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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 55

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.: 452

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PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

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 55
Type:	Wheel type tractor, unit construction, all-wheel drive, pivotal steering
Serial No:	3530240

Engine

Make:	GEBRÜDER HOLDER
Model:	VD3
Type:	4-stroke Diesel-engine, watercooled with direct injection
Serial No:	V 3 20660
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 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

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

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 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 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 Volt 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

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

Gear box

Transmission gear:	Own make; speed change gear with 4 forward speeds; group gear with 2 forward and 1 reverse group; total 8 forward and 4 reverse speeds
Rear axle, front axle and final drives:	Crown wheel and pinion in front as well as in the rear; bevelgear type differentials in front and in the rear; differential locks fitted; front axle differential operated by pedal; rear axle differential operated by hand lever; both differential locks are self-disengaging; spur gear final drives in portal axles in front and in the rear
Oil capacity:	Transmission gear box and rear axle 9 l front axle together with power lift 7 l final drives each 0,3 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	348,87	1,23	0,34
	2	202,76	2,12	0,59
	3	125,24	3,44	0,96
	4	79,13	5,44	1,51
Forward fast	1	95,94	4,49	1,25
	2	55,76	7,72	2,15
	3	34,44	12,51	3,47
	4	21,76	19,79	5,50
Reverse	1	255,84	1,68	0,47
	2	148,69	2,90	0,80
	3	91,84	4,69	1,30
	4	58,03	7,42	2,06

*) calculated with the tyre radius acc. to DIN 7807

PRÜFUNGS-ABTEILUNG
Holder A 55 Test No. 73-78

Power take-off	Proportional engine speed p.t.o. not independent; manually engaged; in the rear of tractor; 640 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; 45 mm diameter; stroke 140 mm; BOSCH hydraulic pump HY/ZFR 1/11 C1 101; directly driven by engine; BOSCH control valve HY/SEA 5/175/1; maximum oil pressure 175 kp/cm²; 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 DIN 9674 category I; operated by power lift; lift height above ground from 245 to 830 mm

Holed drawbar	Fitted on clevis of lower links; length between the ball joints 683 mm; thicknes of holed bar 20 mm; centre hole and 3 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 255 to 840 mm; measured at the surface of the holed bar; in the height 450 mm above ground hydraulically lockable; with lower links in horizontal position distance of centre hole: to rear axle centre 740 mm to end of p.t.o.-shaft 582 mm
Trailer hitch	Own make; height above ground 735 and 855 mm; adjustable by shifting hitch; diameter of clevis hole 33 mm; distance to rear axle centre 250 mm
Towing hitch	Height above ground 590 mm
Steering	Pivotal-steering; ZF hydrostatic column steering; model 7407; oil supply by the hydraulic pump of the power lift; BOSCH-flow dividing control valve HY/VH 4/6/1; acting on tractor's limber
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; operated by foot pedal

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

Wheels

Steering wheels:	In front and in the rear, pivotal steering;
Driving wheels:	In front and in the rear; 4 pneumatics 9,5 - 24 AS 6 ply; maximum permissible load on each tyre 1125 kp at 2,1 kp/cm² inflation pressure and 20 km/h velocity; track width 1010 and 1250 mm adjustable by turning wheels; additionally 1500 mm by means of hub- intermediate pieces; rims W 8 x 24
Wheel base:	1450 mm

Weights

Ready for use as tested

		without driver	with driver
Without ballast:	front:	890 kp	900 kp
	rear:	550 kp	610 kp
	total:	1440 kp	1510 kp
Front and rear ballast:	1 weight per wheel	50 kp each	200 kp
	water in the tyres		240 kp
	overturning protection frame		50 kp
With ballast:	front:	1110 kp	1125 kp
	rear:	820 kp	875 kp
	total:	1930 kp	2000 kp

Seat

Seat support:	UOP TRANSPORTATION EQUIPMENT SA; parallelogramm suspension; adjustable spring with shock absorber; in tractor median plane; height above ground 1000 mm; 60 mm displaceable for and aft
Seat pan:	KRÄMER; upholstered mould seat with back rest and pelvis rest

Overturning protection frame

FRITZMEIER;
steel tube construction
(fitted only for drawbar tests with ballast;
otherwise not tested)

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

Number of grease points (whole tractor) 13

Dimensions

Total length: 3120 mm with implement linkage

Total width: 1330 mm at smallest track width 1010 mm;
1740 mm at largest track width 1500 mm

Total height: 1690 mm to end of exhaust pipe;
1325 mm to top of back rest of passenger's seat

Ground clearence: 440 mm in median plane of tractor

Lighting equipment: Electrical, 12 Volt
acc. 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	1095	475
Side lights *	30 x 40	1065	180
Rear lights **	84 x 94	1080	172
Reflectors	45 x 90	1075	92

*) in combination with direction indicator
**) in combination with direction indicator and stop light
***) at smallest track width 1010 mm

LUBRICANTS AND FUEL USED IN TESTS

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

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

COMPULSORY TESTS

(1) MAIN POWER TAKE-OFF PERFORMANCE

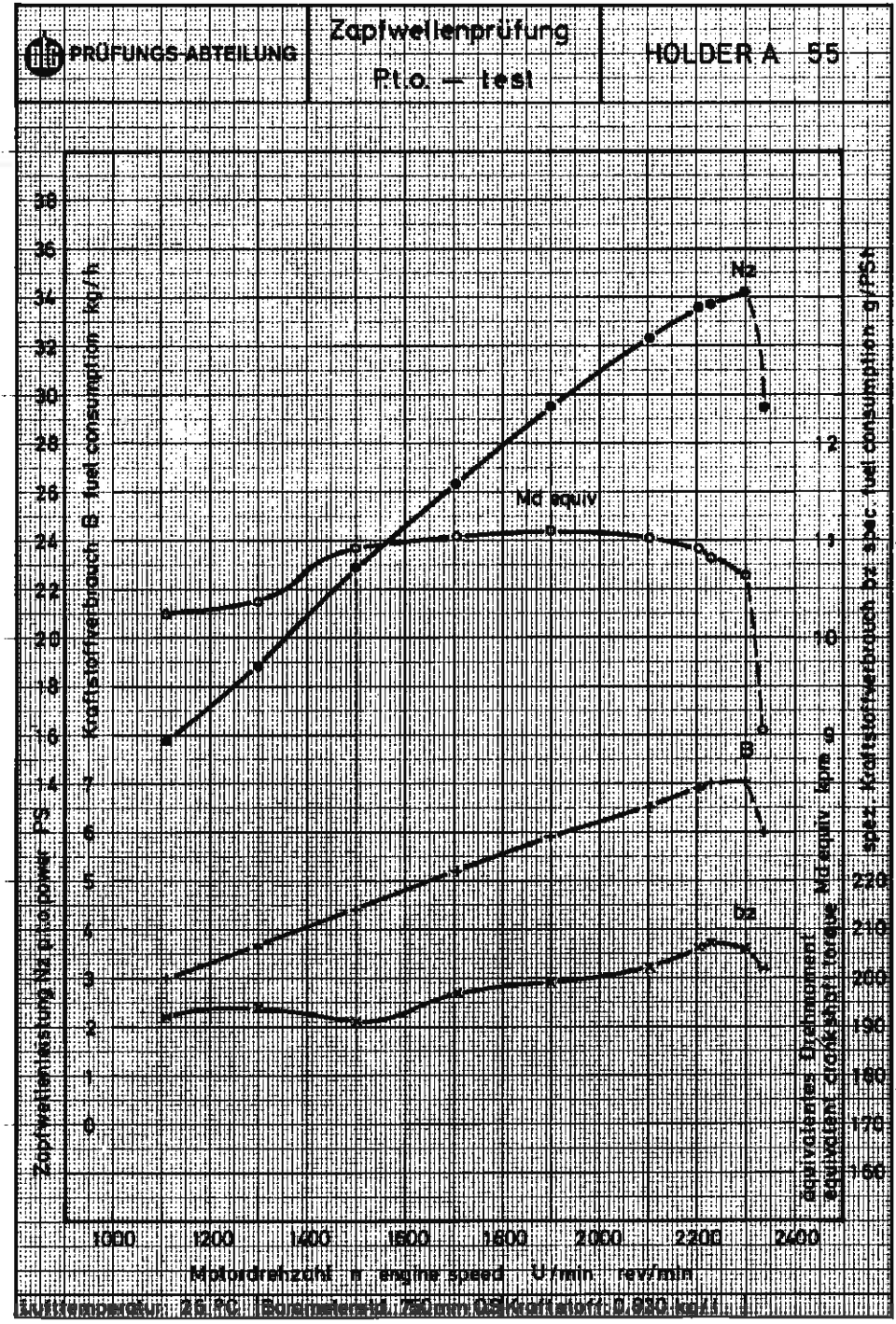
Date of tests: 27th August 1973
Type of dynamometer: Schenck hydraulic dynamometer U1-40

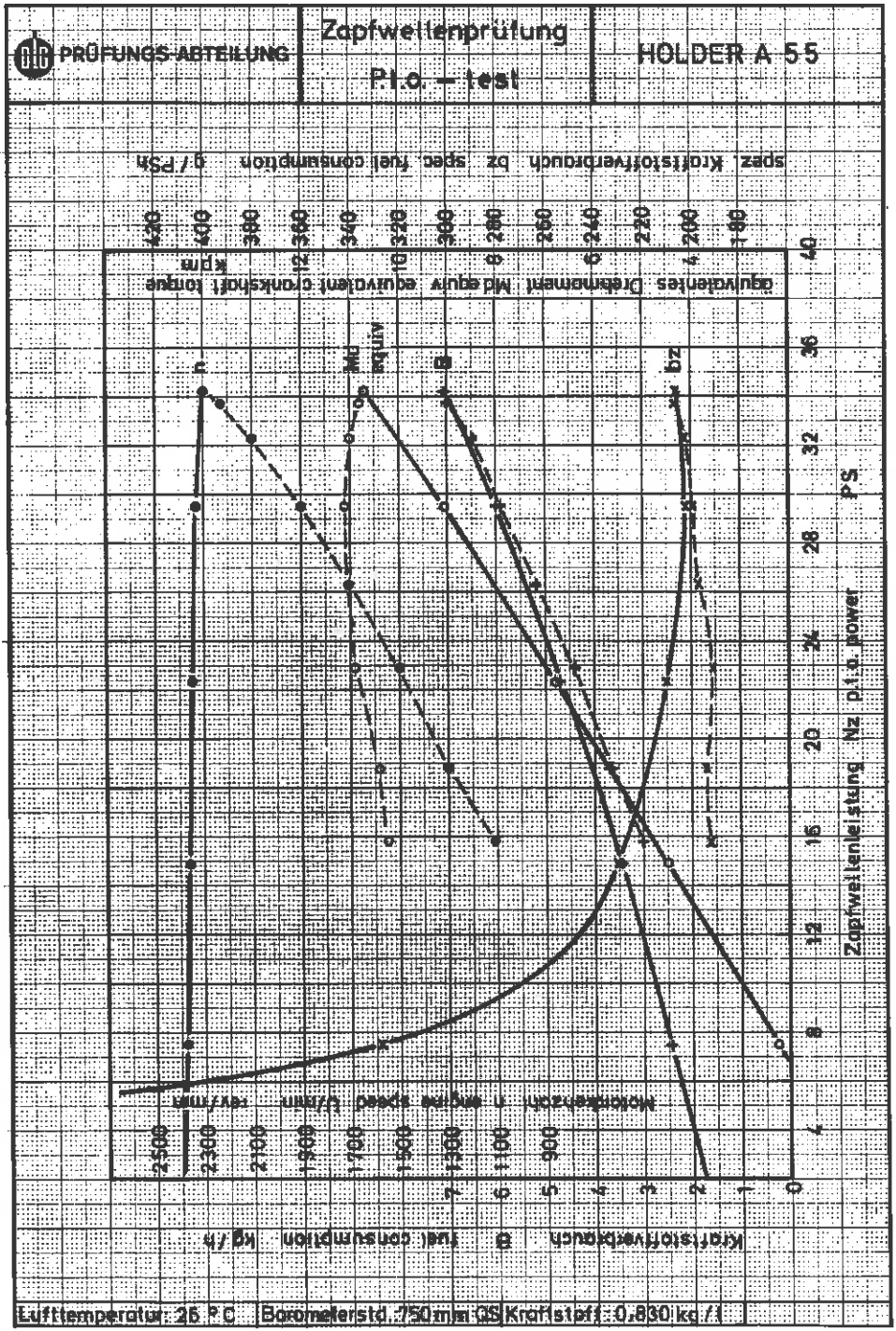
Maximum power

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	8,50	7,05	206	4,02
At standard p.t.o. speed (540 rev/min)						
32,3	2100	540	7,86	6,52	202	4,11
At the speed recommended for drawbar work						
34,2	2300	590	8,50	7,05	206	4,02
Part loads						
(i) 85% of the torque at maximum power						
29,5	2335	599	7,20	5,97	202	4,10
(ii) unloaded						
-	2408	617	1,93	1,60	-	-
(iii) 50% of the load defined in (i)						
14,9	2361	605	4,15	3,45	231	3,59
(iv) maximum power						
34,2	2300	590	8,50	7,05	206	4,02
(v) 25% of the load defined in (i)						
7,5	2383	611	2,96	2,46	328	2,53
(vi) 75% of the load defined in (i)						
22,3	2350	603	5,63	4,67	210	3,96

No load maximum engine speed: 2408 rev/min
Equivalent crankshaft torque at maximum power: 10,65 kpm
Maximum equivalent crankshaft torque: 11,11 kpm at 1900 rev/min of the engine

Mean atmospheric conditions:	temperature	26°C
	pressure	750 mm Hg
	relative humidity	58%
Maximum temperatures:	coolant	85°C
	engine oil	87°C
	fuel	26°C


PRÜFUNGS-ABTEILUNG
Zapfwellenprüfung
P.t.o. – test
HOLDER A 55
Kraftstoffverbrauch G fuel consumption kg/h
Zapfwellenleistung Nz pto-power PS
Md equiv
Nz
B
b2
spez. Kraftstoffverbrauch b2 spec. fuel consumption g/PSh
äquivalentes Drehmoment Md equiv kpm
equivalent clockshort torque
Motordrehzahl n engine speed U/min rev/min
1000
1200
1400
1600
1800
2000
2200
2400
Lufttemperatur 25 °C Barometerstand 750 mm QS Kraftstoff 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Zapfwellenprüfung
P.t.o. – test
HOLDER A 55
spez. Kraftstoffverbrauch bz spec. fuel consumption g/PSh
äquivalentes Drehmoment Md equiv. equivalent crankshaft torque kpm
Md equiv
bz
n
Zapfwellenleistung Nz p.t.o. power PS
Motordrehzahl n engine speed U/min rev/min
Kraftstoffverbrauch B fuel consumption kg/h
Lufttemperatur: 26 °C Barometerstd. 750 mm QS Kraftstoff: 0,830 kg/l

PRÜFUNGS-ABTEILUNG
Holder A 55

(2) DRAWBAR PERFORMANCE

Date of test: 24th September, 4th and 10th 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 460 mm						
1 slow	1,09	8,3	2060	2374	15,0	2,40
2 slow	1,86	14,2	2070	2356	15,1	2,93
3 slow	2,98	22,9	2080	2340	15,0	3,18
1 fast	3,94	27,9	1910	2299	11,9	3,29
4 slow	4,95	28,8	1570	2300	8,8	3,36
2 fast	7,27	30,1	1120	2299	5,4	3,49
3 fast	12,08	29,6	660	2300	3,0	3,47
(ii) FIVE-HOUR-TEST at 75% of pull at maximum power in 4th gear of slow group						
4 slow	5,21	22,8	1180	2341	5,7	3,43
(iii) FIVE-HOUR-TEST at pull corresponding to 15% wheel slip in test (i)						
3 slow	2,98	22,9	2080	2340	15,0	3,18
(v) MAXIMUM POWER without ballast height of drawbar above ground 460 mm						
3 slow	2,99	18,7	1690	2346	15,0	3,15
1 fast	3,85	24,2	1700	2330	15,1	3,24
4 slow	4,71	27,9	1600	2300	13,0	3,23
2 fast	7,16	29,9	1130	2300	7,4	3,49
3 fast	11,91	29,9	680	2299	3,9	3,48

Total oil consumption during ten hours duration of tests (ii) and (iii): 35 g/h

PRÜFUNGS-ABTEILUNG

Test No. 73-78

Tyres make and size
front: Veith-Pirelli Agrar 9,5-24 AS 6 ply
rear: Veith-Pirelli Agrar 9,5-24 AS 6 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 496 mm						
342	26	83	77	23	72	757
280	25	83	77	23	73	757
261	23	84	78	23	71	758
252	21	84	78	18	81	758
247	18	83	76	18	85	758
233	18	83	76	13	83	758
239	17	83	76	15	93	758
239	26	83	77	23	73	755
261	25	85	78	24	70	753
tyre inflation pressure 1,0 kp/cm² active tyre radius under static load 497 mm						
261	23	85	72	19	74	752
253	23	85	78	20	68	752
254	23	85	72	20	68	752
238	18	84	73	19	84	752
235	22	84	77	19	81	752

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

(3) TURNING SPACE AND TURNING CIRCLE

Wheel equipment front: Veith-Pirelli 9,5-24 AS 6 ply
rear: Veith Pirelli 9,5-24 AS 6 ply

Track of wheels front: 1010 mm
rear: 1010 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		3,78	3,98
Radius of turning circle			3,61	3,66

(4) LOCATION OF CENTRE OF GRAVITY

Height above ground	660 mm
Distance forward from the vertical plane containing the axis of the rear wheels	865 mm
Distance of the median plane of the tractor	0 mm

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

(5) BRAKING PERFORMANCE

A) FOOT BRAKE

Date of tests: 2nd October 1973
Type of track: Concrete
Type of decelerometer: MOTO METER-Bremsverzögerungs- und Pedalkraftschreiber

Weight of ballasted tractor: 2000 kp with driver

Cold brakes

		with ballast	without ballast
Travelling speed	km/h	20,9	20,9
Deceleration	m/s^2	7,2	5,5
Stopping distance	m	2,2	3,2
Force on pedal	kp	36	22
Force on pedal to achieve a deceleration of 2,5 m/s^2	kp	12	9

Brake fade characteristics (hot tests)

Deceleration	hot/cold	%	81	100
Stopping distance	cold/hot	%	79	100
Force on pedal	cold/hot	%	97	104

B) PARK BRAKE

Tractor facing up slope:
Pull on hand brake 9 kp, tractor does not roll

Tractor facing down slope:
Pull on hand brake 9 kp, tractor does not roll

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

(6) AMBIENT NOISE EMITTED BY THE TRACTOR

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

Results of test

Gear: 4th fast gear
Travelling speed before acceleration: 16,0 km/h
Sound level: 82 dBA

(7) NOISE AT THE DRIVER'S EAR LEVEL

Date of tests: 26th September 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

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	effective	Sound level	
	kp	km/h	km/h	dBA	Sone
1 slow	1680	1,23	1,08	90	
2 slow	1680	2,12	1,84	91	
3 slow	1690	3,44	3,03	93	
1 fast	1600	4,49	3,96	95	
4 slow	1640	5,44	4,74	95	
2 fast *	1070	7,72	7,12	95	106
3 fast	670	12,51	11,98	94	
4 fast	light load	19,79	20,65	92	

*) the 2nd fast gear corresponds to the travelling speed nearest to 7,25 km/h

(8) POWER LIFT PERFORMANCE

Date of tests: 15th 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	245	-	585	980	175	1760
On the frame	245	240	640	710	175	965

PRÜFUNGS-ABTEILUNG
Holder A 55

Test No. 73-78

OPTIONAL TESTS

(9) ENGINE PERFORMANCE

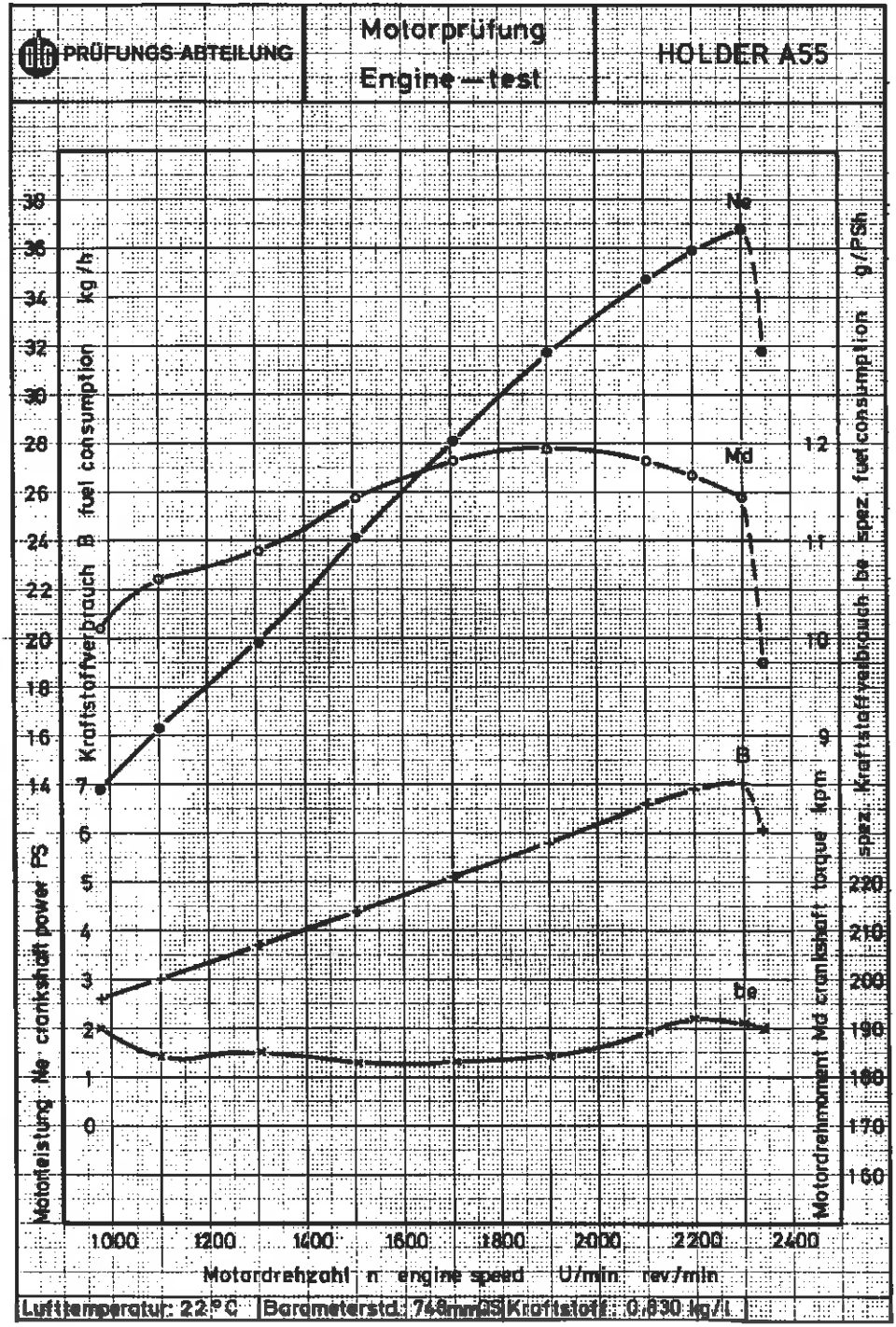
Date of tests: 2nd and 3rd August 1973
Type of dynamometer: Schenck eddy current dynamometer W 150

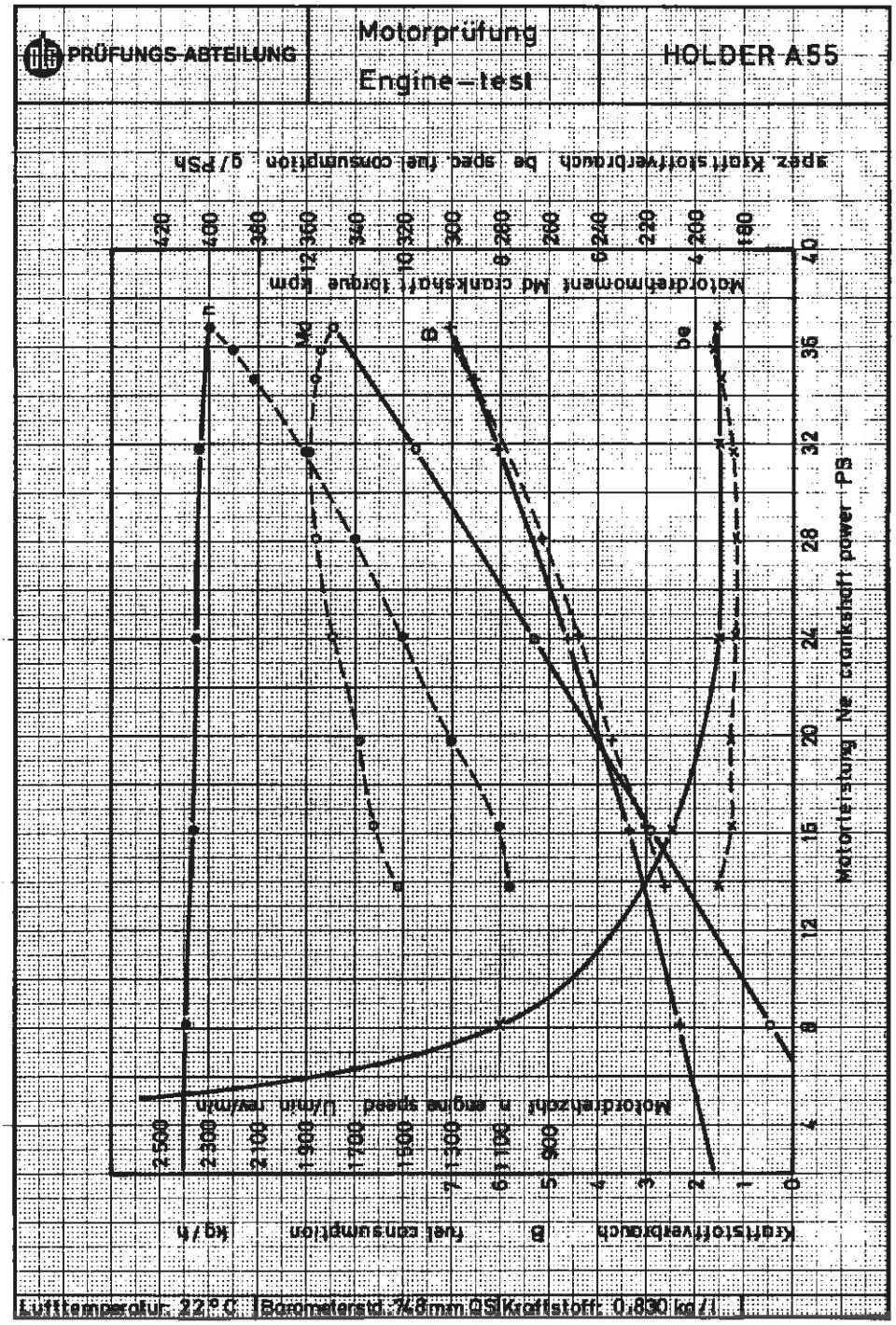
Maximum power

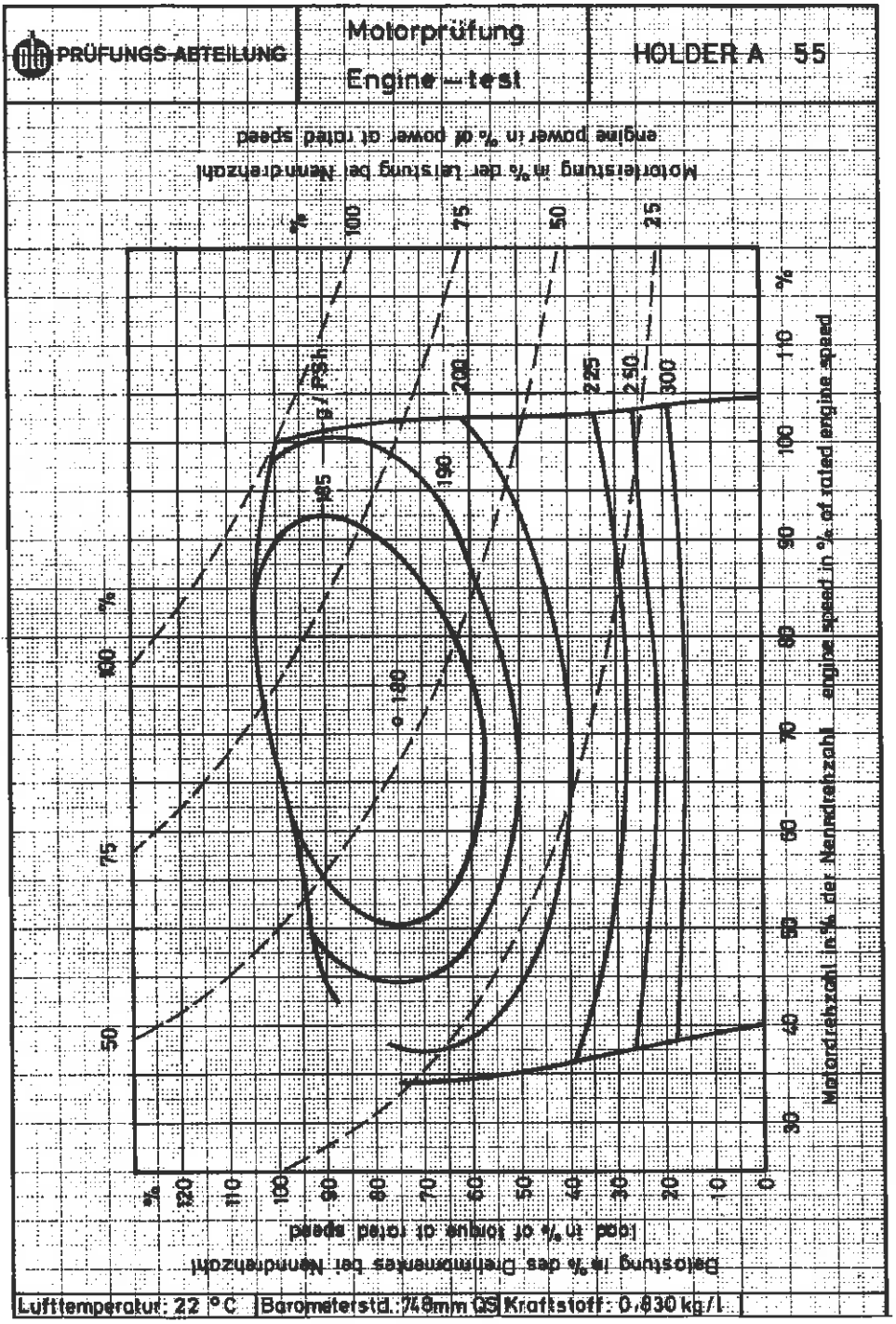
Power PS	Engine speed rev/min	Fuel consumption total 1/h	Fuel consumption total kg/h	Fuel consumption specific g/PSh	Specific energy PSh/l
At maximum power 2-hour test					
36,8	2300	8,47	7,03	191	4,34
At standard p.t.o. speed (540 rev/min)					
34,7	2100	7,90	6,55	189	4,39
At the speed recommended for 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	2339	7,29	6,05	190	4,36
(ii) unloaded					
-	2409	1,69	1,40	-	-
(iii) 50% of the load defined in (i)					
16,1	2363	4,04	3,35	209	3,99
(iv) maximum power					
36,8	2300	8,47	7,03	191	4,34
(v) 25% of the load defined in (i)					
8,1	2389	2,74	2,27	280	2,96
(vi) 75% of the load defined in (i)					
24,0	2355	5,51	4,57	190	4,35

Optimum fuel consumption: 180 g/PSh at 19,7 PS and 1640 rev/min
Standard fuel consumption 1/2 (DIN 9606): 2,74/6,89 l/h
No load maximum engine speed: 2409 rev/min
Torque at maximum power: 11,45 kpm
Maximum torque: 11,95 kpm at 1900 rev/min of the engine

Mean atmospheric conditions:	temperature	22°C
	pressure	748 mm Hg
	relative humidity	90%
Maximum temperatures:	coolant	85°C
	engine oil	94°C
	fuel	25°C


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine — test
HOLDER A55
Ne
Md
B
be
Motorleistung Ne crankshaft power PS
Kraftstoffverbrauch B fuel consumption kg/h
spez. Kraftstoffverbrauch be spez. fuel consumption g/PSh
Motordrehmoment Md crankshaft torque kpm
Motordrehzahl n engine speed U/min rev/min
1000
1200
1400
1600
1800
2000
2200
2400
Lufttemperatur: 22 °C
Barometerstd.: 748 mm QS
Kraftstoff: 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine-test
HOLDER A55
spez. Kraftstoffverbrauch be spec. fuel consumption g/PSh
Motordrehmoment Md crankshaft torque kgm
Motorleistung Ne crankshaft power PS
Motordrehzahl n engine speed U/min rev/min
Kraftstoffverbrauch B fuel consumption kg/h
Lufttemperatur 22°C Barometerstd. 748 mm QS Kraftstoff: 0,830 kg/l


PRÜFUNGS-ABTEILUNG
Motorprüfung
Engine – test
HOLDER A 55
Motorleistung in % der Leistung bei Nenndrehzahl
engine power in % of power at rated speed
PS/h
Motordrehzahl in % der Nenndrehzahl engine speed in % of rated engine speed
Belastung in % des Drehmomentes bei Nenndrehzahl
load in % of torque at rated speed
Lufttemperatur: 22 °C
Barometerstd.: 748mm QS
Kraftstoff: 0,830 kg/l