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Report on test in accordance with
O.E.C.D. STANDARD CODE for the Official Testing
of Agricultural Tractors



HOLDER-AGRICULTURAL TRACTOR A 45

Manufactured by: GEBRÜDER HOLDER, Maschinenfabrik
D-7418 Metzingen

Date of Tests: August till October 1973

DLG-Testing Station for Agricultural Machinery
D-6114 Groß-Umstadt

DEUTSCHE LANDWIRTSCHAFTS-GESELLSCHAFT e.V.
Prüfungsabteilung für Landmaschinen
D-6000 Frankfurt/Main 1, Zimmerweg 16

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

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

Date of Approval: 26th March 1974

Serial No.: 454

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Printed in Germany

PRÜFUNGS-ABTEILUNG
Holder A 45

Test No. 73-76

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PRÜFUNGS-ABTEILUNG
Holder A 45

Test No. 73-76

Tractor manufacturer:	GEBRÜDER HOLDER, Maschinenfabrik D-7418 Metzingen
Submitted for test by:	Manufacturer
Selected by:	Manufacturer with agreement by DLG
Place of running-in:	Metzingen and Groß-Umstadt
Duration of running-in:	Engine and tractor appr. 50 hours

SPECIFICATION OF TRACTOR

Tractor

Make:	GEBRÜDER HOLDER
Model:	A 45
Type:	Wheel type tractor, unit construction, all-wheel drive, pivotal steering
Serial No:	350 158

Engine

Make:	GEBRÜDER HOLDER
Model:	VD3
Type:	4-stroke Diesel engine, watercooled, with direct injection
Serial No:	V3 20254
Cylinders:	3 in line, vertical, bore 95 mm, stroke 95 mm, displacement 2019 cm^3, compression ratio 15,6:1
Valves:	Overhead
Fuel system:	Fuel feed by gravity; BOSCH in line injection pump: PES 3 A 65 D 410/3 RS 1274; manufacturer's production setting 41 mm^3/stroke at rated engine speed and full load; injection timing 38° before TDC; BOSCH multihole injection nozzles DLL 140 S 591; injection pressure 175 kp/cm^2; filter cartridge in the fuel tank; capacity of fuel tank 23 l
Governor:	BOSCH centrifugal variable speed type governor: EP/RSV 250-1150 A 1 B 1042 L; governed range of engine speed from 800 to 2500 rev/min; rated engine speed 2300 rev/min

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Air cleaner	MANN UND HUMMEL; oil bath air cleaner; oil capacity 0,5 l; (optional: cyclonic pre-cleaner, not fitted on tractor tested)
Exhaust silencer:	Own make; multi-chamber expansion type silencer; 115 mm diameter, 365 mm long; mouth showing rearwards with 45° to the left-hand side
Lubrication system:	Forced feed by gear type pump; strainer in sump; MANN UND HUMMEL oil filter in full flow with by-pass valve; replaceable cartridge; oil capacity 6 l; oil changing period 150 hours; recommended oil viscosities: winter SAE 10W summer SAE 20W/20 tropics SAE 30
Cooling system:	Water cooling with overpressure relief valve adjusted to 0,4 kp/cm²; impeller assisted; by-pass thermostat; fan with 4 blades, 260 mm diameter; water capacity 9,2 l
Starting system:	Electrical; BOSCH screw push starter motor JF 2,5 PS; BERU glowing plug 184 G in intake pipe
Electrical equipment:	12 V negative earth; BOSCH direct current generator: EH (R) 14 V 11 A 19; 1 battery 88 Ah at 20 hours rating
Clutch	FICHTEL UND SACHS AG; single plate dry clutch KS 200; pedal operated

Gear box

Transmission gear:	Own make; speed change gear with 3 forward speeds; group gear with 2 forward and 1 reverse group; total 6 forward and 3 reverse speeds
Rear axle, front axle and final drives:	Crown wheel and pinion in front and in the rear; bevel gear type differential in front and in the rear; differential lock only in front axle; pedal operated, self disengaging; spur gear final drives in portal axles in front and in the rear
Oil capacity:	Transmission gear box and rear axle 6,75 l front axle together with power lift 7,0 l final drives each 0,2 l
Oil changing:	1500 hours

Total ratios and speeds

Group	Gear	Number of engine revolutions for one revolution of the driving wheel	Nominal travelling speed at rated engine speed *)	
			km/h	m/s
forward slow	1	270,09	1,25	0,35
	2	168,19	2,01	0,56
	3	88,49	3,82	1,06
forward fast	1	56,43	5,99	1,66
	2	35,14	9,62	2,67
	3	18,49	18,28	5,08
reverse	1	270,09	1,25	0,35
	2	168,19	2,01	0,56
	3	88,49	3,82	1,06

*) calculated with the standard tyre radius acc. to DIN 7814

Power take off	Proportional engine speed p.t.o.; not independent; manually engaged; in the rear of tractor; 460 mm above ground in median plane of tractor; 29 x 34,9 x 8,7 mm = 1 3/8", 6 splines; (DIN 9611 Form A; BS 1495; ASAE S. 203.7) 590 rev/min at rated engine speed; standard speed of p.t.o. 540 rev/min at 2100 rev/min engine speed; may be set by aid of tractormeter; direction of rotation clockwise, viewed from tractor rear
Belt pulley	Optional, not fitted on tractor tested; in the rear of tractor; driving device mounted on p.t.o.-shaft; engaged by p.t.o. hand lever; 210 mm diameter, 120 mm width; 1475 rev/min at rated engine speed; belt speed 16,3 m/s; direction of rotation clockwise or reverse; driving device may be turned
Power lift	Own make; hydraulic power lift in disintegrated construction; floating position, no controls; 2 single acting rams; 40 mm diameter, 140 mm stroke; BOSCH hydraulic pump HY/ZFR 1/11 C 1 101; (optional HY/ZFR 1/4 C1 101 if tractor is fitted with ZF-Gemmer steering) directly driven by engine; BOSCH control valve HY/SEA 5/175/1; maximum pressure 175 kp/cm^2; oil capacity (together with front axle) 7 l; 5 l may be taken off by oil tapping for remote cylinder; (1 oil tapping for 1 single acting remote ram optional, not fitted on tractor tested)
Implement linkage	Three point linkage in special construction for vertical lifting; joint balls of links acc. to DIN 9674 category I; lift height above ground from 160 to 655 mm

Holed drawbar	Fitted on clevis of lower links; length between the ball joints 430 mm; thickness of holed bar 15 mm, width 65 mm; centre hole and 2 holes with 80 mm distance each on either side; all holes 22 mm diameter; height above ground adjustable by power lift in the range from 168 to 663 mm measured on the surface of the holed drawbar; in the height 450 mm above ground hydraulically lockable; with lower links in horizontal position distance of centre hole: to rear axle centre 618 mm to end of p.t.o.-shaft 395 mm
Trailer hitch	Own make; height above ground 565 or 685 mm; adjustable by shifting hitch; diameter of clevis hole 33 mm; distance to rear axle centre 300 mm
Towing hitch	Height above ground 415 mm
Steering	Pivotal-steering; ZF-hydrostatic column steering; model 7407; oil supply by the hydraulic pump of power lift with BOSCH flow dividing control valve HY/VH 4/6/1; acting on tractor's limber; (optional ZF-Gemmersteering, kick-back proof; model 7359)
Brakes	
Parking brake:	Mechanically operated internal shoe type brake; acting on 2 brake drums in the front wheels; brake drums 180 mm diameter; operated by hand lever
Foot brake:	Mechanically operated internal shoe type brake; acting on 2 brake drums in the rear wheels; brake drums 180 mm diameter; pedal operated

Wheels

Steering wheels:	In front and rear, pivotal steering	
Driving wheels:	In front and rear; 4 pneumatics 7,50-18 AS 4 ply DIN 7814; maximum permissible load on each tyre 600 kp at 1,5 kp/cm² inflation pressure; track width 680 or 920 mm; changeable by turning wheels; rims 5,50 F x 18	
Wheel base:	1285 mm	

Weights — Ready for use as tested

		without driver	with driver
Without ballast:	front	765 kp	775 kp
	rear	350 kp	415 kp
	total	1115 kp	1190 kp
Front and rear ballast:	1 weight per wheel	50 kp each	200 kp
	water in the tyres		132 kp
With ballast:	front	931 kp	941 kp
	rear	516 kp	581 kp
	total	1447 kp	1522 kp

Seat — Own make;
upholstered mould seat with back rest;
adjustable spring with shock absorber;
in median plane of tractor;
730 mm above ground

Overturning protection frame — Own make;
steel tube construction with 2 spars;
behind driver's seat

Number of grease points (whole tractor) 13

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Holder A 45

Test No. 73-76

Dimensions

Total length:	2875 mm with implement linkage;
Total width:	880 mm at smallest track width 680 mm; 1120 mm at largest track width 920 mm;
Total height:	1075 mm to top of back rest of driver's seat; 1760 mm to top of overturning protection frame;
Maximum ground clearance	250 mm in median plane of tractor
Lighting equipment:	Electric, 12 V acc. to StVZO (German governmental regulations)

	Dimensions mm	Height above ground to centre mm	Distance from outside edge of tractor to centre mm **
Head lights	90 Ø	920	280
Side lights	-	-	-
Rear lights *	84 x 94	955	167
Reflectors	45 x 90	950	82

*) in combination with direction indicator and stop light
**) at smallest track width 680 mm

FUELS AND LUBRICANTS USED IN TESTS

Fuel:	ARAL-Diesel fuel (DIN 51601) specific gravity at 15°C 0,830 kg/l
Engine oil:	ARAL-KOWAL SAE 20W/20 HD
Transmission oil: speed change gear, rear axle and final drives:	Transmission oil SAE 80
front axle:	Engine oil SAE 20W/20
Hydraulic fluid:	Engine oil SAE 20W/20

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Holder A 45

Test No. 73-76

COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE

Date of tests: 4th September 1973
Type of dynamometer: Schenck hydraulic dynamometer U1-40

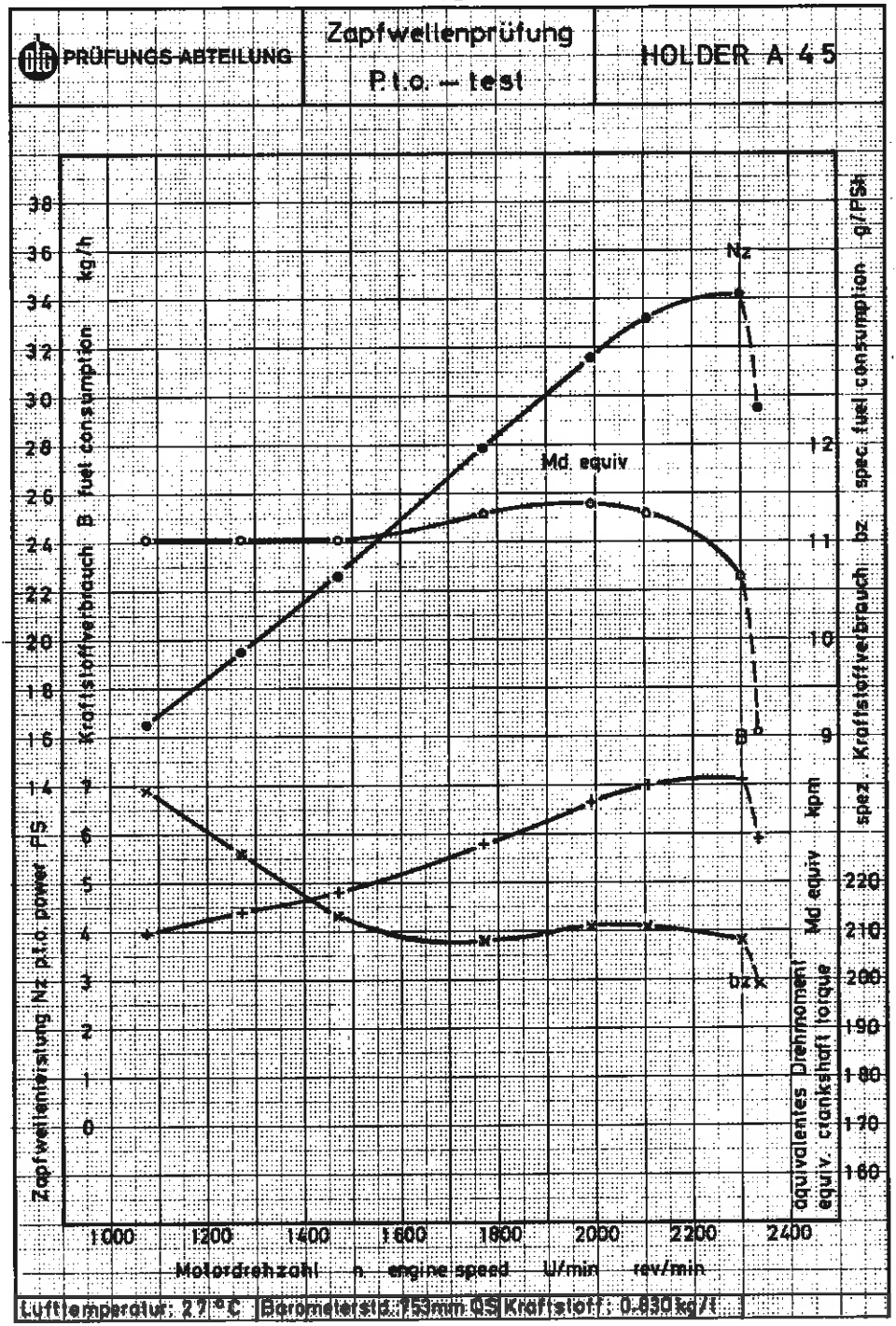
Maximum power

Power PS	Speed engine rev/min	Speed p.t.o. rev/min	Fuel consumption total l/h	Fuel consumption total kg/h	Fuel consumption specific g/PSh	Specific energy PSh/l
At maximum power 2-hour test						
34,2	2300	590	8,56	7,10	208	3,99
At standard p.t.o. speed (540 rev/min)						
33,2	2100	540	8,45	7,01	211	3,93
At the speed recommended for drawbar work						
34,2	2300	590	8,56	7,10	208	3,99
Part loads						
(i) 85 % of the torque at maximum power						
29,5	2336	599	7,08	5,88	199	4,17
(ii) unloaded						
-	2470	633	1,93	1,60	-	-
(iii) 50 % of the load defined in (i)						
15,3	2423	621	4,17	3,46	226	3,67
(iv) maximum power						
34,2	2300	590	8,56	7,10	208	3,99
(v) 25 % of the load defined in (i)						
7,7	2453	629	2,95	2,45	316	2,62
(vi) 75 % of the load defined in (i)						
22,5	2385	611	5,59	4,64	206	4,03

No load maximum engine speed: 2470 rev/min
Equivalent crankshaft torque at maximum power: 10,68 kpm
Maximum equivalent crankshaft torque: 11,40 kpm at 1990 rev/min of the engine

Mean atmospheric conditions:
- temperature 27°C
- pressure 753 mm Hg
- relative humidity 65 %

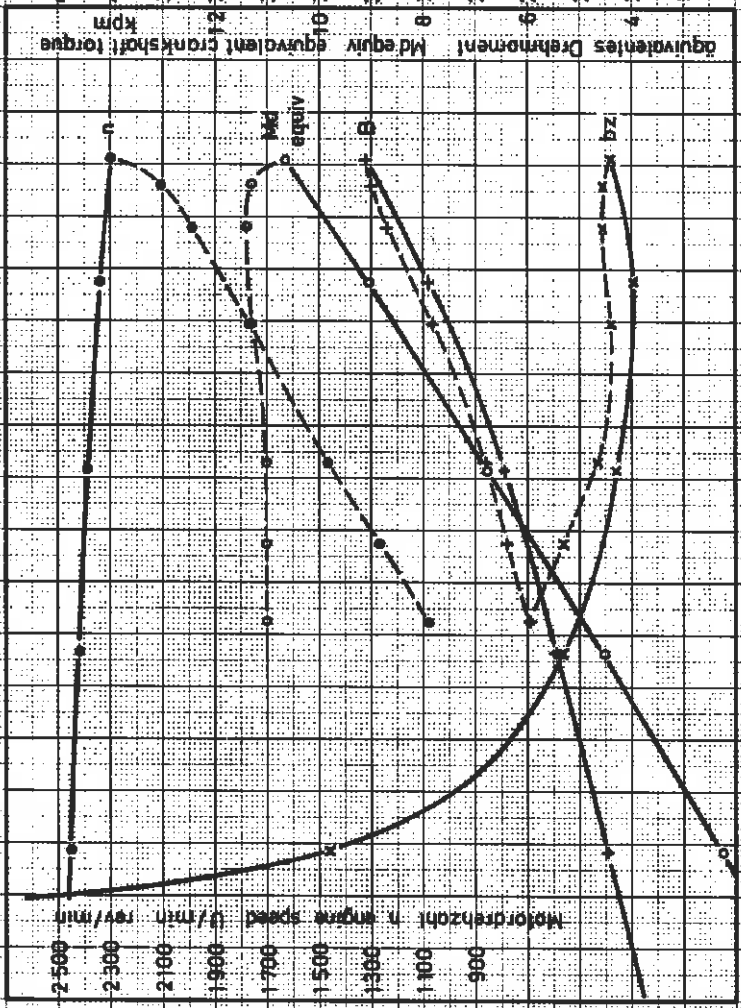
Maximum temperatures:
- coolant 83°C
- engine oil 96°C
- fuel 27°C


PRÜFUNGS ABTEILUNG
Zapfwellenprüfung
P.t.o. – test
HOLDER A 45
Zapfwellenleistung Nz p.t.o. power PS
Kraftstoffverbrauch B fuel consumption kg/h
spez. Kraftstoffverbrauch bz spec. fuel consumption g/PSh
Nz
Md equiv
B
bz
äquivalentes Drehmoment Md equiv kpm
equiv. crankshaft torque
Motordrehzahl n engine speed U/min rev/min
Lufttemperatur: 27 °C
Barometerstd.: 753mm QS
Kraftstoff: 0.830 kg/l

PRÜFUNGS-ABTEILUNG

Zapfwellenprüfung
P.t.o. — test

HOLDER A 45



Lufttemperatur: 27 °C | Barometerstd.: 753mm QS | Kraftstoff: 0,830 kg/l

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(2) DRAWBAR PERFORMANCE

Date of test: 22nd October till 31st October 1973
Type of track: Concrete

Gear No. and Group	Speed km/h	Horse-power PS	Drawbar pull kp	Engine speed rev/min	Slip of wheels %	Specific energy PSh/l
(i) MAXIMUM POWER with ballast height of drawbar above ground 275 mm						
1 slow	1,15	6,0	1400	2422	15,0	1,20
2 slow	1,84	9,5	1390	2420	14,9	2,43
3 slow	3,45	18,0	1410	2379	15,0	3,09
1 fast	5,19	27,1	1410	2303	14,5	3,22
2 fast	9,09	30,3	900	2302	6,6	3,55
(ii) FIVE-HOUR-TEST at 75 % of pull at maximum power in first gear of fast group						
1 fast	5,76	22,6	1060	2367	7,8	3,47
(iii) FIVE-HOUR-TEST at pull corresponding to 15 % wheel slip in test (i)						
3 slow	3,45	18,0	1410	2379	15,0	3,09
(v) MAXIMUM POWER without ballast height of drawbar above ground 280 mm						
3 slow	3,44	15,8	1240	2391	15,0	2,90
1 fast	5,21	23,9	1240	2330	15,1	3,22
2 fast	8,81	29,7	910	2301	9,5	3,40

Total oil consumption during ten hours duration of tests (ii) and (iii): 11 g/h

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Tyres make and size
Front: Veith-Pirelli Agrar 7,50 - 18 AS 4 ply
Rear: Veith-Pirelli Agrar 7,50 - 18 AS 4 ply

Specific fuel consumpt. g/PSh	Temperatures Fuel °C	Coolant °C	Engine-oil °C	Atmospheric conditions Temperature °C	Relative humidity %	Pressure mm Hg
tyre inflation pressure 1,5 kp/cm² active tyre radius under static load 395 mm						
437	17	80	88	12	90	751
342	17	80	86	12	83	762
269	16	80	85	6	97	761
258	13	82	84	7	99	761
234	14	84	84	11	99	761
239	15	83	90	10	99	760
269	19	80	81	9	99	760
tyre inflation pressure 1,0 kp/cm² active tyre radius under static load 397 mm						
286	16	81	87	10	99	766
258	12	81	88	12	83	760
244	16	83	89	12	81	760

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Holder A 45

(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment front: Veith-Pirelli 7,50-18 AS 4 ply

rear: Veith-Pirelli 7,50-18 AS 4 ply

Track of wheels front: 920 mm

rear: 920 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	No steering brakes		2,42	2,53
Radius of turning circle			2,28	2,39

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	532 mm
Distance forward from the vertical plane containing the axis of the rear wheels	830 mm
Distance of the median plane of the tractor	0 mm

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(5) BRAKING PERFORMANCE

A) FOOT BRAKE

Date of tests: 29th October 1973
Type of track: Concrete
Type of decelerometer: MOTO METER-Bremsverzögerungs- und Pedalkraftschreiber

Weight of ballasted tractor: 1522 kp with driver

Cold brakes

		with ballast	without ballast
Travelling speed	km/h	19,6	19,6
Deceleration	m/s^2	5,6	6,4
Stopping distance	m	3,2	2,8
Force on pedal	kp	30	24
Force on pedal to achieve a deceleration of 2,5 m/s^2	kp	13	9

Brake fade characteristics (hot tests)

			with ballast	without ballast
Deceleration	hot/cold	%	97	97
Stopping distance	cold/hot	%	100	108
Force on pedal	cold/hot	%	100	104

B) PARK BRAKE

Tractor facing up slope:
Pull on hand brake 10 kp, tractor does not roll

Tractor facing down slope:
Pull on hand brake 10 kp, tractor does not roll

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(6) AMBIENT NOISE AMITTED BY THE TRACTOR

Date of test: 25th October 1973
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer type 2203

Results of test

Gear: 3rd fast gear
Travelling speed before acceleration: 14,7 km/h
Sound level: 84 dBA

(7) NOISE AT THE DRIVER'S EAR LEVEL

Date of tests: 25th October 1973
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer type 2607
Type of frequency analyser (fitted with octave filter): Brüel and Kjaer type 1614

Overturning protection frame fitted on tractor

Results of tests

Gear	Drawbar pull at which the tractor develops the maximum sound level	Travelling speed nominal	Travelling speed effective	Sound level	
	kp	km/h	km/h	dBA	Sone
1 slow	1290	1,25	1,04	91	
2 slow	1300	2,01	1,59	91	
3 slow	1280	3,82	3,16	92	
1 fast *)	1260	5,99	5,01	93	90
2 fast	940	9,62	8,82	94	94
3 fast	light load	18,28	19,60	90	

*) The lrst fast gear corresponds to the travelling speed nearest to 7,25 km/h

(8) POWER LIFT PERFORMANCE

Date of tests: 16th October 1973

	Height above ground in down position		Vertical movement	Maximum force excerted throughout the full lift range	Oil pressure	Lifting force when front of tractor lifts
	hitch points mm	test frame mm	mm	kp	kp/cm²	kp
At hitch points	160	-	495	840	175	1610

The test frame cannot be fitted because of the special construction of the implement linkage

PRÜFUNGS-ABTEILUNG
Holder A 45

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OPTIONAL TESTS

(9) ENGINE PERFORMANCE

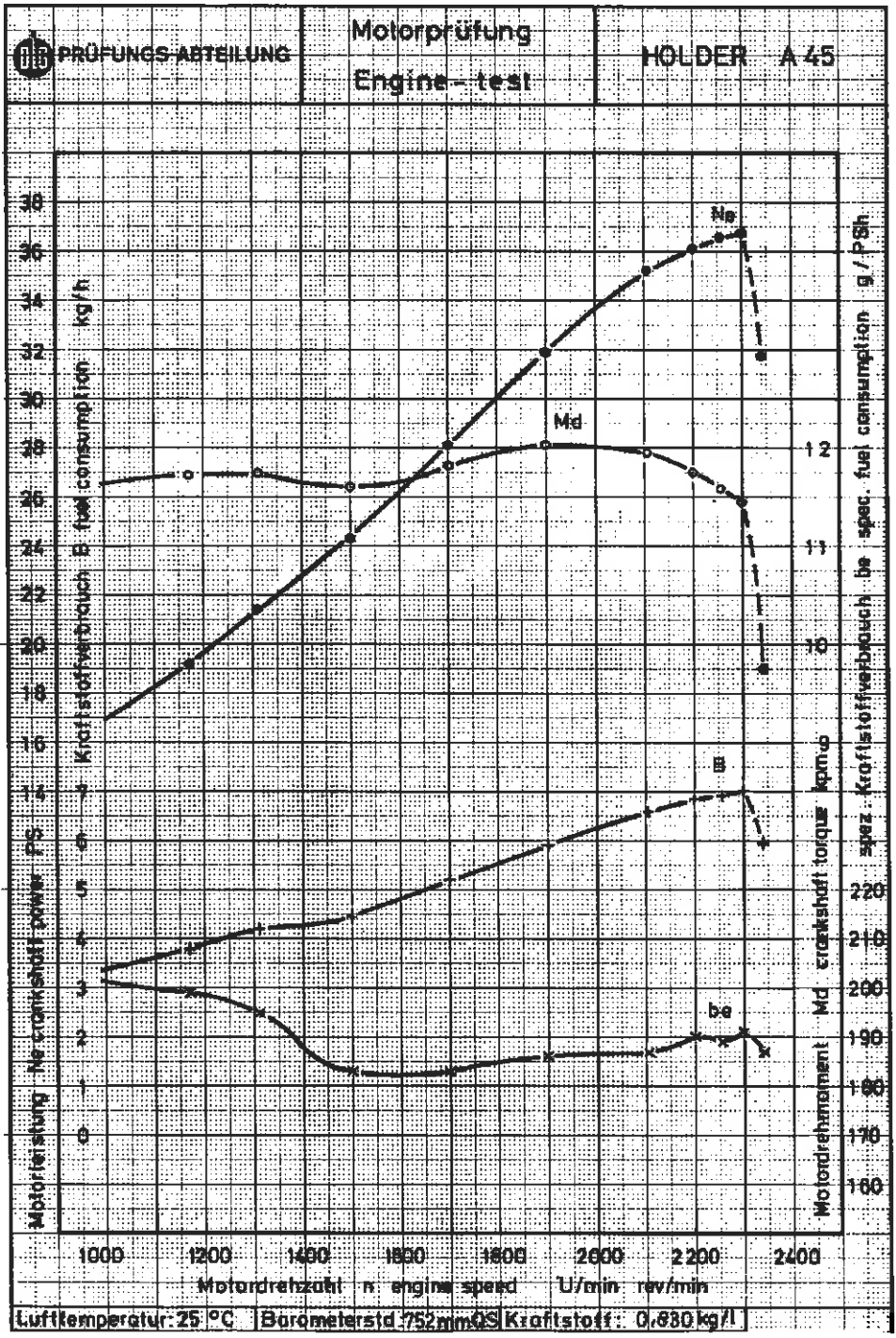
Date of tests: 15th till 17th August 1973
Type of dynamometer: Schenck eddy current dynamometer W 150

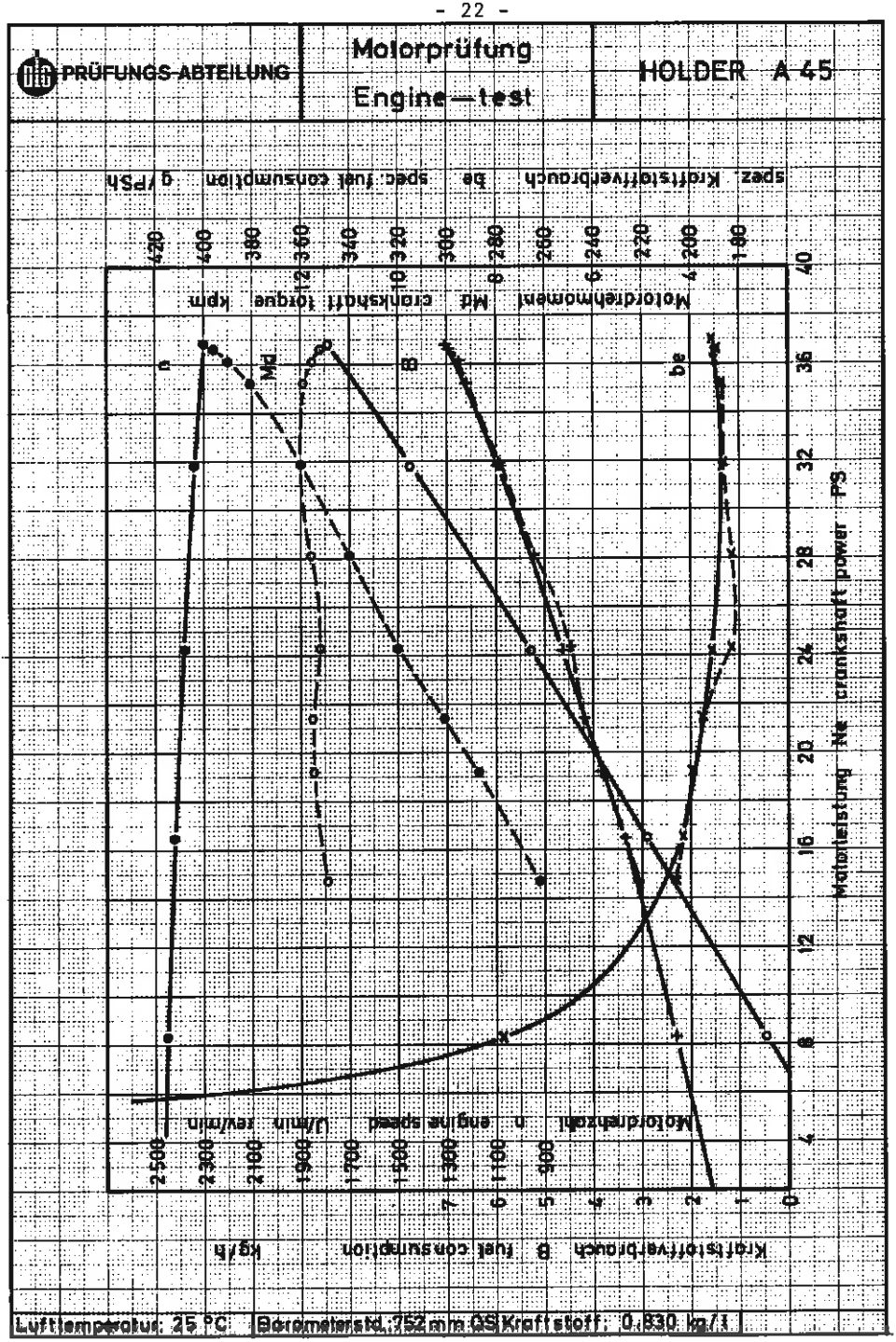
Maximum power

Power PS	Engine speed rev/min	Fuel consumption total 1/h	Fuel consumption total kg/h	Fuel consumption specific g/PSh	Specific energy PS h/l
At maximum power 2-hour test					
36,8	2300	8,47	7,03	191	4,34
At standard p.t.o. speed (540 rev/min)					
35,2	2100	7,93	6,58	187	4,44
At the speed recommended for drawbar work					
36,8	2300	8,47	7,03	191	4,34
Fuel consumption at part loads					
(i) 85 % of torque at maximum power					
31,8	2340	7,15	5,94	187	4,45
(ii) unloaded					
-	2472	1,69	1,40	-	-
(iii) 50 % of the load defined in (i)					
16,5	2422	4,05	3,36	203	4,08
(iv) maximum power					
36,8	2300	8,47	7,03	191	4,34
(v) 25 % of the load defined in (i)					
8,3	2454	2,76	2,29	277	3,01
(vi) 75 % of the load defined in (i)					
24,2	2377	5,58	4,63	191	4,34

Optimum fuel consumption: 180 g/PSh at 26,3 PS and 1750 rev/min
Standard fuel consumption 1/2 (DIN 9606): 3,23/6,90 1/h
No load maximum engine speed: 2472 rev/min
Torque at maximum power: 11,45 kpm
Maximum torque: 12,05 kpm at 1900 rev/min of the engine

Mean atmospheric conditions:	temperature	25°C
	pressure	752 mm Hg
	relative humidity	57 %
Maximum temperatures:	coolant	82°C
	engine oil	97°C
	fuel	24°C


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine-test
HOLDER A 45
Motorleistung Nennleistung power PS
Kraftstoffverbrauch fuel consumption kg/h
Motordrehmoment Md crankshaft torque kpm
spez. Kraftstoffverbrauch be spec. fuel consumption g/PSh
Ne
Md
be
1000
1200
1400
1600
1800
2000
2200
2400
Motordrehzahl n engine speed U/min rev/min
Lufttemperatur: 25 °C
Barometerstd.: 752 mmQS
Kraftstoff: 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine—test
HOLDER A 45
Motorleistung Ne crankshaft power PS
Motordrehmoment Mt crankshaft torque kpm
Motordrehzahl n engine speed U/min rev/min
Kraftstoffverbrauch B fuel consumption kg/h
spez. Kraftstoffverbrauch be spec. fuel consumption g/PSh
Mt
Md
B
be
n
Luftlemperatur: 25 °C
Barometerstd. 752 mm QS Kraftstoff: 0,830 kg/l

PRÜFUNGS ABTEILUNG

Motorprüfung
Engine-test

HOLDER A 45

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

Belastung in % des Drehmomentes bei Nenndrehzahl
load in % of torque at rated speed

Meßdrehzahl in % der Nenndrehzahl engine speed in % of rated engine speed

Luft-temperatur: 25 °C | Barometerstd. 752 mm QS | Kraftstoff: 0,830 kg/l