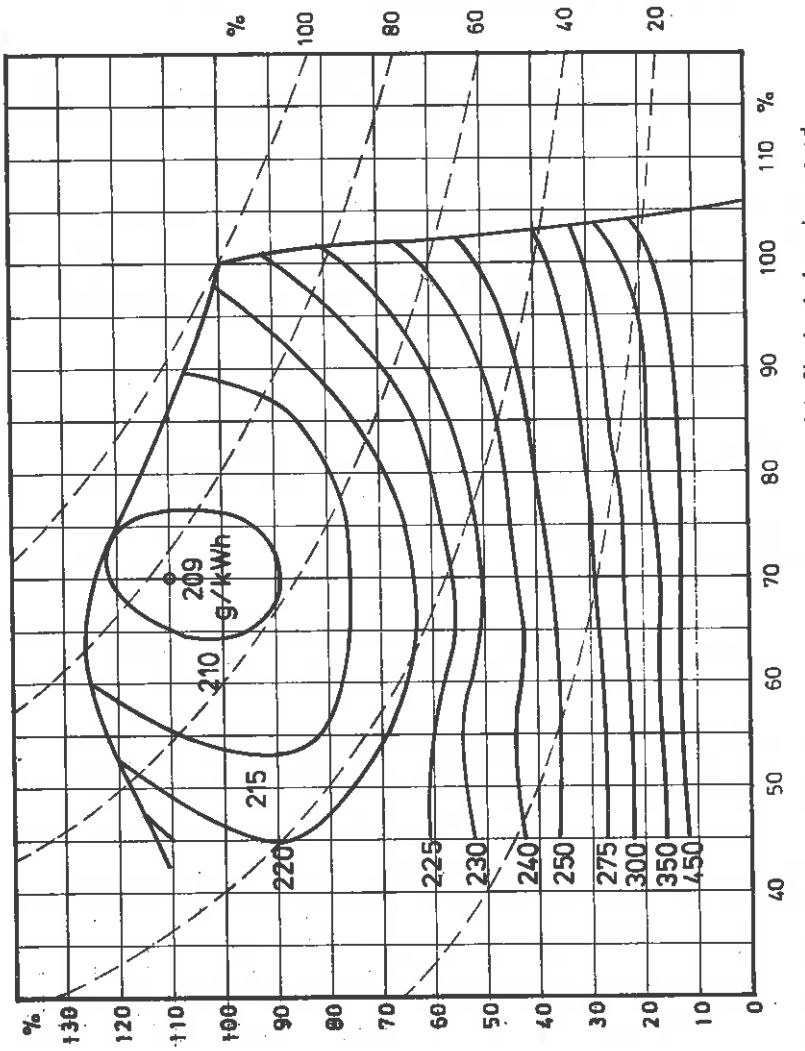
Engine performance

Test Nr. 84-162



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FENDT FARMER 310 LSA

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ADDITIONAL TESTS

(10) MAIN POWER TAKE-OFF PERFORMANCE (750 rev/min)

Date of tests: 13th August 1984
Location of tests: DLG-Testing-Station Groß-Umstadt
Type of dynamometer: SCHENCK hydraulic dynamometer U1-40

Power	Speed engine	Speed fl.clutch output	Speed p.t.o.	Fuel consumption hourly		Fuel consumption spec.	Specific energy
kW	rev/min	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
Maximum power							
At 2-hour test							
63.2	2350	2303	744	18.45	15.57	247	3.42
At rated engine speed							
63.2	2350	2303	744	18.45	15.57	247	3.42
Part loads, the governor hand lever in the position corresponding to the maximum power at full load (curve a)							
(i) 85% of the torque at maximum power at 2-hour test							
54.9	2384	2353	760	16.59	14.00	255	3.31
(ii) unloaded							
-	2494	2487	803	4.73	4.00	-	-
(iii) 50% of the torque defined in (i)							
28.1	2428	2411	779	10.29	8.68	309	2.73
(iv) maximum power							
63.2	2350	2303	744	18.45	15.57	247	3.42
(v) 25% of the torque defined in (i)							
14.3	2454	2444	789	7.39	6.24	437	1.93
(vi) 75% of the torque defined in (i)							
41.7	2406	2383	769	13.36	11.28	271	3.12

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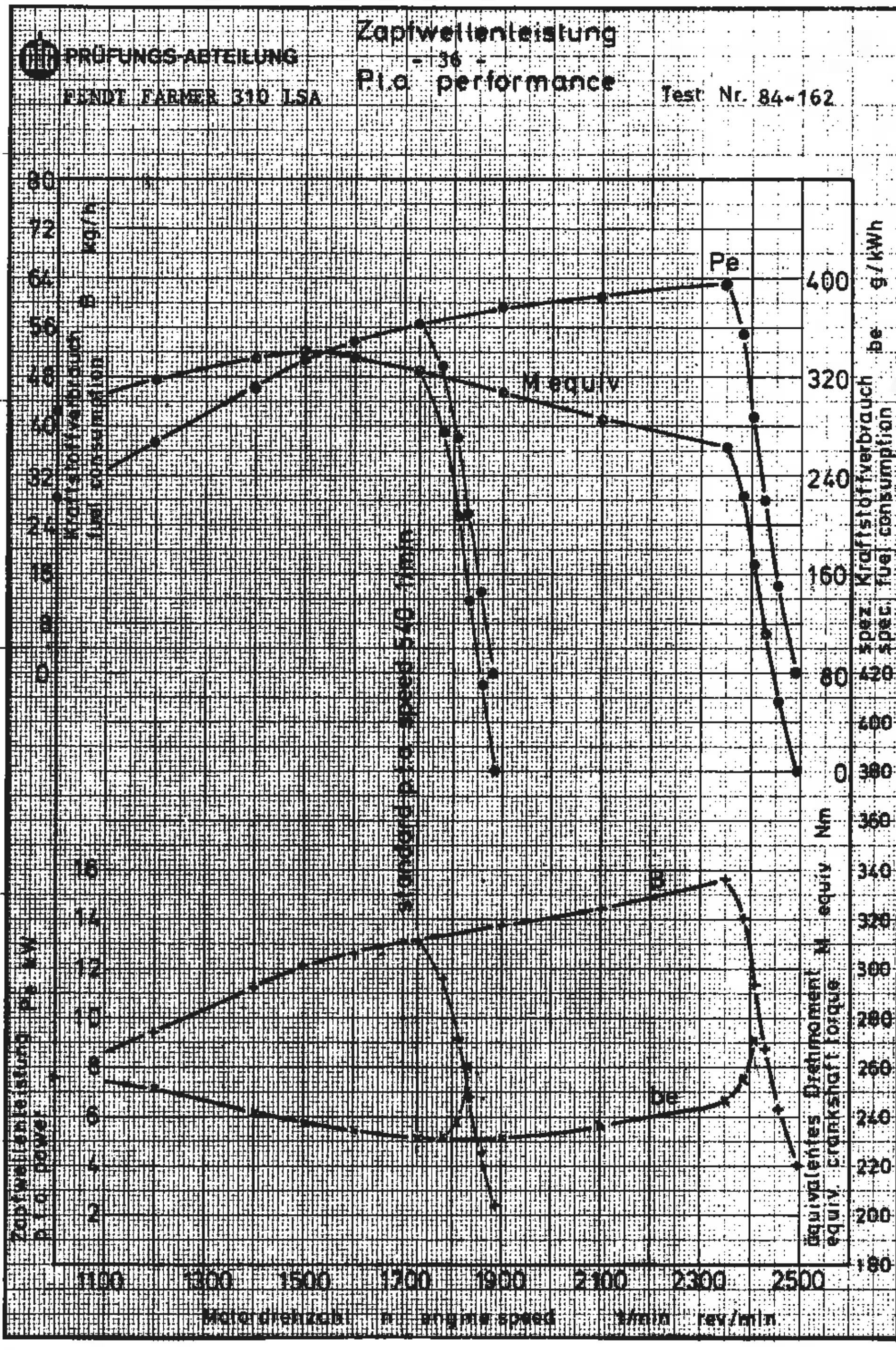
Power	Speed engine	Speed fl.clutch output	Speed p.t.o.	Fuel consumption hourly		Fuel consumption spec.	Specific energy
kW	rev/min	rev/min	rev/min	l/h	kg/h	g/kWh	kWh/l
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (curve b)							
(i) 85% of the torque at maximum power at standard p.t.o speed							
49.8	1780	1733	560	13.65	11.52	231	3.65
(ii) unloaded							
-	1887	1885	608	2.82	2.38	-	-
(iii) 50% of the torque defined in (i)							
25.9	1832	1801	581	7.98	6.73	260	3.25
(iv) maximum power							
56.6	1730	1672	540	15.52	13.10	231	3.65
(v) 25% of the torque defined in (i)							
13.2	1860	1840	594	5.27	4.44	336	2.51
(vi) 75% of the torque defined in (i)							
38.2	1810	1771	572	10.77	9.09	238	3.54

Standard specific fuel consumption (g/kWh): 255/309/231/260

No load maximum engine speed: 2494 rev/min
Equivalent flywheel torque at maximum power (2 hours): 262 Nm
Maximum equivalent flywheel torque: 338 Nm at 1500 rev/min of the engine

Mean atmospheric conditions:	temperature	23 °C
	pressure	996 mbar
	relative humidity	80 %
Maximum temperatures:	coolant	88 °C
	engine oil	112 °C
	fuel	20 °C
	engine air intake	24 °C

The equivalent flywheel torques are given relative to the output shaft of the fluid clutch



PRÜFUNGS-ABTEILUNG
FENDT FARMER 310 LSA
Zapfwellenleistung
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P.t.o. performance
Test Nr. 84-162
Pe
M equiv
be
Kraftstoffverbrauch
fuel consumption
kg/h
spez. Kraftstoffverbrauch be g/kWh
spec. fuel consumption
standard p.t.o. speed 540 1/min
Zapfwellenleistung Pe kW
p.t.o. power
äquivalentes Drehmoment M equiv Nm
equiv. crankshaft torque
1100
1300
1500
1700
1900
2100
2300
2500
Motordrehzahl n engine speed 1/min rev/min

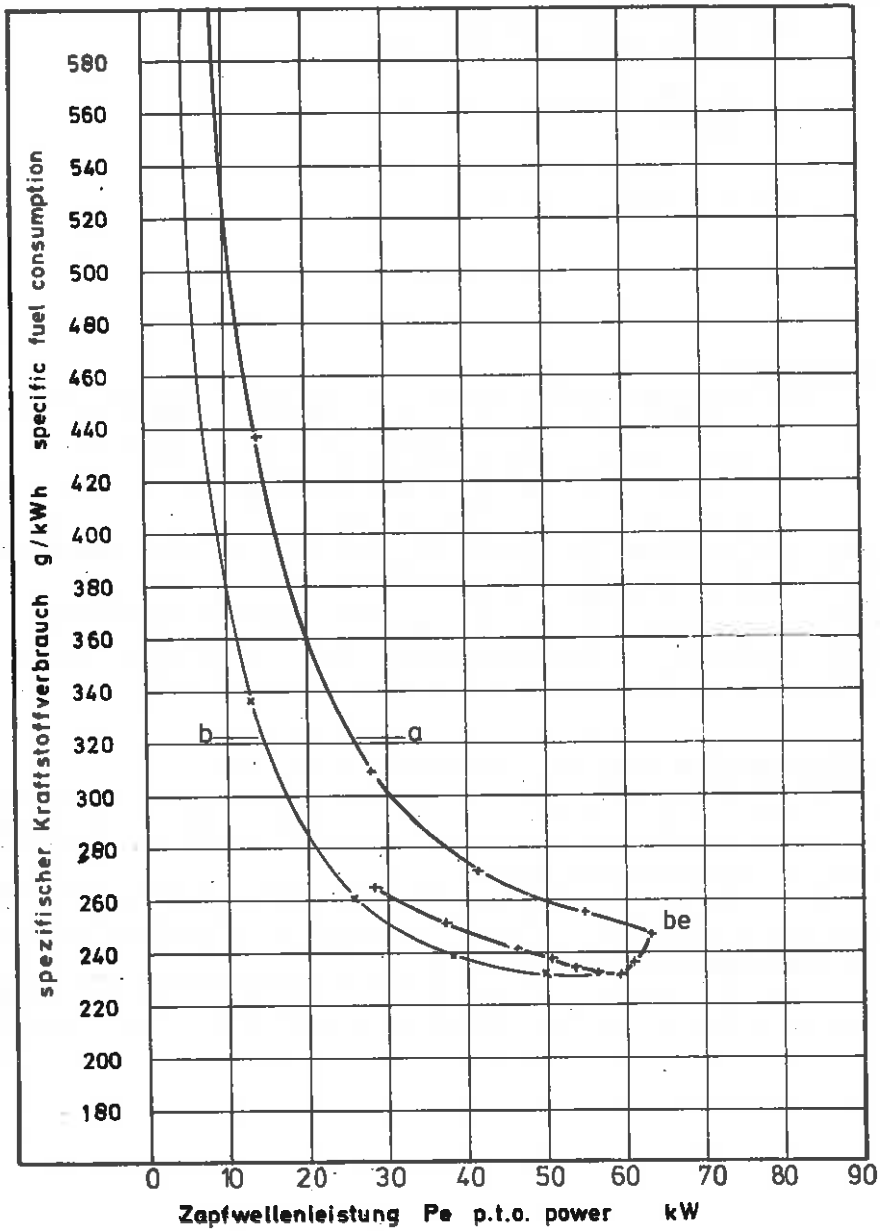
PRÜFUNGS-ABTEILUNG

FENDT FARMER 310 LSA

Zapfwellenleistung

P.t.o. performance

Test Nr. 84-162



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Test No. 84-162

(11) POWER LIFT TEST

with modified linkage geometry

D = 697 mm

L = 722 mm

Date of tests: 15th August 1984

Power Lift

	Height of lower hitch point 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	390	510	3870	161	-	-
On the frame	390	550	3090	161	5154	5,5

Temperature of hydraulic fluid at start of test 65 °C

Lifting heights relative to horizontal lower links

mm	-164	-144	-100	0	+100	+200	+300	+366	+386
Lifting forces at hitch points									
daN		5380	5080	4690	4430	4260	4040	3870	
Lifting forces at test frame									
daN	5120		4690	4300	4000	3740	3440		3090

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