O.E.C.D. No.: 460
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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 30

Manufactured by: GEBRÜDER HOLDER, Maschinenfabrik
D-7418 Metzingen

Date of Tests: October till November 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 Centre (C.N.E.E.M.A., France) as being in accordance with the O.E.C.D. STANDARD CODE.

Date of Approval: 29th May 1974

Serial No.: 460

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PRÜFUNGS-ABTEILUNG
Holder A 30

Test No. 73-77

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 30
Type:	Wheel type tractor, unit construction, all-wheel drive, pivotal steering
Serial No:	250 528

Engine

Make:	GEBRÜDER HOLDER
Model:	VD 2
Type:	4-stroke Diesel Engine, watercooled, with direct injection
Serial No:	V 2 20 351
Cylinders:	2 in line; bore 95 mm, stroke 95 mm; displacement 1346 cm^3, compression ratio 15,6 : 1
Valves:	Overhead
Fuel system:	Fuel feed by gravity; BOSCH in line injection pump: PES 2 A 65 D410/3 RS 1273; 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; filtercartridge in the fuel tank; capacity of fuel tank appr. 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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Test No. 73-77

Air cleaner:	MANN UND HUMMEL oil bath air cleaner; oil capacity 0,4 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; with mouth showing upwards
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 4 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 overpressure; impeller assisted; by-pass thermostat; fan with 4 blades, 230 mm diameter; water capacity 7,0 l
Starting system:	Electrical; BOSCH screw push starter motor IF 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 55 Ah at 20 hours rating
Clutch	FICHTEL UND SACHS AG single plate dry clutch K 180; pedal operated

PRÜFUNGS-ABTEILUNG
Holder A 30

Test No. 73-77

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 the 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 9,25 l front axle together with power lift 12,0 l
Recommended oil:	Transmission gear box and rear axle: transmission oil SAE 80 front axle (with power lift): engine oil SAE 20W/20
Oil changing period:	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	247,59	1,25	0,35
	2	154,17	2,00	0,56
	3	81,12	3,80	1,06
forward fast	1	51,73	5,96	1,66
	2	32,21	9,58	2,66
	3	16,95	18,20	5,06
reverse	1	247,59	1,25	0,35
	2	154,17	2,00	0,56
	3	81,12	3,80	1,06

*) calculated with the tyre radius 356 mm acc. to tyre manufacturer's specification

Power take-off	Proportional engine speed p.t.o.; not independent; manually engaged, in the rear of tractor; 440 mm above ground in tractor's median plane; 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 p.t.o.-speed 540 rev/min at 2106 rev/min engine speed; may be set by aid of tractormeter; direction of rotation clockwise
Belt pulley	Optional, not fitted on tractor tested; 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; hydr. power lift in disintegrated construction; floating position, no controls; 2 single acting rams, 40 mm bore, 140 mm stroke; BOSCH hydraulic pump HY/ZFR 1/4 C 1 101; (optional HY/ZFR 1/11 C 1 101 if tractor is fitted with ZF hydraulic column steering) directly driven by engine; BOSCH control valve HY/SAE 5/175/1; maximum pressure 175 kp/cm²; oil capacity (together with front axle) 12 l; 7 l may be taken off through oil tapping; recommended oil and oil changing period see chapter "Gear box" page 6; (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; lift height above ground from 135 to 610 mm; optionally three-point linkage with joint balls of links acc. to DIN 9674 category I

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 143 to 618 mm measured on the surface of the holed bar; in the height of 380 mm above ground hydraulically lockable; with lower links in horizontal position distance of centre hole: to rear axle centre 663 mm to end of p.t.o.-shaft 395 mm
Trailer hitch	Own make; height above ground 550 or 670 mm; adjustable by shifting hitch; diameter of clevis hole 33 mm; distance to rear axle centre 345 mm maximum supporting force 200 kp
Towing hitch	Height above ground 400 mm
Steering	Pivotal-steering; ZF-Gemmersteering, kick-back proof; model 7359; acting on tractor's limber (optional 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)

Brakes

Parking brake:	Mechanically operated internal shoe type brake; acting on 2 brake drums in the front wheels; brake drums 150 mm diameter; operated by hand lever with ratchet
Foot brake:	Mechanically operated internal shoe type brake; acting on 2 brake drums in the rear wheels; brake drums 150 mm diameter; pedal operated

Wheels

Steering wheels:	In front and rear, pivotal steering
Driving wheels:	In front and rear; 4 pneumatics 7.00-16 AS 4 ply maximum permissible load on each tyre 420 kp at 1,5 kp/cm² inflation pressure track width 615 and 855 mm; changeable by turning wheels; rims 4,50 E x 16
Wheel base:	1195 mm

Weights

Ready for use, as tested

		without driver	with driver
Without ballast:	front	645 kp	656 kp
	rear	312 kp	376 kp
	total	957 kp	1032 kp
Front and rear ballast:	1 weight per wheel	35 kp each	140 kp
With ballast:	front	715 kp	726 kp
	rear	382 kp	446 kp
	total	1097 kp	1172 kp

Seat

Own make;
upholstered mould seat with back rest;
adjustable spring and shock absorber;
in median plane of tractor;
720 mm above ground;
seat position not adjustable

Number of grease points

(whole tractor) 13

Overturning protektion frame

Own make;
steel tube construction with 2 spars;
behind driver's seat
(optional, not fitted on tractor tested)

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Holder A 30

Test No. 73-77

Dimensions

Total length:	2740 mm with implement linkage
Total width:	728 mm at smallest track width 1025 mm at largest track width
Total height:	1760 mm to top of protection frame
Maximum ground clearence:	240 mm in median plane of tractor

Lighting equipment: Electric 12 Volt
acc. to 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	230/350
Rear lights *)	84 x 94	845	117/237
Reflectors	45 x 90	840	42/162

*) in combination with direction indicator and stop light
**) first figure at smallest track width
second figure at largest track width

FUELS AND LUBRICANTS USED IN TESTS

Fuel:	ARAL-Diesel fuel (DIN 51 601) specific gravity at 15°C 0,830 kg/l
Engine oil:	ARAL-KOWAL SAE 20W/20 HD
Transmission oil: speed change gear and rear axle:	Transmission oil SAE 80
front axle:	Engine oil SAE 20W/20
Hydraulic fluid:	Engine oil SAE 20W/20

PRÜFUNGS-ABTEILUNG
Holder A 30

Test No. 73-77

COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE

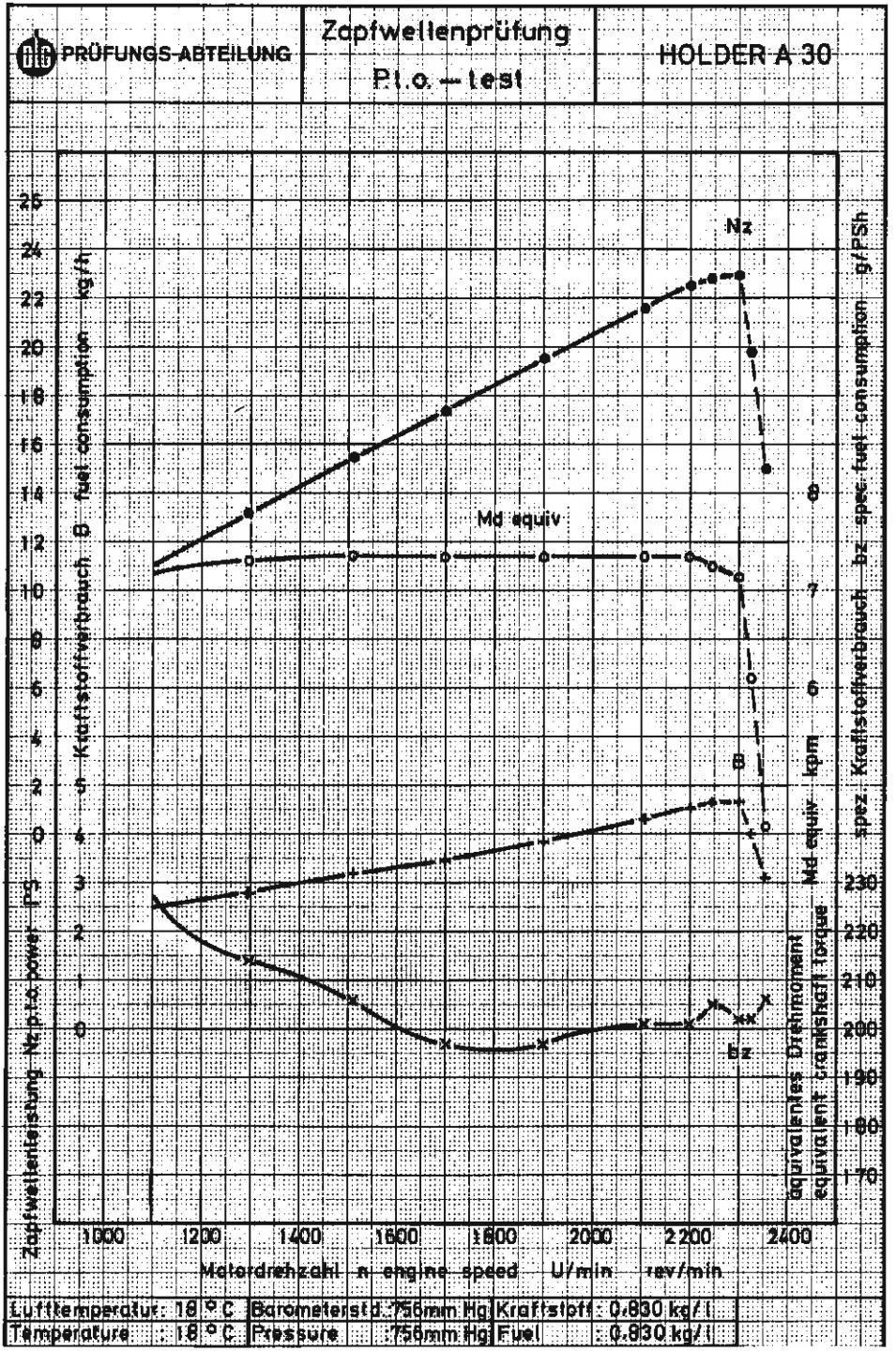
Date of tests: 31st October 1973
Type of dynamometer: Schenck hydraulic dynamometer U1-40

Maximum power

Power	Speed		Fuel consumption			Specific energy
	engine	p.t.o.	total		specific	
PS	rev/min	rev/min	l/h	kg/h	g/PSh	PSh/l
At maximum power 2-hour test						
23,0	2300	590	5,60	4,65	202	4,11
At standard p.t.o. speed (540 rev/min)						
21,6	2106	540	5,22	4,33	201	4,14
At the speed recommended for drawbar work						
23,0	2300	590	5,60	4,65	202	4,11
Part loads						
(i) 85% of the torque at maximum power						
19,8	2326	596	4,81	3,99	202	4,12
(ii) unloaded						
-	2404	617	1,43	1,19	-	-
(iii) 50% of the load defined in (i)						
10,1	2375	609	2,80	2,32	229	3,61
(iv) maximum power						
23,0	2300	590	5,60	4,65	202	4,11
(v) 25% of the load defined in (i)						
5,1	2392	613	2,00	1,66	325	2,55
(vi) 75% of the load defined in (i)						
15,0	2353	603	3,72	3,09	206	4,03

No load maximum engine speed: 2404 rev/min
Equivalent crankshaft torque at maximum power: 7,16 kpm
Maximum equivalent crankshaft torque: 7,35 kpm at 1900 rev/min of the engine

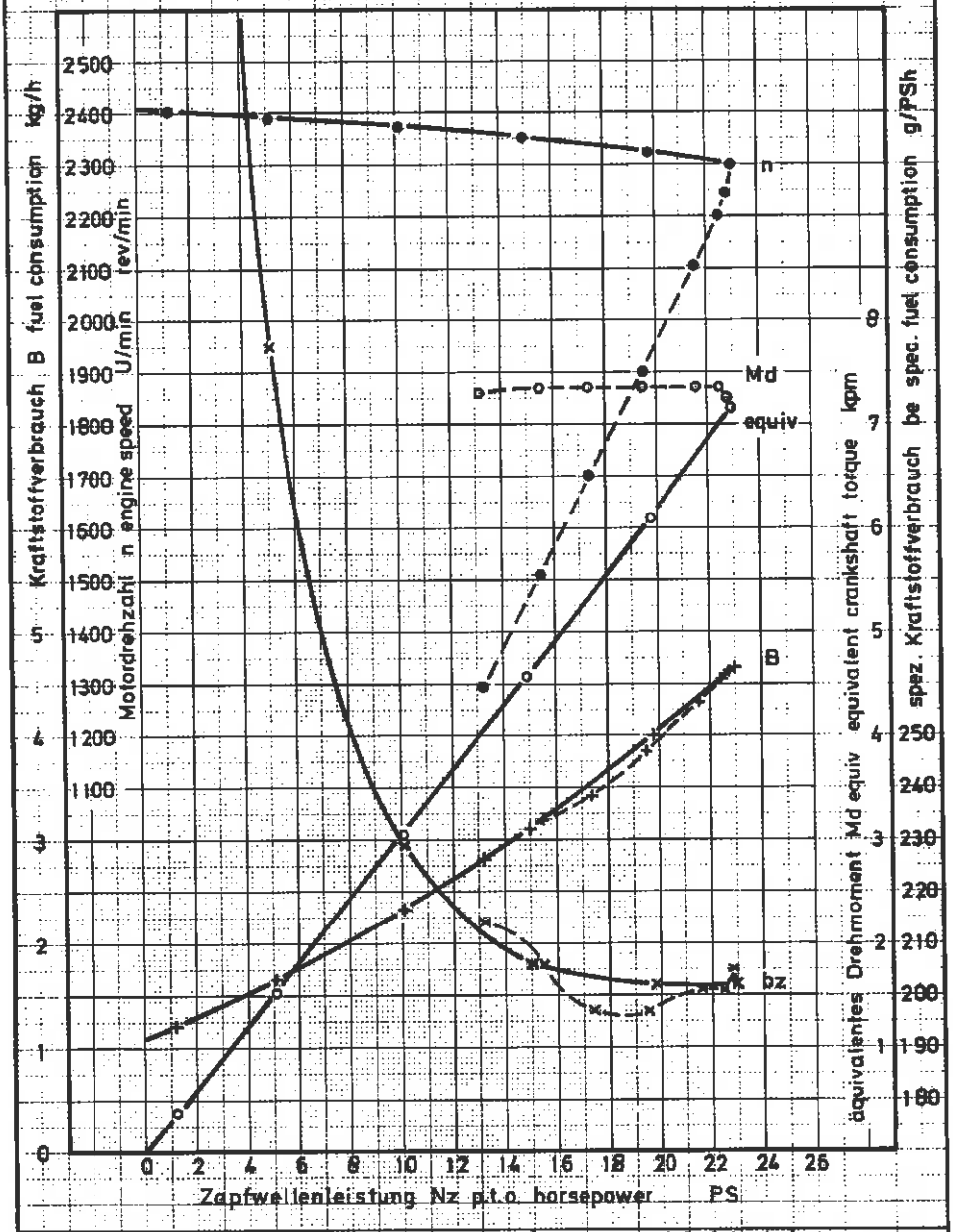
Mean atmospheric conditions:	temperature	18°C
	pressure	756 mm Hg
	relative humidity	75%
Maximum temperatures:	coolant	75°C
	engine oil	94°C
	fuel	19°C


PRÜFUNGS-ABTEILUNG
Zapfwellenprüfung
P.t.o. – test
HOLDER A 30
Nz
Md equiv
B
Bz
Zapfwellenleistung Nz p.t.o. power PS
Kraftstoffverbrauch B fuel consumption kg/h
spez. Kraftstoffverbrauch bz spec. fuel consumption g/PSh
äquivalentes Drehmoment Md equiv kpm
equivalent crankshaft torque
Motordrehzahl n engine speed U/min rev/min
1000
1200
1400
1600
1800
2000
2200
2400
Lufttemperatur : 18 °C
Temperature : 18 °C
Barometerstd. 756mm Hg
Pressure 756mm Hg
Kraftstoff : 0,830 kg/l
Fuel : 0,830 kg/l

PRÜFUNGS-ABTEILUNG

Zapfwellenprüfung
P.t.o. – test

HOLDER A 30



Lufttemperatur: 18°C	Barometerstd. 756mmHg	Kraftstoff: 0,830 kg/l
Temperature : 18°C	Pressure : 756mmHg	Fuel : 0,830 kg/l

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(2) Drawbar performance

Date of test: 6th, 19th and 20th November 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 260 mm						
1 slow	1,09	4,7	1150	2395	15,1	2,10
2 slow	1,75	7,5	1160	2384	15,0	2,63
3 slow	3,26	14,0	1160	2350	14,9	3,10
1 fast	5,18	18,8	980	2300	11,7	3,34
2 fast	8,89	19,9	600	2300	5,6	3,51
(ii) FIVE-HOUR-TEST at 75% of pull at maximum power in 1st gear of fast group						
1 fast	5,54	15,0	730	2348	7,5	3,36
(iii) FIVE-HOUR-TEST at pull corresponding to 15% wheel slip in test (i)						
3 slow	-	-	1160	2350	-	-
(v) MAXIMUM POWER without ballast height of drawbar above ground 270 mm						
2 slow	1,75	6,3	970	2377	14,9	2,48
3 slow	3,28	11,9	980	2356	15,0	3,04
1 fast	5,02	17,7	950	2303	14,6	3,15
2 fast	8,67	19,0	590	2298	8,0	3,38

Total oil consumption during ten hours duration of tests (ii) and (iii): 8 g/h

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Tyres make and size
front: Veith Pirelli Agrar 7.00-16 AS 4 ply
rear: Veith Pirelli Agrar 7.00-16 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 351 mm						
394	10	80	75	10	95	754
316	10	80	75	9	92	754
267	10	80	75	8	97	754
248	10	80	73	8	95	754
236	11	80	71	10	96	752
247	10	80	76	9	98	750
-	10	80	74	10	99	750
tyre inflation pressure 1,5 kp/cm² active tyre radius under static load 351 mm						
334	12	80	75	10	87	752
272	13	80	78	10	87	752
263	12	80	78	9	92	752
245	12	80	78	9	92	752

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

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Test No. 73-77

(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment front: 7.00-16 AS 4 ply
rear: 7.00-16 AS 4 ply

Track of wheels front: 855 mm
rear: 855 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		2,28	2,26
Radius of turning circle			2,15	2,14

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	554 mm
Distance forward from the vertical plane containing the axis of the rear wheels	750 mm
Distance of the median plane of the tractor	0 mm

PRÜFUNGS-ABTEILUNG
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Test No. 73-77

(5) BRAKING PERFORMANCE

A) FOOT BRAKE

Date of tests: 12th and 14th November 1973
Type of track: Concrete
Type of decelerometer: MOTO METER-Bremsverzögerungs- und Pedelkraftschreiber

Weight of ballasted tractor: 1172 kp with driver

Cold brakes

		with ballast	without ballast
Travelling speed	km/h	18,6	18,6
Deceleration	m/s^2	6,0	5,3
Stopping distance	m	2,4	2,6
Force on pedal	kp	57	33
Force on pedal to achieve a deceleration of 2,5 m/s^2	kp	26	16

Brake fade characteristics (hot tests)

deceleration	hot/cold	%	98	96
Stopping distance	cold/hot	%	99	93
Force on pedal	cold/hot	%	100	94

B) PARK BRAKE

Tractor facing up slope:
Pull on hand brake 3 kp, tractor does not roll

Tractor facing down slope:
Pull on hand brake 4 kp, tractor does not roll

PRÜFUNGS-ABTEILUNG

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(6) AMBIENT NOISE EMITTED BY THE TRACTOR

Date of test: 7th November 1973
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer type 2203

Results of test

Gear: 3rd fast
Travelling speed before acceleration: 14,0 km/h
Sound level: 84 dBA

(7) NOISE AT THE DRIVER'S EAR LEVEL

Date of tests: 7th November 1973
Type of track: Concrete
Type of sound level meter: Brüel and Kjaer type 2607
Type of frequency analyser: Brüel and Kjaer type 1614
(fitted with octave filter)

No cab or 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	990	1,25	1,10	89	
2 slow	1010	2,00	1,73	90	
3 slow	980	3,80	3,28	91	
1 fast	970	5,96	5,05	92	90
2 fast	590	9,58	8,80	92	
3 fast	light load	18,20	19,32	88	

*) The 1st fast gear corresponds to the travelling speed nearest to 7,25 km/h

(8) POWER LIFT PERFORMANCE

Date of tests: 14th November 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	135	-	475	865	175	1180

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

PRÜFUNGS-ABTEILUNG
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Test No. 73-77

OPTIONAL TESTS

(9) ENGINE PERFORMANCE

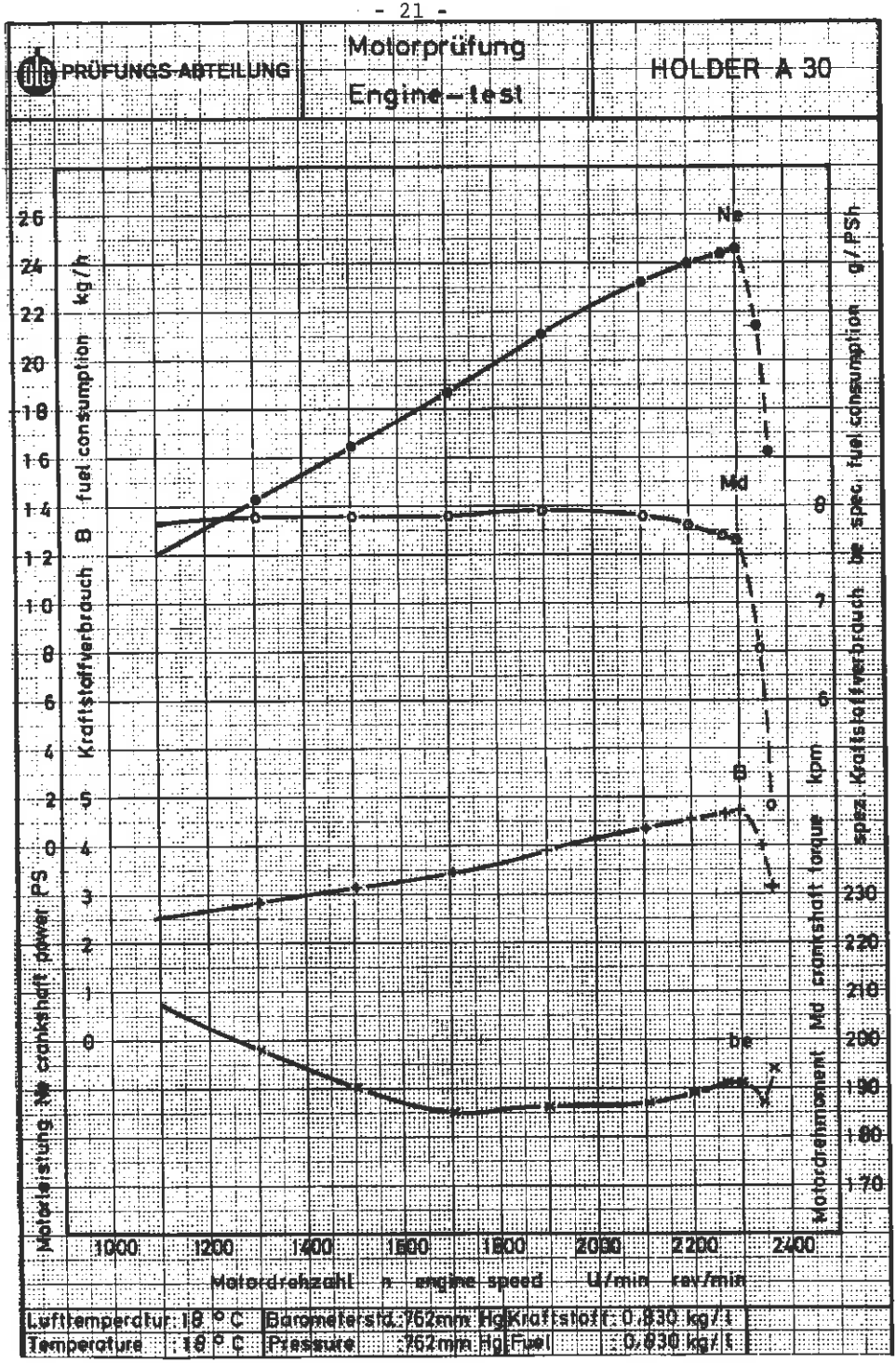
Date of tests: 24th and 25th October 1973
Type of dynamometer: Schenck eddy-current dynamometer W 150

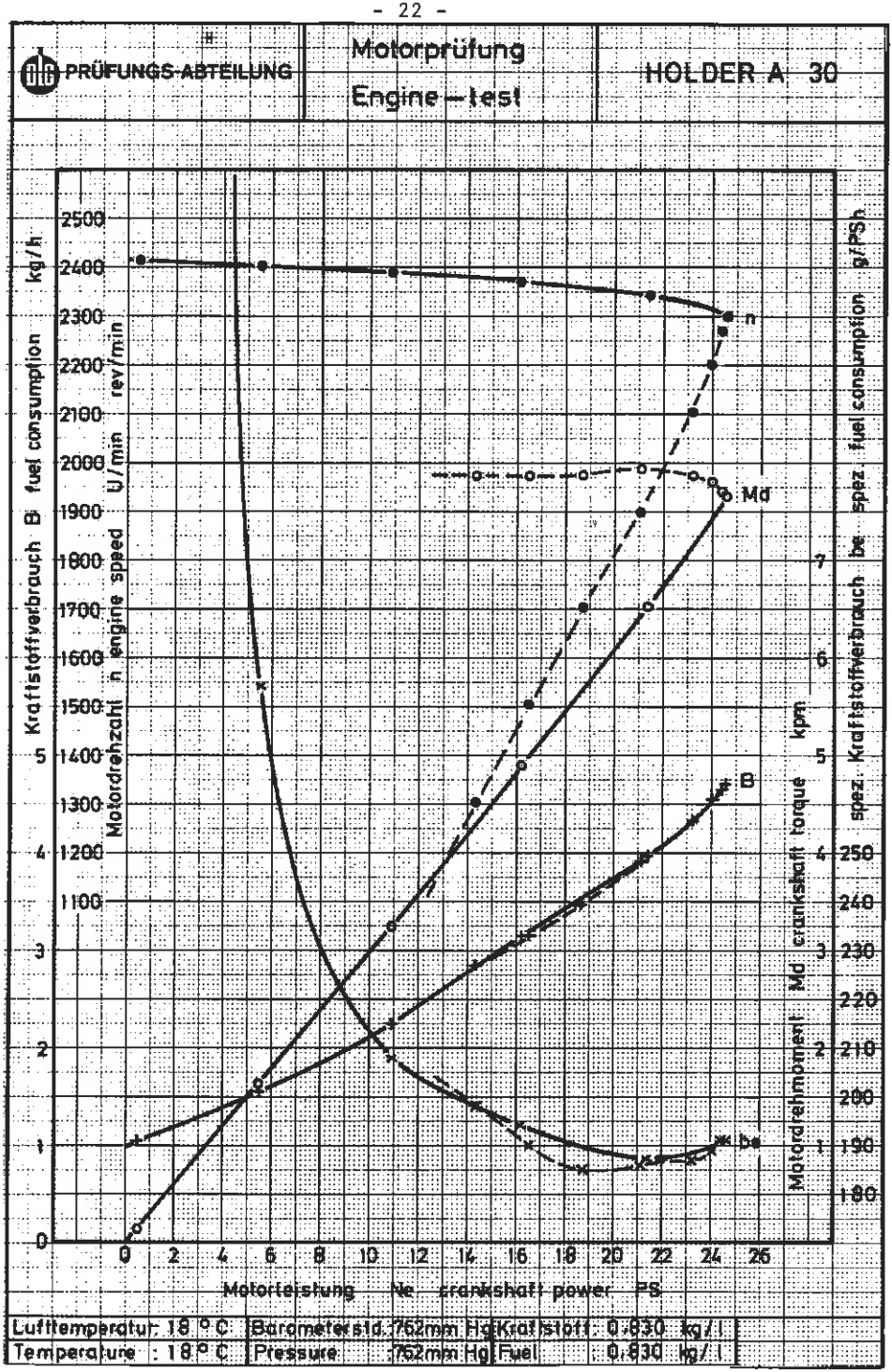
MAXIMUM POWER

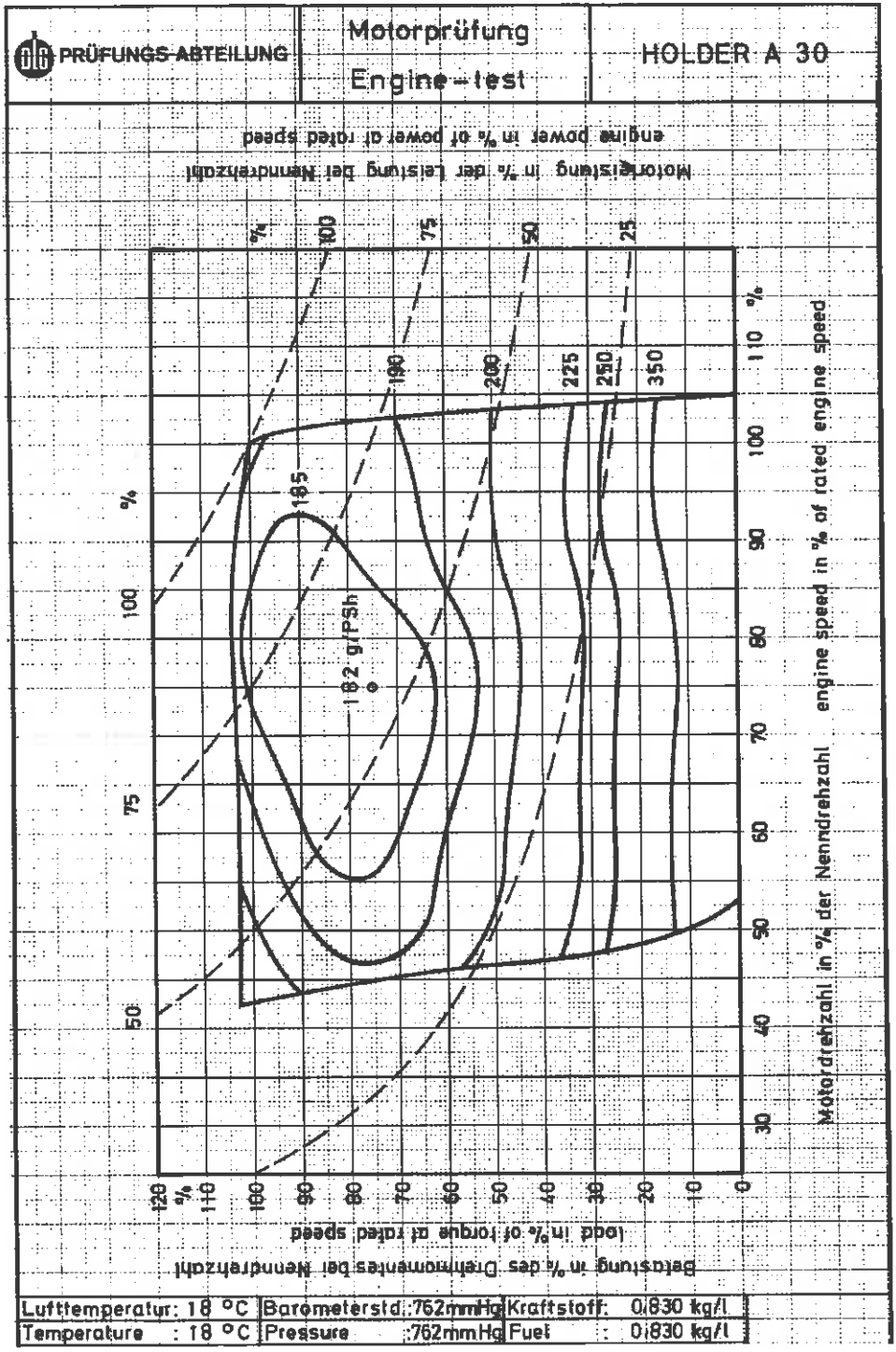
Power PS	Engine speed rev/min	Fuel consumption total 1/h	Fuel consumption total kg/h	Fuel consumption specific g/PSh	Specific energy PSh/l
At maximum power 2-hour test					
24,6	2300	5,65	4,69	191	4,35
At standard p.t.o. speed (540 rev/min)					
23,2	2106	5,22	4,33	187	4,44
At the speed recommended for drawbar work					
24,6	2300	5,65	4,69	191	4,35
Fuel consumption at part loads					
(i) 85% of torque at maximum power					
21,4	2346	4,80	3,98	187	4,46
(ii) unloaded					
-	2416	1,24	1,03	-	-
(iii) 50% of the load defined in (i)					
10,9	2387	2,72	2,26	208	4,01
(iv) maximum power					
24,6	2300	5,65	4,69	191	4,35
(v) 25% of the load defined in (i)					
5,5	2405	1,87	1,55	284	2,94
(vi) 75% of the load defined in (i)					
16,2	2367	3,78	3,14	194	4,29

Optimum fuel consumption: 182 g/PSh at 13,8 PS and 1725 rev/min
Standard fuel consumption 1/2 (DIN 9606): 2,22/4,66 1/h
No load maximum engine speed: 2416 rev/min
Torque at maximum power: 7,66 kpm
Maximum torque: 7,95 kpm at 1900 rev/min of the engine

Mean atmospheric conditions:	temperature	18°C
	pressure	762 mm Hg
	relative humidity	65%
Maximum temperatures:	coolant	71°C
	engine oil	86°C
	fuel	18°C


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine-test
HOLDER A 30
Ne
Md
be
Motorleistung Ne crankshaft power PS
Kraftstoffverbrauch B fuel consumption kg/h
Motordrehmoment Md crankshaft torque kpm
spez. Kraftstoffverbrauch be spec. fuel consumption g/PSh
1000
1200
1400
1600
1800
2000
2200
2400
Motordrehzahl n engine speed U/min rev/min
Lufttemperatur 18 °C Barometerstd. 762mm Hg Kraftstoff 0,830 kg/l
Temperature 18 °C Pressure 762mm Hg Fuel 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine – test
HOLDER A 30
Kraftstoffverbrauch B fuel consumption kg/h
Motordrehzahl n engine speed U/min rev/min
Motordrehmoment Md crankshaft torque kpm
spez. Kraftstoffverbrauch be spez. fuel consumption g/PSh
n
Md
B
be
Motorleistung Ne crankshaft power PS
Lufttemperatur: 18 °C | Barometerstd. 762mm Hg | Kraftstoff: 0,830 kg/l
Temperature : 18 °C | Pressure 762mm Hg | Fuel 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine-test
HOLDER A 30
Motorleistung in % der Leistung bei Nenndrehzahl
engine power in % of power at rated speed
%
100
75
50
25
100
75
50
185
182 g/PSh
180
200
225
250
350
110 %
100
90
80
70
60
50
40
30
Motordrehzahl in % der Nenndrehzahl engine speed in % of rated engine speed
Belastung in % des Drehmomentes bei Nenndrehzahl
load in % of torque at rated speed
120 %
110
100
90
80
70
60
50
40
30
20
10
0
Lufttemperatur: 18 °C
Temperature : 18 °C
Barometerstd. :762mmHg
Pressure :762mmHg
Kraftstoff: 0,830 kg/l
Fuel : 0,830 kg/l