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

O.E.C.D. No. 701



Agricultural Tractor AGRIA 4800

Manufacturer
Agria Werke GmbH, D-7108 Möckmühl

Deutsche Landwirtschafts-Gesellschaft e. V.
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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: January till May 1980
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.N.E.E.M.A., France) as being in accordance with the O.E.C.D STANDARD CODE.

Date of Approval: 26th November 1980 O.E.C.D. No. 701

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 = 750,1 mm Hg		

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PRÜFUNGS-ABTEILUNG
AGRIA 4800

Test No. 79-102

Tractor manufacturer:	AGRIA WERKE GMBH D-7108 Möckmühl
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Möckmühl and Groß-Umstadt
Duration of running-in:	Engine appr. 40 hours tractor appr. 100 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	AGRIA WERKE GMBH
Model:	4800
Type:	Wheel tractor, unit construction, rear wheel driven
Serial No.:	4808006

Engine

Make:	RUGGERINI, Italy
Model:	RD 92/2
Type:	4-stroke Diesel engine, direct injection air cooled
Serial No.:	816990
Cylinders:	2, in line, bore 92 mm, stroke 85 mm, displacement 1130 cm^3, compression ratio 18,4; replaceable ribbed cylinder liners
Valves:	Overhead
Fuel system:	RUGGERINI fuel feed pump, CIPA unit in-line injection pump CPFR2K 70/1069/1; 31 mm^3/stroke at rated engine speed and full load, injection timing 29° before TDC; BOSCH multihole injection nozzles DLL 160 S707, injection pressure 210 bar; UNIVERSAL fuel filter with replaceable cartridge; capacity of fuel tank 9,5 l
Governor:	RUGGERINI mechanically acting centrifugal variable speed governor, incorporated in engine block, governed range of engine speed 700 to 2960 rev/min, rated engine speed 2800 rev/min

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Air filter:	TORNA oil bath air filter with precleaner oil capacity 0,6 l
Exhaust silencer:	Own make; multi chamber expansion-absorption type silencer on the left hand side of engine, oval shaped 175 x 120 mm, length 450 mm, mouth 660 mm above ground
Lubrication system:	Forced feed from gear pump; RUGGERINI oil filter in full flow with replaceable cartridge, cartridge change interval 200 hours; oil capacity 2,5 l, recommended oil quality MIL-L-46152 recommended oil viscosity SAE 10W/30 or SAE 10W/40 oil change interval 50 hours
Cooling system:	Air cooling by radial blower incorporated in flywheel
Starting system:	Electrical BOSCH pre engaged-drive starting motor 000 135 4089 1,8 kW
Electrical equipment:	12 Volt BOSCH 3-phase alternator G1-14V-33A 1 lead acid battery, 44Ah at 20 hours rating

Transmission

Clutch:	FICHTEL UND SACHS AG dry single disc type clutch K 180 for travel drive and p.t.o. drive, pedal operated; clutch disc diameter 180 mm
Gear box:	Own make; speed change gear with 3 speeds, 1st and 3rd speed collar shifted, 2nd speed sliding gear shifted; collar shifted group gear with 2 groups (I and II); collar shifted reversing gear; total 6 forward and 6 reverse speeds

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Rear axle and final drives: Bevel gear rear axle drive; bevel gear differential with self disengaging lock, lock hand-lever operated; spur gear final drives

Transmission lubrication: Oil capacity 7 l contains gear box, rear axle drive and final drives; oil change interval 1000 hours; recommended oil MIL-L-2105/API GL4 gear oil SAE 90

Front axle: Not propelled

Total ratios and speeds (tyres 7.50-16 4 ply)

Group	Gear No.	Total ratio engine : driving wheel	Nominal travelling speed at rated engine speed *) km/h
Forward speeds			
I	1	338,40	1,20
	2	108,80	3,74
	3	41,27	9,85
II	1	199,40	2,04
	2	64,11	6,34
	3	24,32	16,71
Reverse speeds			
I	1	344,49	1,18
	2	110,76	3,67
	3	42,01	9,67
II	1	202,98	2,00
	2	65,26	6,23
	3	24,75	16,42

*) calculated with the radius 385 mm according to the tyre-manufacturer's specification

Power take-off

Dependent p.t.o.
at rear of tractor, in tractor's median plane,
for 4° inclined downwards,
340 mm above ground, 410 mm behind rear axle centre
35 mm diameter, 6 splines DIN 9611 and
ISO 500 type 1;

Depending on position of reversing gear-shift lever
2 p.t.o. speeds and 2 directions of rotation
are possible;

Reversing gear-shift lever in position
forward:
809 rev/min at rated engine speed,
standard p.t.o. speed 540 rev/min at
1869 rev/min engine speed;
direction of rotation clockwise viewed from
tractor rear

Reversing gear-shift lever in position
reverse:
795 rev/min at rated engine speed,
direction of rotation anticlockwise viewed from
tractor rear

Power lift

Hydraulic system:

Own make;
hydraulic power lift, disintegrated construction
without control functions;
HIDROIRMA gear type pump directly driven
by engine,
delivery 5,6 cm^3/rev or 14 l/min at rated
engine speed;
BUCHER control valve for lifting, lowering and
floating position, with relief valve
maximum working pressure 177 bar;
2 WEBER single acting rams without overpressure
relief valve, 35 mm bore, 120 mm stroke;
hydraulic oil tank with 2,5 l capacity,
recommended oil: engine oil SAE 10W/30 or
SAE 10W/40
MIL-L-46152
oil change interval 250 hours
oil filter change interval 250 hours;
no external tapping

Implement linkage:	Three point linkage, own design (no ISO-Standard); lift rods length adjustable in steps to 335, 360, 400 and 425 mm; lifting range above ground: with short lift rods from 211 to 544 mm with long lift rods from 59 to 479 mm
Holed bar:	Optional, fitted to tested tractor; short bar, fitted on clevis of lower links; length between the joint balls 430 mm, thickness 15 mm, width 70 mm; centre hole and 2 holes in 80 mm distance each on either side, all holes 21 mm diameter heigth above ground adjustable by power lift in the range from 48 to 533 mm, depending on lift rods length, measured at the surface of the bar; distance of holes centre line with lower links in horizontal position: from rear axle centre 720 mm from p.t.o. shaft end 310 mm

Pull attachment

Trailer hitch:	AGRIA SK 77B not automatically acting, heigth above ground adjustable to 530, 580 and 630 mm; hole diameter 33 mm; distance of hole centre: to rear axle centre 450 mm to p.t.o. shaft end 40 mm; permissible vertical load 250 kg
Towing hitch:	None
Steering	Own make, mechanical; acting on front wheels

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Brakes

Parking brake:	Mechanical band brake, acting by a special bevel gear on the crown wheel of the rear axle drive; operated by hand lever with ratchet; brake pulley diameter 80 mm
Service brake:	Own make; mechanically acting internal-expanding-shoe brake, acting on 2 brake drums with 190 mm diameter at the rear wheels, pedal operated
Steering brake:	2 separate pedals on the left and right hand side of gear box, acting on the brake drums of the service brake

Wheels

Steered wheels:	2 pneumatics in front 5.50-12 4 ply maximum permissible load per tyre 445 kg at 1,5 bar inflation pressure and 30 km/h; track width to 735 mm and after turning wheels to 860 mm adjustable; rims 4.00 Bx12
Driving wheels:	2 pneumatics at rear 7.50-16 4 ply diagonal type tyre casing; maximum permissible load per tyre 700 kg at 1,5 bar inflation pressure and 25 km/h; track width to 680 mm and after turning wheels to 890 mm adjustable; rims 5.50 Fx16
Wheel base:	1210 mm

Overturning protection frame	Own make, not OECD-tested

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Seat: GRAMMER DS 44 L
upholstered seat with back rest,
adjustable spring with shock absorber;
height of driver's platform above ground 395 mm,
height of unloaded seat above platform 560 mm;
seat for and aft shiftable about 70 mm

Number of grease points: 8

Track setting during test: Front axle 860 mm
rear axle 890 mm

Dimensions

Total length:	2480 mm without ballast 2700 mm with ballast
Total width:	1090 mm with and without ballast
Total height:	1815 mm to the top of frame
Ground clearance:	220 mm below pivotal points of lower links

Weights: Ready for use as tested, with overturning protection frame

		without driver	with driver
Without ballast:	front	285 kg	285 kg
	rear	420 kg	500 kg
	total	705 kg	785 kg
Front ballast:	4 front weights 14 kg each		56 kg
	1 weight per wheel 16 kg each		32 kg
Rear ballast:	1 weight per wheel 28 kg each		56 kg
	water in the tyres		66 kg
	1 concrete weight fitted on implement linkage		175 kg
With ballast:	front	260 kg	260 kg
	rear	830 kg	910 kg
	total	1090 kg	1170 kg

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Lighting equipment Electrical, 12 Volt
as per German legislation

	Dimensions mm	Height above ground to centre mm	Distance from outside edge of tractor to centre mm
Head lights	85 dia	885	405
Rear lights	70 x 20	785	205
Reflectors	80 dia	725	200

Permissible total weights and axle loads

for all available wheel equipment (authorized by the national administration)

Tyre dimensions at front	Tyre dimensions at rear	Permissible total weight kg	Permissible axle load at front kg	Permissible axle load at rear kg
155 R 12	10.00-12 6ply	1200	550	900
5.50-12 4 ply	7.50-16 4ply		550	
4.00-12 2 ply	7.50-16 4ply		420	
145 R 12	10.0/75-15Impl 6ply		550	

FUELS AND LUBRICANTS USED IN TESTS

Fuel: ARAL Diesel-fuel DIN 51601
specific gravity at 15 °C:

at engine test 0,824 kg/l
at p.t.o. test 0,824 kg/l
at drawbar test 0,840 kg/l

Engine oil: BP SUPERVISCOSTATIC SAE 10W/40

Gear oil: BP hypoid gear oil SAE 90

Hydraulic oil: BP SUPERVISCOSTATIC SAE 10W/40

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COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE (540 rev/min)

Date of tests: 25th and 26th February 1980
Type of dynamometer: SCHENCK eddy-current dynamometer W150

Power kW	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption total l/h	Fuel consumption total kg/h	Fuel consumption specific g/kWh	Specific energy kWh/l
Maximum power						
At 2-hour test						
15.5	2800	809	5.19	4.27	275	2.99
At standard p.t.o. speed						
11.0	1869	540	3.69	3.04	277	2.98
At the speed recommended for drawbar work						
15.5	2800	809	5.19	4.27	275	2.99
Part loads, the governor hand lever in the position corresponding to the maximum power at full load						
(i) 85% of the torque at maximum power at 2-hour test						
13.6	2878	831	4.39	3.61	266	3.09
(ii) unloaded						
-	2961	856	1.30	1.07	-	-
(iii) 50% of the load defined in (i)						
7.0	2964	856	2.75	2.27	325	2.54
(iv) maximum power						
15.5	2800	809	5.19	4.27	275	2.99
(v) 25% of the load defined in (i)						
3.5	2949	852	2.00	1.64	473	1.74
(vi) 75% of the load defined in (i)						
10.4	2936	848	3.54	2.92	281	2.93

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Power kW	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption total l/h	Fuel consumption total 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						
(i) 85% of the torque at maximum power at standard p.t.o. speed						
9.5	1907	551	3.26	2.68	282	2.92
(ii) unloaded						
-	2030	586	0.71	0.59	-	-
(iii) 50% of the load defined in (i)						
4.9	1970	569	1.75	1.44	293	2.82
(iv) maximum power						
11.0	1869	540	3.69	3.04	277	2.98
(v) 25% of the load defined in (i)						
2.5	2009	580	1.29	1.07	425	1.94
(vi) 75% of the load defined in (i)						
7.3	1945	562	2.30	1.90	261	3.16

Standard specific fuel consumption (g/kWh): 266/325/282/293

No load maximum engine speed: 2961 rev/min
Equivalent crankshaft torque at maximum power (2 hours): 53 Nm
Maximum equivalent crankshaft torque: 56 Nm at 1869 rev/min of the engine

Mean atmospheric conditions:	temperature	24 °C
	pressure	1007 mbar
	relative humidity	40 %
Maximum temperatures:	coolant	-
	engine oil	123 °C
	fuel	18 °C
	engine air intake	27 °C

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Zapfwellenleistung
P.t.o. performance

Test Nr. 79-102

Pe

M equiv

B

be

standard

p.t.o. speed

Zapfwellenleistung P kW
p.t.o. power

Kraftstoffverbrauch B kg/h
fuel consumption

äquivalentes Drehmoment M equiv Nm
equiv. crankshaft torque

spez. Kraftstoffverbrauch be g/kWh
spec. fuel consumption

Motordrehzahl n engine speed U/min rev/min

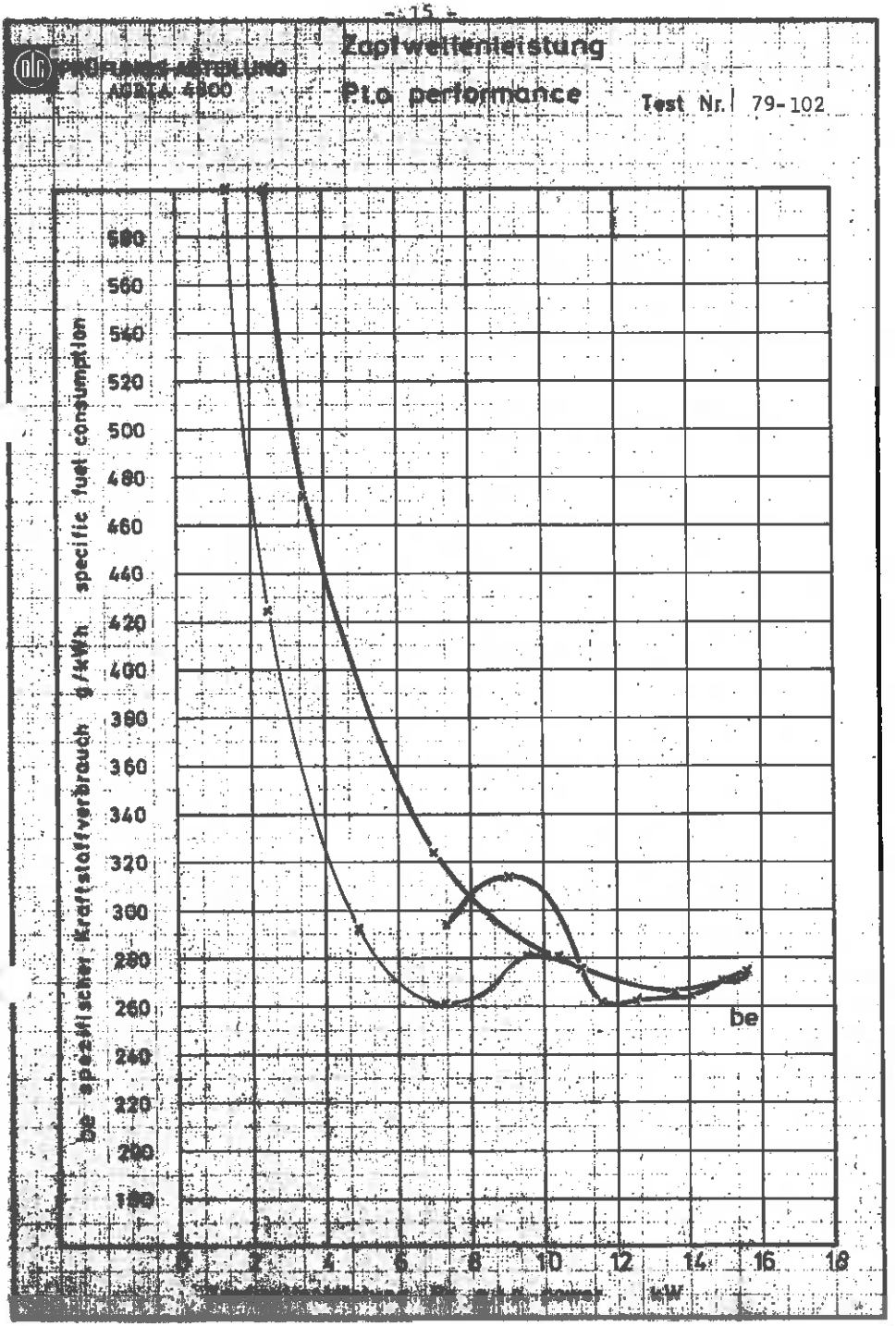
1600 1800 2000 2200 2400 2600 2800 3000

Zapfwellenleistung

Prüfungsstation AGRIA 4900

P.t.o. performance

Test Nr. 79-102



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(2) DRAWBAR PERFORMANCE

Date of tests: 13th till 21st May 1980
Type of track: Concrete

Gear No. and Group	Driving speed km/h	Power kW	Drawbar pull daN	Engine speed rev/min	Slip of wheels %
(i) MAXIMUM POWER with ballast height of drawbar above ground 260 mm					
1 I	1,02	2,6	925	2950	15,1
1 II	1,73	4,5	928	2942	14,9
2 I	3,14	8,2	936	2920	14,9
2 II	5,18	12,7	884	2800	13,3
3 I	8,60	13,0	544	2804	7,1
(ii) FIVE-HOUR-TEST at 75% of pull at maximum power in 2nd II gear					
2 II	5,63	10,4	663	2890	8,7
(iii) FIVE-HOUR-TEST at pull corresponding to 15% wheel slip in test (i)					
2 I	3,12	8,1	936	-	-
(iv) MAXIMUM POWER without ballast height of drawbar above ground 400 mm					
2 I	3,20	5,8	653	2918	14,9
2 II	5,35	9,9	665	2883	14,9
3 I	8,37	12,7	545	2799	11,8

Total oil consumption during ten hours duration of tests (ii) and (iii) 9 g/h

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Tyres size front: 5.50-12 4 ply
rear: 7.50-16 4 ply

Tread bar height at the beginning of drawbar tests 90 % of the value when new

Specific energy kWh/l	Specific fuel consumpt. g/kWh	Temperatures Fuel °C	Coolant °C	Engine oil °C	Atomspheric conditions Tempe-rature °C	Relative humidity %	Pressure mbar
tyre inflation pressure 0,8 bar							
1,29	648	20	-	78	14	84	997
1,76	473	21	-	82	16	78	997
2,29	364	21	-	84	16	79	997
2,47	338	19	-	104	16	88	997
2,53	331	19	-	110	15	88	997
2,62	319	22	-	112	21	70	992
-	-	23	-	112	24	58	996
tyre inflation pressure 0,8 bar							
2,07	403	20	-	85	15	49	1003
2,59	322	20	-	88	15	47	1003
2,46	340	20	-	102	16	48	1003

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

(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment front: 5.50-12 4 ply
rear: 7.50-16 4 ply

Track of wheels front: 860 mm
rear: 890 mm

	With brakes left-hand m	With brakes right-hand m	Without brakes left-hand m	Without brakes right-hand m
Radius of turning space	2,20	2,19	2,42	2,43
Radius of turning circle	2,09	2,08	2,31	2,32

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	585 mm
Distance forward from rear axle centre	451 mm
Distance from tractor's median plane, to the right	3 mm

PRÜFUNGS-ABTEILUNG

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(5) BRAKING PERFORMANCE

A) SERVICE BRAKE

Date of tests: 16th and 19th May 1980
Type of track: Concrete
Type of decelerometer: MOTO-METER-Bremsverzögerungs- und Pedalkraftschreiber

Weight of ballasted tractor with driver 1170 kg

Cold brakes

		With ballast	Without ballast
Travelling speed	km/h	16,6	17,1
Deceleration	m/s^2	5,0	4,0
Stopping distance	m	2,2	3,0
Force on pedal	daN	62	29
Force on pedal to achieve a deceleration of 2,5 m/s^2	daN	27	16

Brake fade characteristics (hot tests)

Deceleration	hot/cold	%	100	103
Stopping distance	cold/hot	%	100	107
Force on pedal	cold/hot	%	100	83

B) PARKING BRAKE

Tractor facing up 16% slope
Pull on hand brake 16 daN, tractor does not roll

Tractor facing down 16% slope
Pull on hand brake 11 daN, tractor does not roll

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(6) AMBIENT NOISE EMITTED BY THE TRACTOR

Date of test: 13th May 1980
Type of track: Concrete
Type of sound level meter: BRÜEL AND KJAER model 2209

Results of test

Gear: 3rd II
Travelling speed before acceleration: 12,9 km/h
Sound level: 86,5 dB(A)

(7) NOISE AT THE DRIVER'S EAR LEVEL

Date of tests: 13th May 1980
Type of track: Concrete
Type of sound level meter: BRÜEL AND KJAER model 2209

An AGRIA overturning protection frame was fitted on tractor

Results of tests

Gear no. and Group	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	663	1,20	0,97	96,0
1 II	658	2,04	1,62	96,5
2 I	662	3,74	3,15	97,0
2 II *)	651	6,34	5,35	98,5
3 I	546	9,85	8,35	98,5
3 II	light load	16,71	17,14	95,5

*) The 2nd II-gear corresponds to the travelling speed nearest to 7,5 km/h

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(8) POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date of tests: 16th and 17th April 1980

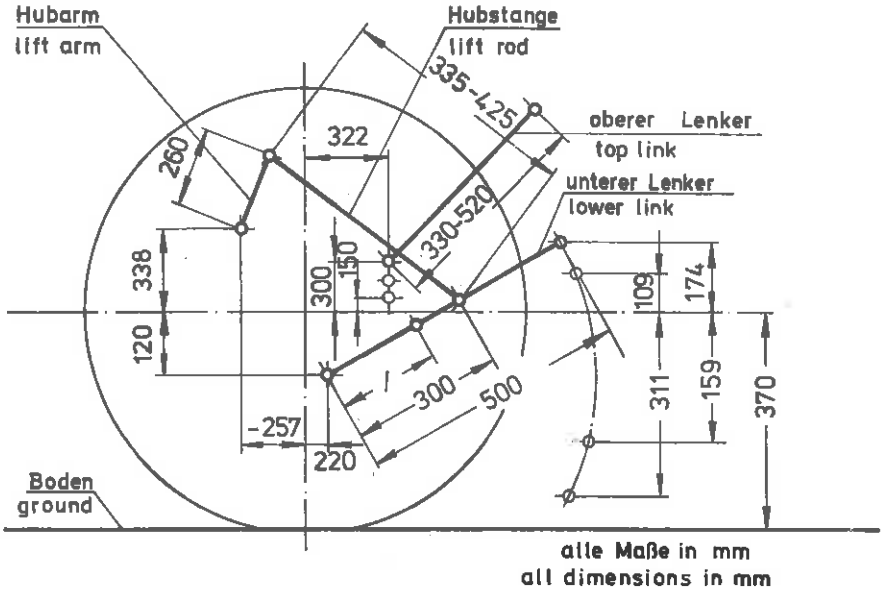
HYDRAULIC PUMP

The measurements were carried out with the power lift circuit because there were no oil tappings fitted on tractor tested

(1)	Opening pressure of relief valve in control valve	142 bar
	Sustained pressure by open relief valve	177 bar
(2)	Pump delivery rate at minimum pressure and rated engine speed	12,8 l/min
(3)	Pump delivery rate at max. hydraulic power	11,4 l/min
	corresponding delivery pressure	144 bar
	power	2,7 kW

POWER LIFT

Dimensions of linkage geometry



LIFTING FORCES

The lifting forces were measured at hitch points (no measurements at test frame, because no standard implement linkage)

Lifting heights relative to horizontal lower links

mm	-191	-100	-39	0	+100	+200	+229	+294
maximum mechanical advantage, lift rods length 425 mm								
daN	870	730		640	560	510	480	
minimum mechanical advantage, lift rods length 335 mm								
daN			890	800	650	550		400

Maximum force exerted throughout the whole range 480 daN

Force at which front of tractor lifts, if front axle is ballasted to its max. allowable load (550 kg) : 850 daN

All values of forces for pressure 144 bar at maximum hydraulic power, see page 21; calculated from measurements at maximum oil pressure 177 bar

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OPTIONAL TESTS

(9) ENGINE PERFORMANCE

Date of tests: 21st and 22nd February 1980
Type of dynamometer: SCHENCK eddy-current dynamometer W 150

Power kW	Engine speed rev/min	Fuel consumption total l/h	Fuel consumption total kg/h	Fuel consumption specific g/kWh	Specific energy kWh/l
Maximum power					
At 2-hour test					
17.0	2800	5.19	4.27	251	3.28
At standard p.t.o. speed (540 rev/min)					
11.5	1869	3.67	3.02	262	3.15
At the speed recommended for drawbar work					
17.0	2800	5.19	4.27	251	3.28
Part loads					
(i) 85% of the torque at maximum power at 2-hour test					
14.8	2867	4.47	3.69	249	3.31
(ii) unloaded					
-	2925	1.30	1.07	-	-
(iii) 50% of the load defined in (i)					
7.5	2917	2.74	2.26	300	2.75
(iv) maximum power					
17.0	2800	5.19	4.27	251	3.28
(v) 25% of the load defined in (i)					
3.8	2926	2.02	1.66	441	1.87
(vi) 75% of the load defined in (i)					
11.2	2896	3.54	2.92	260	3.17

Optimum fuel consumption: 241 g/kWh at 12.4 kW and 2380 rev/min
No load maximum engine speed: 2925 rev/min
Torque at maximum power (2 hours): 58 Nm
Maximum torque: 59 Nm at 1801 rev/min of the engine

Mean atmospheric conditions:	temperature	16 °C
	pressure	1006 mbar
	relative humidity	45 %
Maximum temperatures:	coolant	-
	engine oil	102 °C
	fuel	23 °C
	engine air intake	22 °C

PRÜFUNGSABTEILUNG
ACRITA 4800

Motorleistung
Engine performance

Test Nr. 79-102

Pe

M

be

B

Kraftstoffverbrauch
fuel consumption

Motordrehmoment
crankshaft torque

Motordrehzahl
engine speed

spez. Kraftstoffverbrauch be g/kWh
spec. fuel consumption

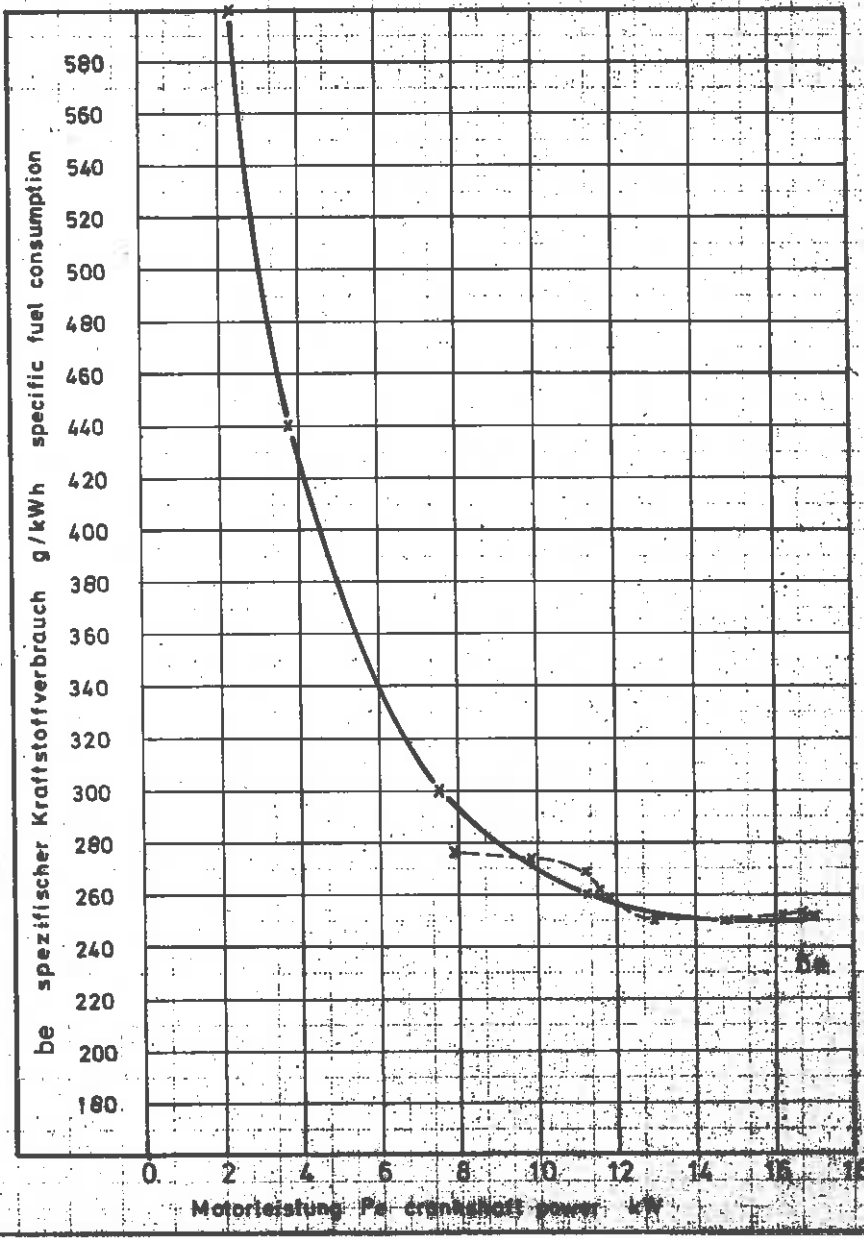
Nm

U/min rev/min

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Motorleistung
Engine performance

Test Nr. 79-102



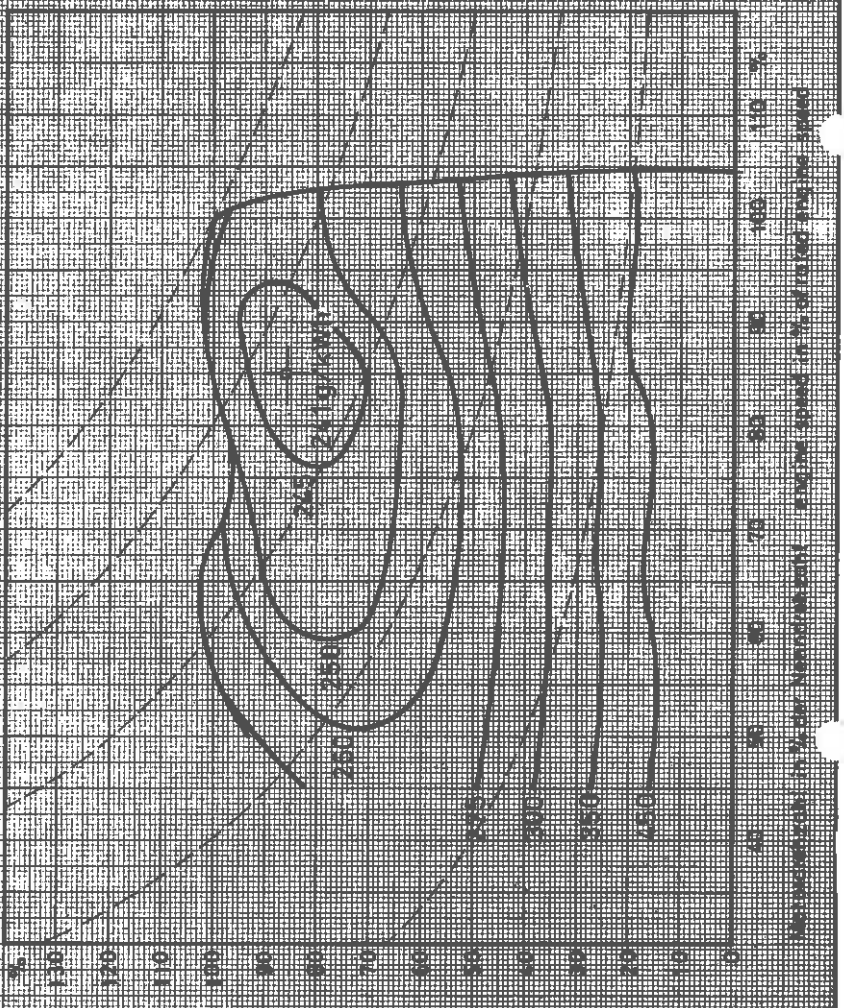
DLG PRÜFUNGS-ABTEILUNG

ACROS 6500

Motorleistung
Engine performance

Test No. 79-102

Motorleistung in % der Leistung bei Nennendrehzahl
engine power in % of power at rated engine speed



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