Report No. 4008/OECD

Report on Test in accordance with O.E.C.D. Test Code for agricultural Tractors

No. 32

Güldner - Diesel - Tractor Toledo G 40
with type 3L 79 3-cylinder engine

Manufactured by: Gesellschaft für Linde's Eismaschinen AG.,
Niederlassung Güldner-Motorenwerke, Aschaffenburg



Date of Test: July/October 1962

SCHLEPPER -PRÜFFELD DARMSTADT
Darmstadt - Kranichstein

SCHLEPPER-PRÜFFELD

KURATORIUM FÜR TECHNIK IN DER LANDWIRTSCHAFT

REPORT ON TEST No. 4008 / O E C D

GÜLDNER - Toledo G 40

Manufacturer:	Gesellschaft für Linde's Eismaschinen AG., Niederlassung Güldner-Motorenwerke, Aschaffenburg
Test requested by:	Gesellschaft für Linde's Eismaschinen AG., Niederlassung Güldner - Motorenwerke, Aschaffenburg
Date of tests:	July/October 1962

This test has been approved by the

O E C D - Coordinating Centre (C.N.E.E.M.A., France)

as beeing in accordance with the

O E C D - Tractor Test Code

It does not contain an evaluation of the performance of the tractor on practical farm work.

SCHLEPPER-PRÜFFELD
Güldner-Toledo G 40

Test Nr.4008/OECD

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S E C T I O N I

SPECIFICATION OF TRACTOR

Tractor

Make : Gesellschaft für Linde's Eismaschinen AG., Niederlassung Güldner Motorenwerke, Aschaffenburg

Model: Toledo G 40

Type : Diesel wheel type tractor, unit construction

No. : Serial No. 218 26 0001

Engine

Make : Gesellschaft für Linde's Eismaschinen AG., Niederlassung Güldner Motorenwerke, Aschaffenburg

Model: 3 L 79

Type : 4 - stroke - diesel with swirl-chamber

No. : Serial No. 118 26 0007

Rated output: 36 hp (metric) at 2200 r.p.m.

Cylinders : 3 cylinders; vertical in line;
100 mm bore x 100 mm stroke;
compression ratio: 19 : 1;
replaceable single cylinders, ribbed, alloied cast iron;
overhead valves.

Rated speeds: For p.t.o. work : 2200 r.p.m.
for belt work : 2200 r.p.m.
for drawbar work on field: 2200 r.p.m.
for road work : 2200 r.p.m.

Fuel system : Fuel - commercial available diesel oil;
Bosch type PES 3A 70C 300RS 1037 injection pump;
Bosch type DNOSD 211 injection nozzles;
injection timing: 23° before T.D.C.;
injection pressure: 140 kp/cm²
Bosch type FJ/AF 11/3 felt tube fuel filter
capacity of fuel tank: 48 l.

Governor : Güldner - make, mechanical centrifugal variable speed governor; governor range of engine speed with no laod: 740 r.p.m. to 2300 r.p.m.

Air cleaner: Mann & Hummel - make; oil bath cleaner with Venturi reduction tube and cyclonic precleaner; oil capacity 1 l

Oiling system: Forced feed from gear type pump; Mann type 67503 92 126 Patr. H 926, multi-high efficiency filter in full flow;
recommended oil in summer HD SAE 20
in winter HD SAE 10
tropics HD SAE 30
oil-change period: 200 hrs
oil-capacity: 10 l

Cooling system: Air cooling with gear driven axial flow bower

Transmission

Clutch: Fichtel & Sachs type DO 250/225 K dry disc dual clutch for p.t.o. shaft and gear box drive respectively, foot pedal operated.

Gearbox: Make Zahnradfabrik Friedrichshafen (ZF), patented easy shifting control *) ZF type with selector pins and constant mesh, 8 forward speeds and 4 reverse speeds by a group gear; oil capacity ca. 20 l; (* manufacturers name of the control)

Differential: Make Zahnradfabrik Friedrichshafen (ZF), crown wheel and pinion, bevel gear type differential; lock fitted, by handlever operated, automatically disengaging.

Speeds:

Gear No.	Number of engine revolutions for one revolution of driving wheel	Theoretical travelling speed for 2200 r.p.m. rated speed of engine km/h	m/s
1.	449,40 : 1	1,21	0,34
2.	262,30 : 1	2,07	0,57
3.	159,70 : 1	[illegible]	[illegible]
4.	98,70 : 1	5,50	1,53
5.	124,75 : 1	4,35	1,21
6.	72,95 : 1	7,44	2,07
7.	44,44 : 1	12,22	3,40
8.	27,43 : 1	19,78	5,50
1.R.	419,60 : 1	2,16	0,60
2.R.	245,00 : 1	3,70	1,03
3.R.	149,20 : 1	6,05	1,68
4.R.	92,20 : 1	9,80	2,72

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Steering device :	Zahnradfabrik Friedrichshafen type ZF - Gemmer steering GD 38 with single droparm and fixed drag link
Brakes :	Hand-brake: external band brake type, independant from foot brake actuating on drums on differential half - shafts; Foot-brake: internal shoe type; actuating on drums on differential half - shafts; dual main foot pedal, combined by a latch for normal use, independant for steering brake use.

Wheels

Steering wheels :	Two at front, 6,00-16 AS Front, 6ply pneumatic (acc. to DIN 7808) track 1270 mm (+) and 1426 mm (+) acc. to DIN 9677), changed by reversing wheels; maximum permissible weight on each tyre 600 kg at 2,5 kp/cm², 900 kg at 3,0 kp/cm² (acc. to DIN 7808)
Driving wheels :	Two at rear, 12,4/11 - 32 AS, 6ply pneumatic (acc. to DIN 7807); track 1250 mm and 1500 mm (acc. to DIN 9677); changed by reversing wheels; maximum permissible weight on each tyre 1000 kg at 1,0 kp/cm² 1500 kg at 1,5 kp/cm² (acc. to DIN 7807); wheel base 1954 mm

Belt pulley

Location :	At rear of tractor, p.t.o. driven;
Diameter/width:	220 / 150 mm
Speed :	1593 r.p.m. at 2200 r.p.m. rated engine speed
Linear belt speed :	18,4 m/s (acc. to DIN 9630 : 19,85-22,0 m/s; acc. to B.S. : 15,25 - 16,25 m/s)
Direction of rotation :	Clockwise, viewed from left hand side of tractor.

Power take off

a) Main p.t.o.	:	Independant p.t.o. by hand lever changeable to 1000 r.p.m. or 540 r.p.m. foot pedal and dual clutch operated;
Location	:	At rear of tractor, 544 mm above ground in centre line of tractor
Dimensions	:	Spline shaft 29 x 34,9 x 8,7 mm, 1 3/8" (acc. to DIN 9611 Form A and B.S. 1495)
Speed	:	575 r.p.m. at 2200 r.p.m. rated engine speed, 1150 r.p.m. at 2200 r.p.m. rated engine speed, (standard p.t.o. speed 540 r.p.m. according to DIN 9611 and B.S. 1495 may be set by aid of the tractormeter also p.t.o. speed of 1000 r.p.m.)
Direction of rotation	:	Clockwise viewed from tractor rear
b) Shaft for mover-bar drive		
Location	:	818 mm at front of rear axle centre, 476 mm above ground, 153 mm to the left hand side of centre line of tractor
Dimensions	:	Shaft with thread M 30 x 3, 58 mm long
Speed	:	1150 r.p.m. at 2200 r.p.m. rated engine speed
Direction of rotation	:	Anticlockwise viewed from tractor front, driven by p.t.o. drive out of gear box.

Power lift

Own make live hydraulic, draft and position controll system and floating position, with Bosch make control valve and Bosch make gear type oil pump, single acting ram cylinder, oil capacity 9,5 l, maximum oil pressure 175 kp/cm², oil delivery of pump 16 l/min at 175 kp/cm; maximum load at end of lower links 1700 kp links in horizontal position manufacturers figure.

Implement linkage

At rear of tractor: Three point linkage, cate - gorie I or II (acc. to DIN 9674) controlled by power lift.

Drawbar

Fixed hydraulic controlled implement linkage with central hole and 3 holes with 40 mm dis - tance, 2 with 80 mm, 1 with 240 mm and 2 with 80 mm distance apart either side of centre line; vertical adjustments from 380 - 100 mm to 820 - 100 mm above ground.

Trailer hitch

At rear of tractor: Height above ground 645 mm and 715 mm by reversing hitch.

Towing hitch

At front of tractor: Height above ground 490 mm

Electrical equipment

Voltage	:	12 Volts
Generator	:	Bosch type L J/G E H 90/12/1800 R13
Battery	:	Two batteries, lead acid, 12 Volts, capacity 60 Ah each.
Starting device	:	Bosch type EJD 1,8/12 R 105, solenoid engaged starter motor;
Starting aid	:	Glowing plugs Bosch type KE/GSA 10/8
Lighting equipment	:	Acc. to StVZO (German lighting regu - lation) additionally head-light main beam

Overall dimensions

Overall lenght	:	3234 mm, with three point hitch
Overall width	:	1572 mm, track 1250 mm, without ballast
Overall height	:	1533 mm, top of steering wheel
Maximum ground clearance	:	400 mm below mover-bar drive

Weights

With implement three point linkage, power lift, full fuel tank oil, astestet bur without driver

	Without ballast kg	With ballast kg
On front wheels	737	881
On rear wheels	1316	2040
Total	2053	2921

Special remarks: None

SECTION II

LABORATORY TESTS

1. COMPULSORY TESTS

Main power take - off test

Date and location of test: 4.9.1962, Schlepper - Prüffeld, Darmstadt - Kranichstein

Type of dynamometer: Schenck hydraulic brake

Position of governor control: Fully open and for standard p.t.o.-speed

Fuel: Shell diesel fuel, density 0,825 kg/l at 15°C, commercial quality in accordance with DIN 51 601

Engine oil: BP Energol - Diesel D, HD 20 (SAE)

(1) Sustained power tests

Duration of test h	Horse power metric hp	Engine speed r.p.m.	Equiv. torque kpm	Spec. fuel cons. g/hph	Mean Temperatures Fuel °C	Oil °C	Water °C	Air °C	Atm. press. mm Hg.
Maximum power high speed p.t.o. engaged, p.t.o. speed = 1150 r.p.m.									
2	34,1	2198	11,1	213	17	80	n.rec.	22	735
Power at 85 % of engine speed at maximum torque high speed p.t.o. engaged, p.t.o. speed = 813 r.p.m.									
1	25,6	1555	11,8	213	19	75	n.rec.	22	735

(2) Varying speed tests

Horse power metric hp	Engine speed r.p.m.	Fuel Consumption l/h	hph/l	g/hph	Mean Temperatures Fuel °C	Oil °C	Water °C	Air °C	Atm. press. mm Hg.
Power at rated engine speed and for drawbar work									
34,0	2200	8,86	3,93	215	17	73	n.rec.	22	735
Power at 1000 r.p.m. p.t.o. - speed									
30,2	1980	7,60	3,97	209	20	70	n.rec.	22	735
Power at 540 r.p.m. standard p.t.o.-speed in accordance with DIN 9611 and Par. 112									
25,1	2078	7,28	3,51	207	19	65	n.rec.	22	735
Maximum no load engine speed									
-	2350	2,90	-	-	17	73	n.rec.	22	735

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2. SUPPLEMENTARY TESTS

a) Engine tests

Date and location of tests: 20.7.1962, Schlepper-Prüffeld, Darmstadt-Kranichstein

Type of dynamometer : Schenck hydraulic brake

Position of governor control: Fully open

Fuel: Shell diesel fuel, density 0,825 kg/l at 15°C commerical quality in accordance with DIN 51 601

Engine oil: BP Energol - Diesel D, HD 20 (SAE)

(1) Sustained power tests

Duration of test h	Horse power metric hp	Engine speed r.p.m.	Torque kpm	Spec. fuel cons. g/hph	Mean temperatures fuel °C	oil °C	water °C	air °C	Atm. press mm Hg.
Maximum power									
2	36,1	2200	11,73	199	21	87	n.gem.	24	739
Power at 85 % of engine speed at maximum torque									
1	27,0	1549	12,50	197	20	78	n.gem.	26	743

(2) Varying speed tests

Horse power metric hp	Engine speed r.p.m.	Fuel consumption l/h	hph/l	g/hph	Mean temperatures fuel °C	oil °C	water °C	air °C	Atm. press mm Hg.
Power at rated engine speed for all works									
36,3	2200	8,80	4,13	200	21	78	n.gem.	22	739
Maximum no load engine speed									
-	2300	2,08	-	-	21	78	n.gem.	22	739

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2. SUPPLEMENTARY TESTS

b) Belt tests

Date and location of tests: 5.9.1962, Schlepper-Prüffeld, Darmstadt-Kranichstein

Position of governor control: Fully open

Fuel: Shell diesel-fuel, density 0,825 kg/l at 15°C commercial quality in accordance with DIN 51 601

Engine oil: BP Energol - Diesel D, HD 20 (SAE)

(1) Sustained power tests

Duration of test h	Horse power metric hp	Engine speed r.p.m.	Equiv. torque kpm	Spec. fuel cons. g/hph	Mean temperatures fuel °C	oil °C	water °C	air °C	Atm. press. mm Hg.
Maximum power, linear belt speed 18,4 m/s, belt slip 0,7 %									
2	31,9	2200	10,38	228	21	80	n.gem.	20	732
Power at 85 % of engine speed at maximum torque									
1	24,0	1549	11,09	226	18	75	n.gem.	20	732

(2) Varying speed tests

Horse power metric hp	Engine speed r.p.m.	Fuel consumption l/h	hph/l	g/hph	Mean temperatures fuel °C	oil °C	water °C	air °C	Atm. press. mm Hg.
Power at rated engine speed for belt work linear belt speed 18,4 m/s (acc. to DIN 9630:19,85-22,0 m/s)									
30,9	2200	8,66	3,57	231	21	80	n.gem.	20	732
Maximum no load engine speed									
-	2285	2,64	-	-	21	80	n.gem.	20	732

S E C T I O N III

DRAWBAR TESTS ON ARTIFICIAL TRACK

Date of tests : 2.8. - 15.8. 1962
Type of track : Concrete
Position of governor control: Fully open
Type of tyres, rear: 12,4/11 - 32 AS, 6ply pneumatic Conti Farmer, straight bar open centre type
front: 6,00-16 AS Front, 6ply pneumatic, Conti
Fuel : Shell diesel-fuel, density 0,825 kg/l at 15°C. commercial quality in accordance with DIN 51 601
Engine oil: B P Energol - diesel D H^D 20

a) Tests with ballast

Weight of tractor with driver

Without ballast :	at front	743 kg,	at rear 1382 kg
With ballast :	at front	889 kg,	at rear 2106 kg
Total weight with ballast :	2995 kg		

Weight of ballast

Front:	Wheel - weights (2 per wheel) :	146 kg	
	Water :	nil	
Rear :	Wheel - weights (4 per wheel) :	448 kg	
	Water : (total) :	275 kg	

Tyre inflation pressure

Front :	2,5 kp/cm²
Rear :	1,5 kp/cm²

Height of drawbar above ground : 500 mm (acc. to DIN 9670)

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(1) Maximum powers and pulls

Gear No.	Maximum powers								Maximum pulls	
	Horse power metric hp	Pull kp	Wheel slip %	Speed km/h	Engine speed r.p.m.	Water temp. °C	Air temp. °C	Atm. press. mm Hg.	Pull kp	Reason for stall
1.	10,0	2760	20,9	0,98	2270	n.rec.	22	739	2980	Wheel spin
2.	16,8	2784	22,2	1,63	2255	n.rec.	22	734	2940	Wheel spin
3.	27,0	2556	15,1	2,85	2200	n.rec.	21	734	2760	Engine stall
4.	29,4	1576	7,5	5,04	2205	n.rec.	32	739	1676	Engine stall
5.	29,1	2040	10,9	3,85	2200	n.rec.	19	735	2220	Engine stall
6.	30,0	1168	5,4	6,95	2200	n.rec.	32	739	1244	Engine stall

(2) Fuel consumption

Gear No.	Optimum fuel consumption			Range of pull kp over which specific fuel consumption does not exeed optimum consumption by more than 10%
	Spec. fuel consumption g/hph	hph/l	correspond. pull kp	
1.	402	2,06	2760	1955 - 2915 kp
2.	314	2,64	2208	1565 - 2900 kp
3.	254	3,24	2760	1410 - 2760 kp
4.	238	3,47	1676	980 - 1676 kp
5.	225	3,66	2204	1320 - 2220 kp
6.	235	3,50	1208	705 - 1244 kp

b) Tests without ballast

Weight of tractor with driver:

Front : 743 kg
Rear : 1383 kg
Total : 2126 kg

Tyre inflation pressure:

Front : 2,5 kp/cm²
Rear : 1,5 kp/cm²

Height of drawbar above ground: 500 mm (acc. to DIN 9670)

(1)Maximum powers and pulls

Gear No.	Maximum powers								Maximum pulls	
	Horse power metric hp	Pull kp	Wheel slip %	Speed km/h	Engine speed r.p.m.	Water temp. °C	Air temp. °C	Atm. press mm Hg.	Pull kp	Reason for stall
3.	20,3	1982	20,6	2,77	2255	n.rec.	20	738	2024	Wheel spin
4.	28,8	1600	11,9	4,86	2202	n.rec.	18	737	1696	Engine stall
5.	25,7	1964	20,1	3,53	2235	n.rec.	19	738	2016	Wheel spin
6.	29,8	1178	8,4	6,84	2200	n.rec.	15	737	1272	Engine stall

(2)Fuel consumption

Gear No.	Optimum fuel consumption			Range of pull kp over which specific fuel consumption does not exeed optimum consumption by more than 10 %
	Spec.fuel consumption g/hph	hph/l	correspond. pull kp	
3.	268	3,07	1892	1120 - 2010 kp
4.	248	3,31	1280	870 - 1696 kp
5.	245	3,36	1796	970 - 1945 kp
6.	233	3,54	1272	725 - 1272 kp

S E C T I O N IV

1. Location of centre of gravity

	Test A ballasted	Test B unballasted
Height above ground	709 mm	767 mm
Distance forward from the vertical plane containing the axis of the rear wheels	577 mm	685 mm
Distance from the median plane parallel to the longitudinal axis of the tractor bisecting the track	0 mm	0 mm

2. Turning space and turning radius

Wheel equipment: As for drawbar tests without ballast
Wheel track : Front 1270 mm, rear 1250 mm

	With brakes		Without brakes	
	Right-hand	Left-hand	Right-hand	Left-hand
Radius of turning space	3,0	3,0	3,4	3,4
Turning radius	2,9	2,9	3,3	3,3

S E C T I O N V

1) Repairs and adjustments during tests : None

2) Remarks : None

Darmstadt, am 8. 2. 1963

Schlepperprüffeld Darmstadt

Zapfwellenleistung

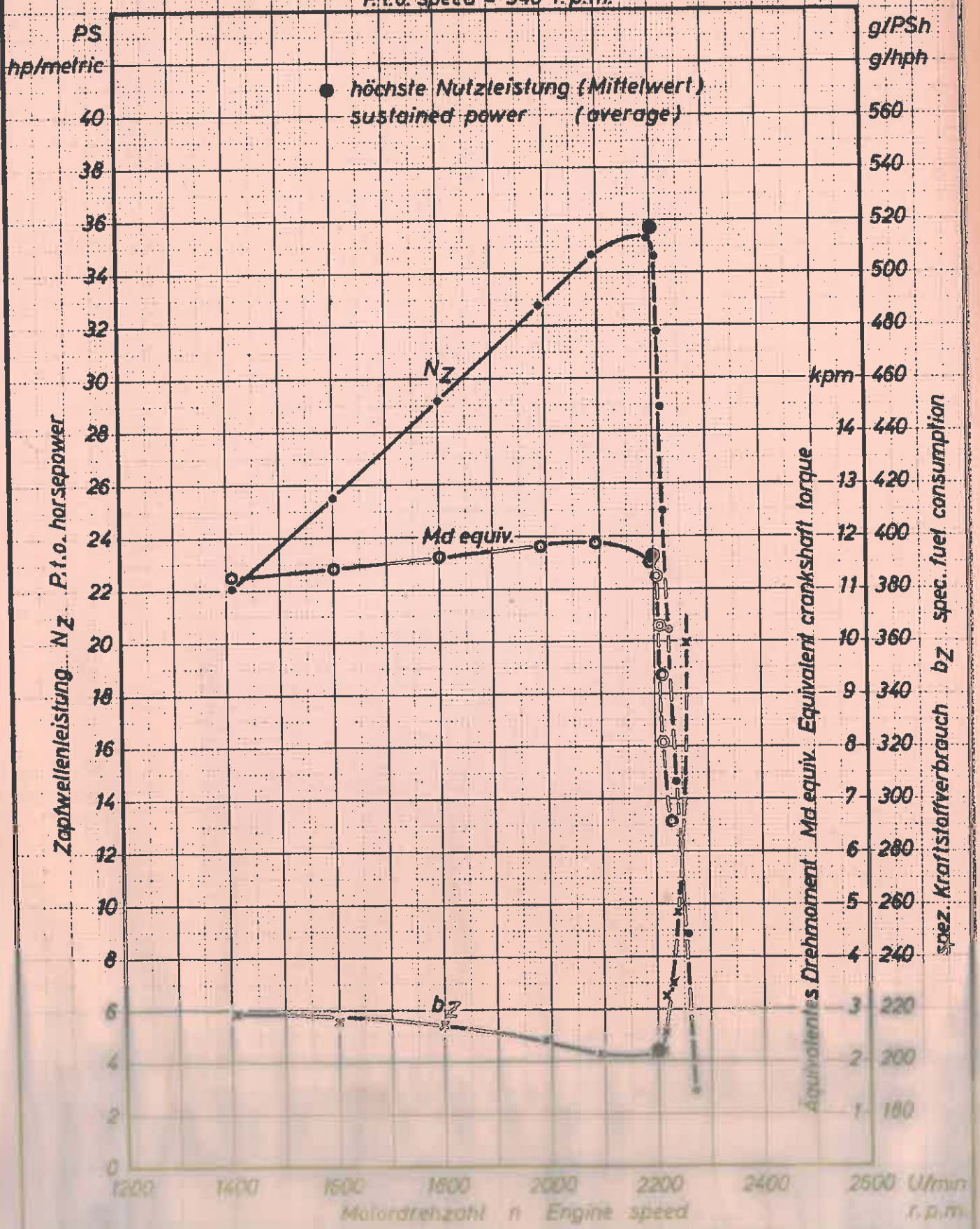
Zapfwellendrehzahl = 540 U/min

Güldner Dieselschlepper
Toledo G 40
Güldner Dieselmotor Typ 3L 79

P.t.o. - test

P.t.o. speed = 540 r.p.m.

Test Nr: 4008



Motor Nr.: 116 26 0307	Motoröl: HD 20	Versuchstag: 3. 9. 1962	Versuchsstg.
Schlepper Nr.: 218 26 0001	Lufttemperatur: 20° C	Versuchs Nr.: 131/4008/62	
Kraftstoff: DK 0 625-15*S	Barometerstg.: 740 mm QS	Kurvenblatt: 1	

Schlepperprüffeld
Darmstadt

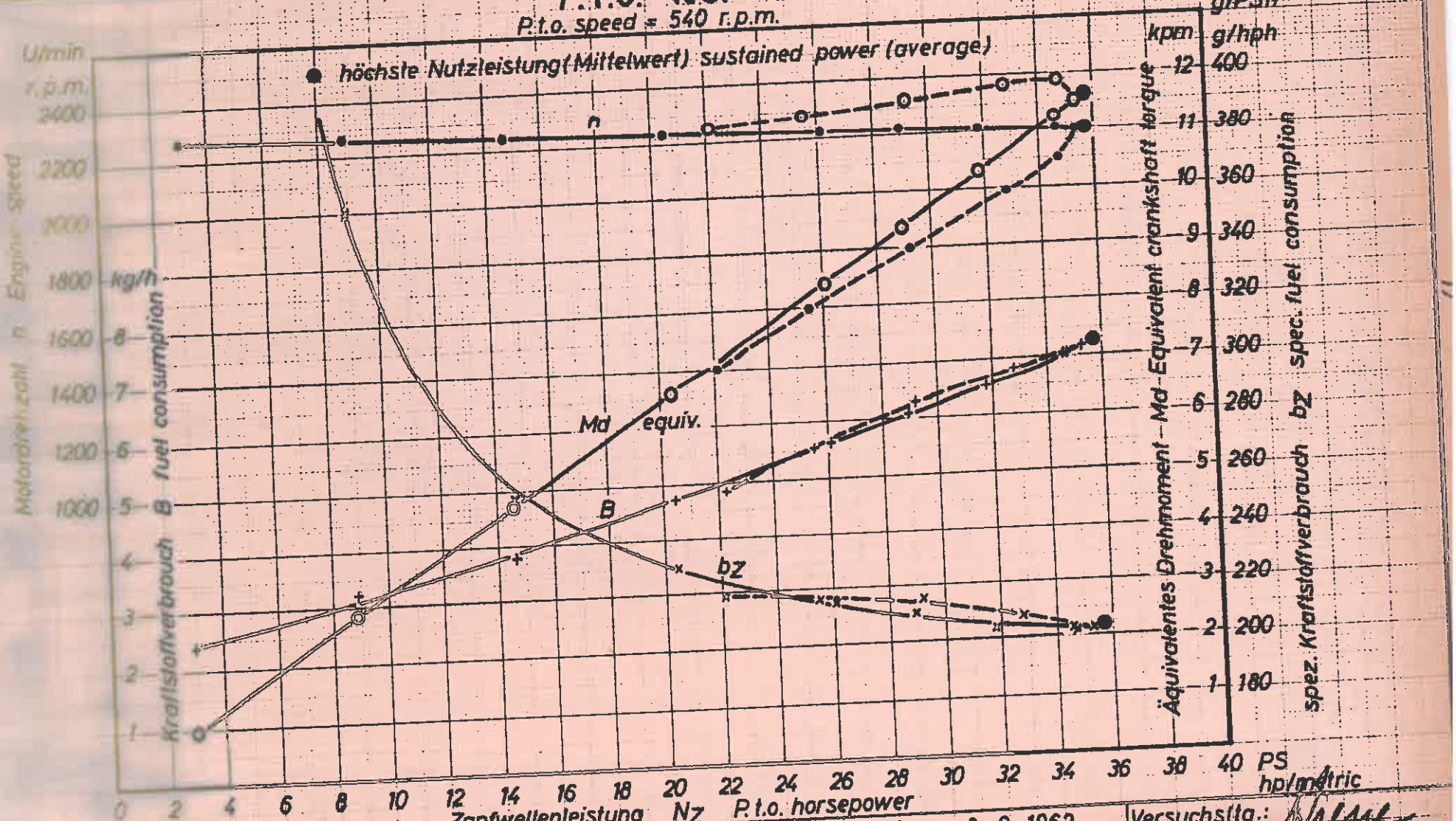
Zapfwellenleistung

Zapfwellendrehzahl = 540 U/min

Güldner Dieselschlepper
Toledo G 40
Güldner Dieselmotor Typ 3L 79
Test Nr: 4008

P.t.o.-test

P.t.o. speed = 540 r.p.m.



Motor Nr.: HE 26 0007	Motoröl: HD 20	Lufttemperatur: 20° C	Versuchstag: 3. 9. 1962
Schlepper Nr.: 216 26 0001	Kraftstoff: DK 0,825/15° C	Barometerstd.: 740mm QS	Versuchs Nr.: 131/4008/62

Versuchsstg.: 2 Kurvenblatt: Fl.