Kuratorium für Technik in der Landwirtschaft
Schloß-Frohnhof Darmstadt-Kranichstein

Report on test No. 4016/SPF

HANOMAG-ROBUST 800

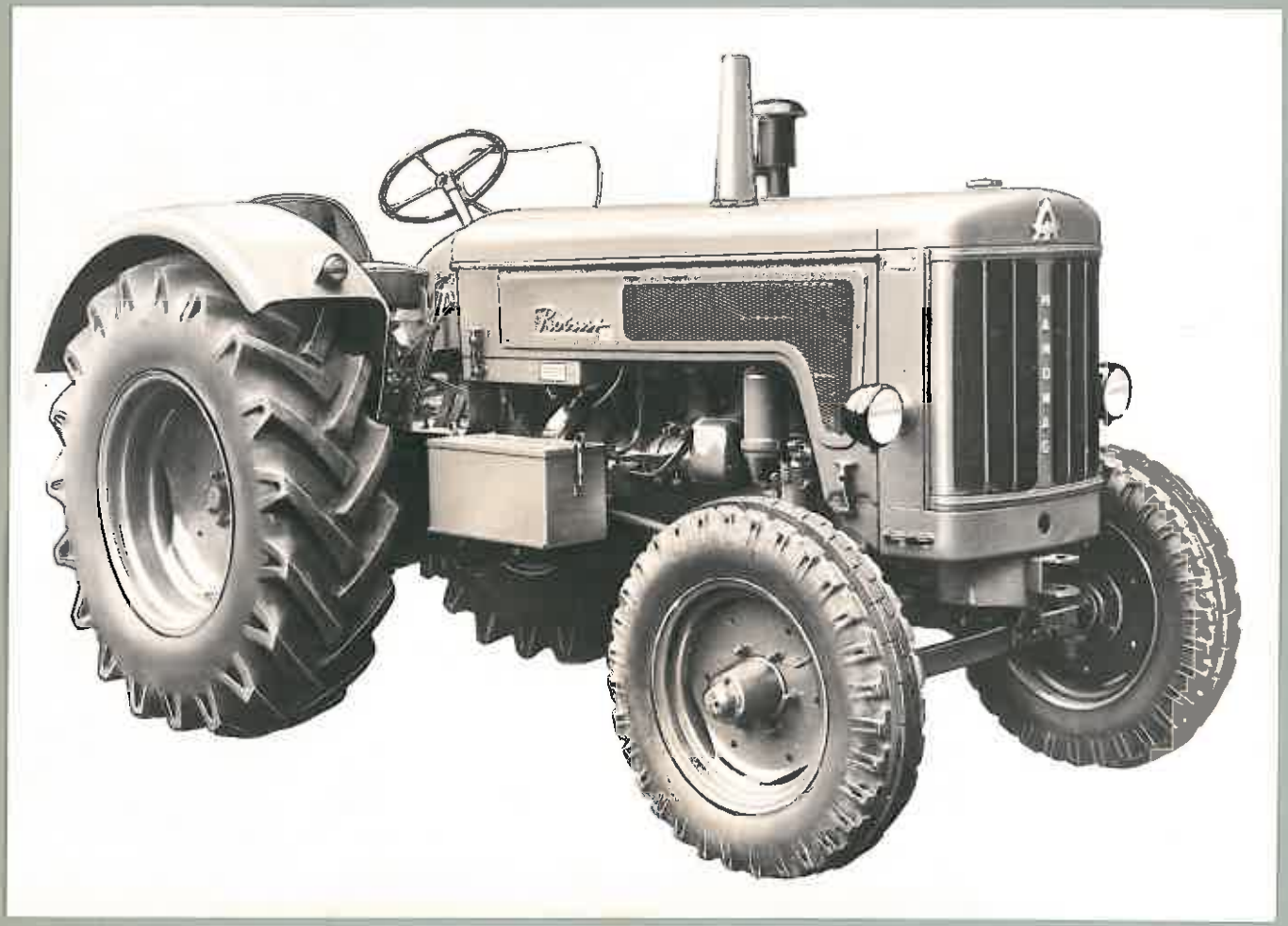
Nr. 60

Manufacturer: RHEINSTAHL HANOMAG AG, Hannover

Test requested by: RHEINSTAHL HANOMAG AG, Hannover

Date of Test: May–October 1964

This report was approved by the OECD Coordinating Centre (C.N.E.E.M.A., France)
as being in accordance with the OECD Tractor Test Code
It does not contain an evaluation of the performance of the tractor on
practical farm work


Robur

SCHLEPPER-PRÜFFELD

KURATORIUM FÜR TECHNIK IN DER LANDWIRTSCHAFT

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Date of Approval: 31. December 1964
Number of Approval: 0 60

Darmstadt, 4. November 1964

Schlepper-Prüffeld * Darmstadt-Kranichstein *

TABLE OF CONTENTS

		Page
	Contents of appendix	3
Section I.	Specification of tractor	3-8
Section II.	Laboratory tests	
	1. Compulsory tests at the main p.t.o.	9
	2. Supplementary tests: Engine tests	10
Section III.	Drawbar tests on concrete track	
	a) Tests with ballast	11-12
	b) Tests without ballast	13
Section IV.	Location of centre of gravity	14
	Turning space and turning radius	14
Section V.	Repairs and adjustments during tests, remarks	14

CONTENTS OF APPENDIX

	Page
LABORATORY TESTS	
Compulsory tests at main p.t.o.	
Curves of p.t.o. horse power, equivalent crankshaft torque and specific fuel consumption versus engine speed	15
Curves of engine speed, equivalent crankshaft torque and fuel consumption versus p.t.o. horse power	16
SUPPLEMENTARY TESTS	
Engine tests	
Curves of engine horse power, crankshaft torque and fuel consumption versus engine speed	17
Curves of engine speed, crankshaft torque and fuel consumption versus engine horse power	18
DRAWBAR TESTS	
With ballast	
Curves of drawbar horse power and wheel - slip versus drawbar pull	19
Curves of specific fuel consumption versus drawbar pull	20
Without ballast	
Curves of drawbar horse power and wheel - slip versus drawbar pull	21
Curves of specific fuel consumption versus drawbar pull	22

S E C T I O N I

SPECIFICATION OF TRACTOR

Tractor

Make: RHEINSTAHL HANOMAG AG., Hannover
Model: Robust 800
Type: Wheel-type diesel-tractor, unit construction
No.: 0549 999 (tractor tested)

Engine

Make: RHEINSTAHL HANOMAG AG., Hannover
Model: D 941 R
Type: 4-stroke-diesel with pre-combustion chamber
No.: 049 999 (engine tested)

Rated engine output (manufacturers rating) 75 hp (metric)
Rated engine speed 1500 r.p.m.

Cylinders: 4 cylinders; vertical in line;
120 mm bore x 150 mm stroke;
compression ratio 18:1
replaceable wet sleeves
overhead valves

Rated speeds: For p.t.o. work 1500 r.p.m.
for field drawbar work 1500 r.p.m.
for belt work 1500 r.p.m.

Fuel system: Fuel-commercial available diesel fuel
Bosch type PE 4A 90C 420 RS 2122
injection pump
Bosch type DN 12 SD 12 injection nozzles;
Bosch nozzles holder KD 57 SDA 65/4
injection timing 19° before T.D.C.
injection pressure 125 kp/cm²
Bosch type FP/KS 22 AD 6/4 supply pump
Bosch type FJSJ 1/3 Z fuel precleaner and main filter
Bosch type filter FJ/D 11W 11A 103, or Knecht type filter FB 617/4 LCM
capacity of fuel tank 110 l

Governor: Bosch type EP/RSV 250-750 A4B 198 DR, mechanical variable speed governor; governed range of engine speed 480-1680 r.p.m.

Air cleaner: Make Mann and Hummel oil bath cleaner with cyclone precleaner;
oil capacity 1,5 l

Oiling System: Forced feed from gear typ pump with Mann and Hummel edge-typ full flow filter type 51 418 51006 in full flow and Mann and Hummel micro-typ filter with paper filter element type 69 708 62 131 in by-pass.
recommended oil in winter SAE 10W HD
in summer SAE 20 HD
in the tropics SAE 30 HD
oil-change period 100 working hours; using S 3 oils after 200 of working hours
oil capacity 19,0 litres

Cooling system: Pressurised water cooled, impeller and 6-blade fan assisted
thermostat with dual flow circulation for temperature control,
cooling water capacity 30 litres

Transmission

Clutch: Make Fichtel and Sachs typ G 350 KR dry single plate clutch; foot pedal operated.

Gearbox: Make RHEINSTAHL HANOMAG AG., Hannover type Robust 800; 10 forward speeds and 2 reverse; sliding gear typ comprising 5 speed gearbox with reverse gear and dual range reduction gear

Differential: Make RHEINSTAHL HANOMAG AG., Hannover crown wheel and pinion bevel gear typ differential; lock fitted, hand lever operated;

Speeds:

Gear No.	Number of engine revolutions for one revolution of driving wheel	Theoretical travelling speed for 1500 r.p.m. rated speed of engine km/h
	forward gears	
1.	288,0:1	1,40
2.	202,0:1	2,00
3.	151,5:1	2,70
4.	102,5:1	3,95
5.	66,3:1	6,06
6.	90,0:1	4,50
7.	63,2:1	6,40
8.	47,3:1	8,60
9.	32,0:1	12,60
10.	20,7:1	20,00
	reverse gears	
1.	118,5:1	3,40
2.	379,0:1	1,10

Steering device: Make Zahnradfabrik Friedrichshafen type 682, stud steering gear

Brakes: Hand-brake-internal shoe-type brake acting on a drums on a gear shaft
Foot-brake-internal shoe-type brake acting on drums insides of the rear wheels
Steering-brake-actuated by divided main footpedal, combined by a latch for normal use, independant for steering brake use.

Wheels

Steering wheels: Two at front. Tyres 7,50-20 AS Front, 6ply pneumatic (acc. to DIN 7808)
Track 1410 mm, no change providet
Maximum permissible weight on each tyre
625 kp at 1,5 kp/cm^2
850 kp at 2,5 kp/cm^2
(acc. to DIN 7808)

Driving wheels: Two at rear. Tyres 18,4/15-30 AS, 8ply pneumatic (acc.to DIN 7807)
Track 1510 mm (acc.to DIN 9621), no change providet
Maximum permissible weight on each tyre 2000 kp at 1,0 kp/cm^2; 2400 kp at 1,4 kp/cm^2 (acc. to DIN 7807)
Wheel base 2350 mm

Belt pully

(not fitted on tractor tested)
Location: At rear of tractor, p.t.o. driven
Diameter x width: 265 x 170 mm
Speed: 1475 r.p.m. at 1500 r.p.m. rated engine speed
Linear belt speed: 20,2 m/s (acc. to DIN 9630)
Direction of rotation: clockwise viewed from tractor rear

Power take off

a) Main p.t.o.: Live power take-off,
Location: At rear of tractor, 670 mm above ground, of centre line
Dimensions : Spline shaft 44,4 x 37,5 x 11 mm
Speed: 565 r.p.m. (acc. to DIN 9611) at 1500 r.p.m. rated engine speed
Direction of rotation: clockwise viewed from tractor rear

Power lift

Own make live hydraulic with Bosch type HY/ZFR 122 AL gear type pump; single acting ram; tapping for external cylinder; Bosch type HY/S 10 C 2 B 2 control valve with hand operated rear axle load amplifier; automatic control of ploughing-depth by HANOMAG Pilot control valve; oil capacity 12,0 l; maximum oil pressure 150 kp/cm^2, maximum oil flow 22 l/min (manufactures figure); maximum load liftable through complete range of movement at the ends of the lower links 1965 kp.

Implement linkage

Three-point linkage, categorie II, controlled by hydraulik power lift (acc. to DIN 9674)

Drawbar

Fixed on hydraulic controlled implement linkage with centre hole and 8 holes apart either side of centre line (acc.to DIN 9676 E); vertical adjustment from 0 mm to 770 mm above ground;
distance from rear axle in horizontal position of lower links 1050 mm

Trailer hitch

At rear of tractor; height above ground 862 and 907 mm adjustable by pins; distance from rear axle 690 mm

Towing hitch

At front of tractor, height above ground 650 mm

Electrical equipment

Voltage 12 Volts
Generator Bosch type LJ/GJA 160/12/1500/R 1
Battery 12 Volts, lead-acid, capacity 135 Ah (2 piece)
(acc. to DIN 72 311)
Starting device Bosch type AL/FKB 6/24 AR 300 SR screw-push starter,
glowing plugs Beru type 123 M
Lighting equipment 12 Volts, according to StVZO (German lighting regulation) additionally head-light main beam.

Overall dimensions

Overall length: 3800 mm with three-point linkage and towing hitch

Overall width : 1970 mm without ballast weights, at track 1510 mm

Overall height: 1960 mm to top of axhaust pipe

Maximum ground clearance: 400 mm in centre line of tractor
460 mm in a distance of 300 mm of the to each side centre line

Weights

With implement linkage, power lift, full fuel tank, öl, cooling water, as tested, but without driver

	Without ballast kg	With ballast kg
On front wheels	1421	1421
On rear wheels	2386	4170
Total	3807	5591

Special remarks: None

S E C T I O N II

LABORATORY TESTS

1. COMPULSORY TESTS

Main power take - off test

Date and location of test: Schlepper-Prüffeld, 24. June 1964
Darmstadt-Kranichstein

Type of dynamometer: Schenck hydraulic brake

Position of governor control: Fully open and relating to standard p.t.o. speed

Fuel: Shell diesel-fuel, density 0,834 kg/l at 15°C
commercial quality in accordance with DIN 51 601

Engine oil: Gasolin S 3 20/W20 (SAE)

Transmission oil: SAE 90

Horse power	Speeds engine	Speeds pto	Torque equiv.	Fuel consumption			Mean temperatures Coolt	Engine oil	Fuel	Room	Atm. press
metric hp	rpm	rpm	kpm	l/h	g/hph	hph/l	°C	°C	°C	°C	mm Hg.
A. Maximum power, 2 h											
70,7	1564	588	32,4	18,35	216	3,85	66	72	21	20	761
B. Power at standard p.t.o. - speed											
67,7	1430	537	33,9	17,32	213	3,91	70	80	20	22	761
C. Power at maximum torque											
49,4	946	356	37,4	12,72	214	3,88	71	72	19	19	761
D. Power at engine rated speed											
69,2	1500	565	33,0	18,10	218	3,82	76	74	20	19	761

No load maximum engine speed: 1685 r.p.m.

2. SUPPLEMENTARY TESTS

a) Engine tests

Date and location of tests: Schlepper-Prüffeld, 14.June 1964
Darmstadt-Kranichstein

Type of dynamometer: Schenck water brake

Position of governor control: Fully open and relating to standard p.t.o. and rated engine speed

Fuel: Shell diesel-fuel, density 0,834 kg/l at 15°C, commercial quality in accordance with DIN 51 601

Engine oil: Gasolin S 3 20/W20 (SAE)

Horse power metric hp	Engine speed r.p.m.	Torque kpm	Fuel consumption l/h	g/hph	hph/l	Mean temperatures Coolt °C	Engine oil °C	Fuel °C	Room °C	Atm. press mm Hg.
A. Maximum power, 2 h										
76,4	1562	35,1	18,41	201	4,15	83	76	27	22	749
C. Power at maximum torque										
56,8	1027	39,6	13,32	196	4,27	80	77	27	20	749
D. Power at rated engine speed										
75,0	1500	35,8	17,84	198	4,20	85	80	27	22	752

No load maximum engine speed: 1680 r.p.m.

S E C T I O N III

DRAWBAR TESTS ON ARTIFICIAL TRACK

Date of tests: 30. June - 6. August 1964
Type of track: Concrete
Position of governor control: Fully open
Type of tyres: Rear 18,4/15-30 AS 8ply Conti Farmer
Front 7,50 - 20 AS Front 6ply Conti

Fuel: Shell diesel-fuel, density 0,834 kg/l at 15°C,
commercial quality in accordance with DIN 51 601

Engine oil: Gasolin S 3 20/W20 (SAE)

Transmission oil: SAE 90

a) TESTS WITH BALLAST

Weight of tractor with driver

Without ballast:	at front 1421 kg	at rear	2457 kg
With ballast:	at front 1421 kg	at rear	4241 kg
Total with ballast:	5662 kg		

Weight of ballast

Front: Wheel - weights non
water - nil
Rear : Wheel - weights (7 per wheel): 588 kg
water : 502 kg
cast iron wheel disks and rims: 694 kg

Tyre inflation pressure

Front: 1,5 kp/cm^2
Rear : 1,5 kp/cm^2

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 %	Engine speed r.p.m.	Speed km/h	Water temp. °C	Air temp. °C	Atm. press mm Hg.	Pull kp	Reason for stall
1.	23,8	5170	21,2	1635	1,24	81	14	748	5340	Wheel-spin
2.	32,8	4960	20,6	1635	1,79	80	20	747	5210	Wheel-spin
3.	43,9	5010	19,3	1598	2,36	83	23	747	5230	Wheel-spin
4.	58,7	4360	14,2	1570	3,64	80	24	752	5140	Engine-stall
5.	62,3	2820	8,9	1556	5,97	82	22	752	3225	Engine-stall
6.	59,2	3925	13,7	1558	4,07	81	21	752	4375	Engine-stall
7.	63,1	2770	8,8	1553	6,15	82	23	752	3020	Engine-stall
8.	63,2	2065	6,1	1551	8,27	83	25	752	2240	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	Drawbar hph/l	corresponding pull kp	
1.	337	2,47	4990	3650 - 5300
2.	298	2,79	4500	3010 - 5160
3.	274	3,04	4340	2640 - 5060
4.	249	3,34	3530	2170 - 5030
5.	237	3,52	3200	1650 - 3225
6.	254	3,27	2850	1780 - 4375
7.	240	3,46	2980	1460 - 3020
8.	231	3,61	2150	1380 - 2150

b) TESTS WITHOUT BALLAST

Weight of tractor with driver

Front : 1421 kg
Rear : 2457 kg
Total : 3878 kg

Tyre inflation pressure

Front : 1,5 kp/cm^2
Rear : 1,5 kp/cm^2

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

(1) Maximum powers and pulls

Gear No.	Maximum powers								Maximum pulls	
	Horse power metr. hp	Pull kp	Wheel slip %	Engine speed r.p.m.	Speed km/h	Water temp. °C	Air temp. °C	Atm. press mm Hg.	Pull kp	Reason for stall
4.	44,2	3235	15,1	1600	3,69	86	30	746	3402	Wheel-spin
5.	59,8	2800	10,4	1559	5,76	84	27	746	3085	Engine-stall
6.	52,2	3340	14,7	1588	4,22	82	21	746	3400	Wheel-spin
7.	61,9	2770	10,6	1555	6,03	79	16	755	3080	Engine-stall
8.	64,7	2050	6,9	1562	8,52	81	23	755	2295	Engine-stall

(2) Fuel consumption

Gear No.	Optimum fuel consumption Spec. fuel consumption	Drawbar	corresponding pull	Range of pull kp over which specific fuel consumption does not exeed optimum consumption by more than 10 %
	g/hph	hph/l	kp	
4.	261	3,19	3000	1750 - 3355
5.	236	3,53	2125	1370 - 3085
6.	250	3,54	2500	1590 - 3400
7.	241	3,46	2130	1350 - 3080
8.	236	3,53	1650	1070 - 2295

S E C T I O N IV

1. Location of centre of gravity

Tractor equipped as in	Test III.a) ballasted	Test III.b) unballasted
Height above ground mm	789	848
Distance forward from the vertical plane containing the axis of the rear axle mm	588	862
Distance from the medium plane parallel to the longitudinal axis of the tractor bisecting the track mm	--	--

2. Turning space and turning radius

Tractor weight and wheel equipment as tested in section III. **b)**, track front 1410 mm,
rear 1510 mm

	with steering brakes		without brakes	
	right-hand	left-hand	right-hand	left-hand
Radius of turning space	4,70 m	4,80 m	4,75 m	5,50 m
Turning radius	4,55 m	4,65 m	4,60 m	5,35 m

S E C T I O N V

1. Rapairs and adjustments during tests: None
2. Remarks: None

Darmstadt, am 12. January 1965

Schlepper-Prüffeld Darmstadt-Kranichstein

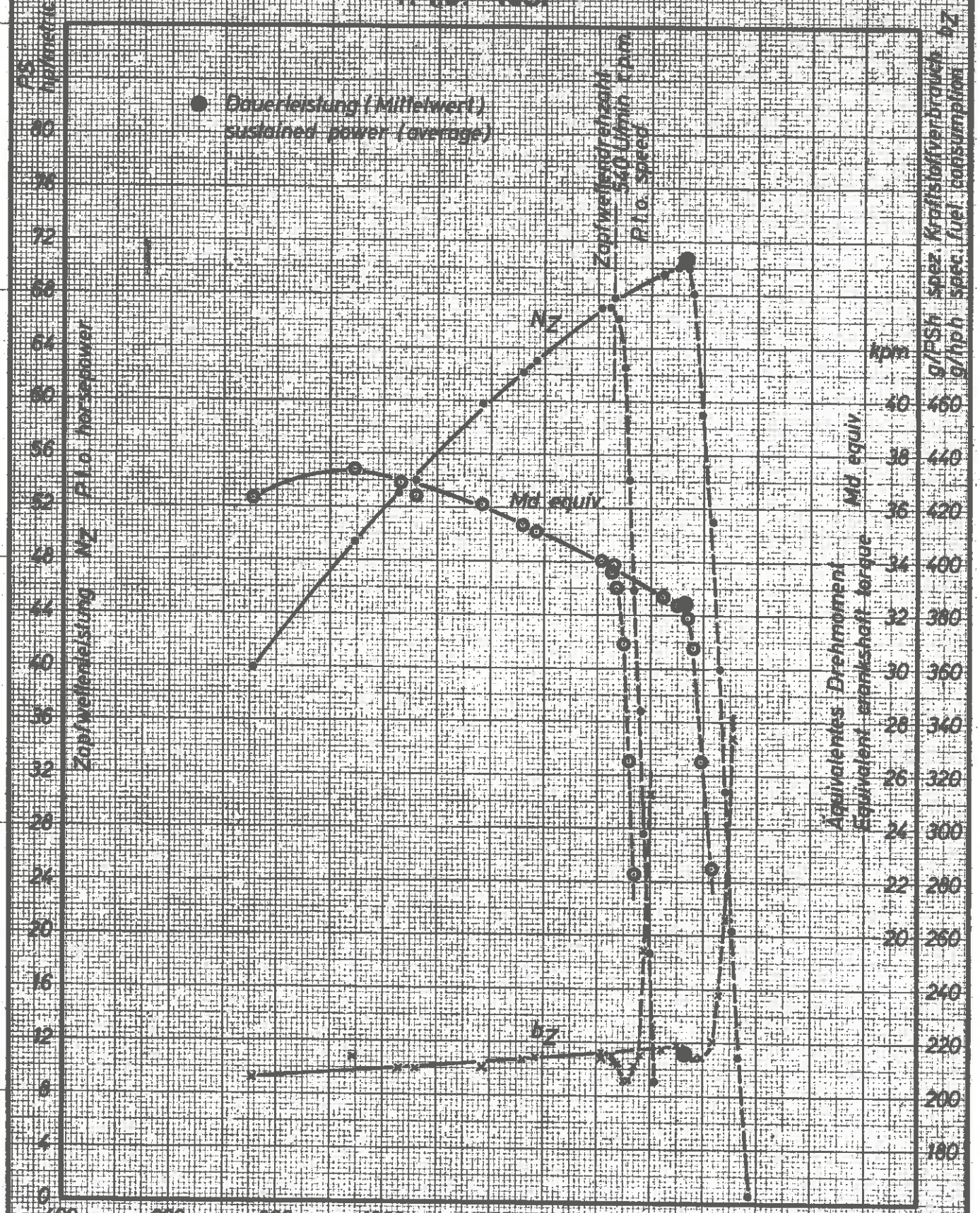
Schlepperprüffeld Darmstadt

Zapfwellenleistung

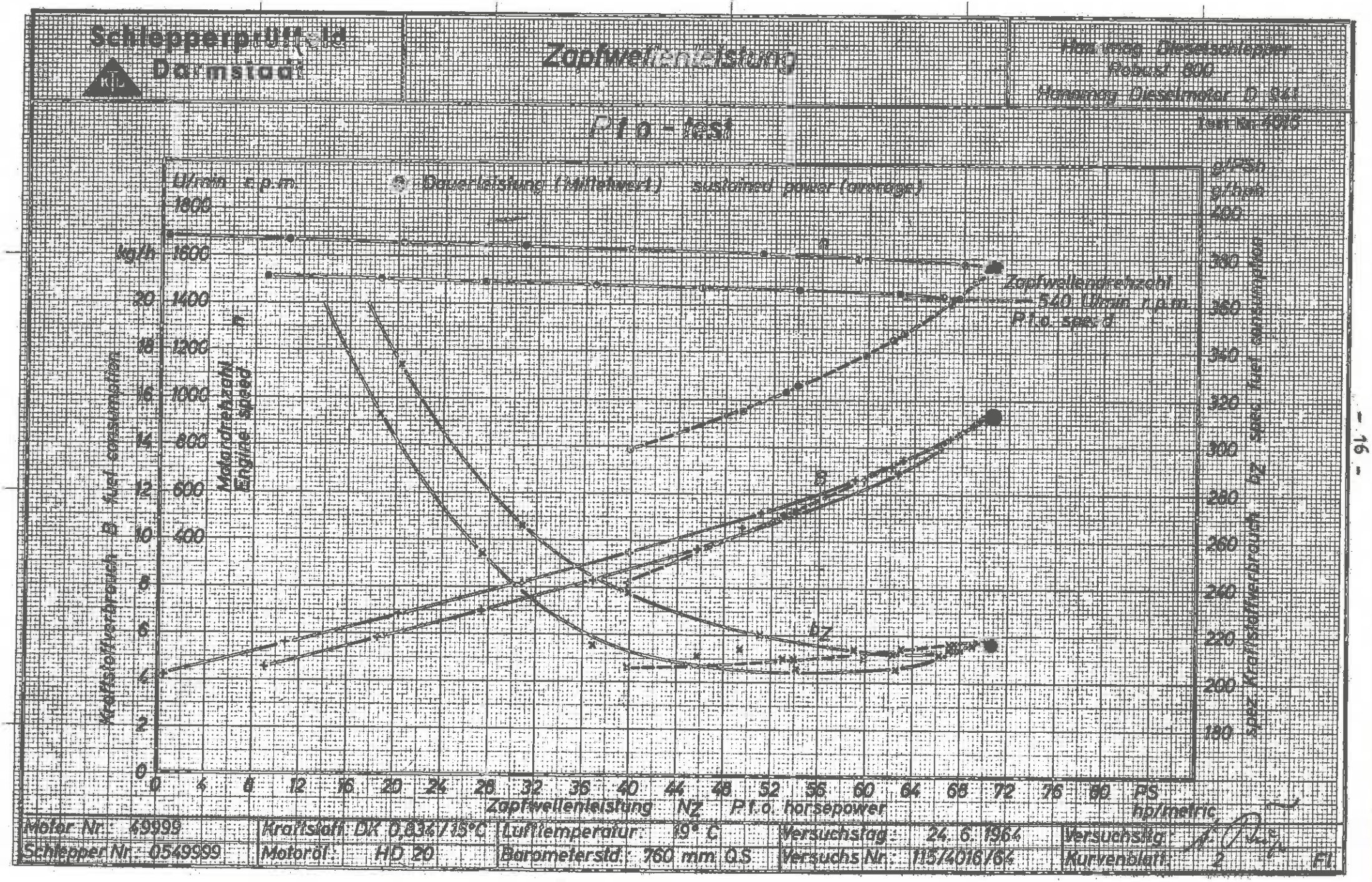
Hanomag Dieselschlepper
Robust 600
Hanomag Dieselmotor D 941

P.to. - test

Test Nr. 4016



Motor Nr.: 49999	Motoröl: HD 20	Versuchstag: 24. 6. 1964	Versuchsöle: —
Schlepper Nr.: 0549999	Lufttemperatur: 19° C	Versuchs Nr.: 115/4016/64	
Kraftstoff: DK 0834 / 15°C	Barometerstd.: 760 mm QS	Kurvenblatt: 1	

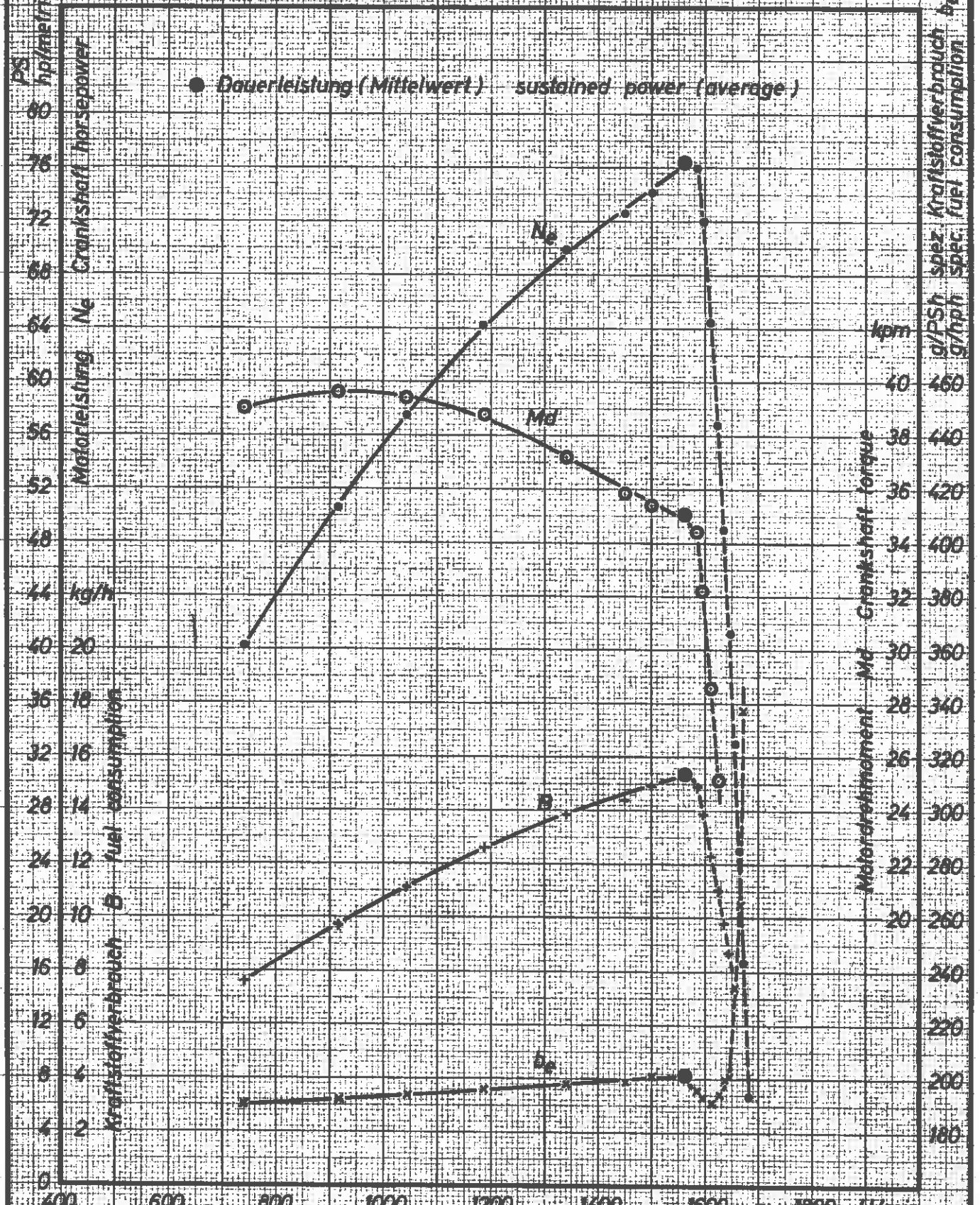

Schlepperprüffeld
Darmstadt
Zapfwellenleistung
P.t.o.-test
Hanomag Dieselschlepper
Robust 800
Henschel Dieselmotor D 941
Test No. 4016
U/min r.p.m.
Dauerleistung (Mittelwert) sustained power (average)
Zapfwellendrehzahl
540 U/min r.p.m.
P.t.o. speed
Motordrehzahl
Engine speed
Kraftstoffverbrauch g fuel consumption
spez. Kraftstoffverbrauch bZ g/PSh fuel consumption
kg/h
g/PSh
Zapfwellenleistung NZ P.t.o. horsepower
PS hp/metric
Motor Nr. 49999
Schlepper Nr. 0549999
Kraftstoff DK 0,834/15°C
Motoröl: HD 20
Lufttemperatur: 19° C
Barometerstd. 760 mm QS
Versuchstag: 24. 6. 1964
Versuchs Nr.: 115/4016/64
Versuchstag
Kurvenblatt: 2
Fl.

Schlepperprüffeld Darmstadt	Motorleistung	Hanomag Dieselschlepper Robust 800 Hanomag Dieselmotor D 941

Engine-test

Test Nr. 4016

● Dauerleistung (Mittelwert) sustained power (average)



Motor Nr.: 49999	Motoröl: HD 20	Versuchstag: 14. 5. 1964	Versuchsstg.:
Schlepper Nr.: 0549999	Lufttemperatur: 22° C	Versuchs Nr.: 115/4016/64	
Kraftstoff: DK 0,834/15° C	Barometerstd.: 749 mm QS	Kurvenblatt: 3	

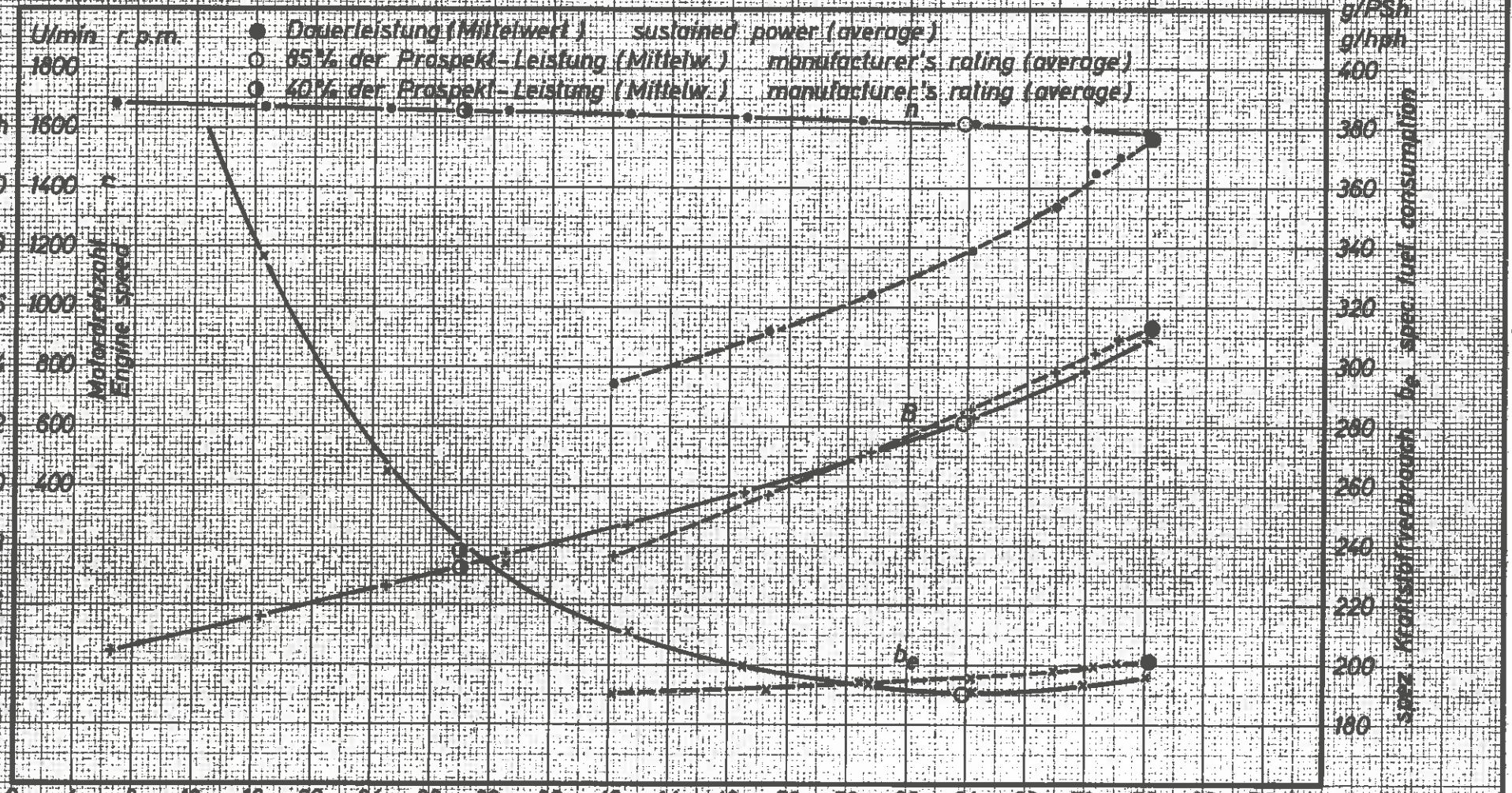
Schlepperprüffeld Darmstadt (KTL)

Motorleistung

Hanomag Dieselschlepper
Robust 800
Hanomag Dieselmotor D 941

Engine - test

Test Nr. 4016



Motor Nr.: 49999	Kraftstoff: DK 0,834/15° C	Lufttemperatur: 22 C	Versuchstag: 14. 5. 1964	Versuchsltg.:
Schlepper Nr.: 0549999	Motoröl: HD 20	Barometerstd.: 749 mm QS	Versuchs Nr.: 115/4016/64	Kurvenblatt: 4 FI.

Schlepperprüffeld Darmstadt

Zugprüfung

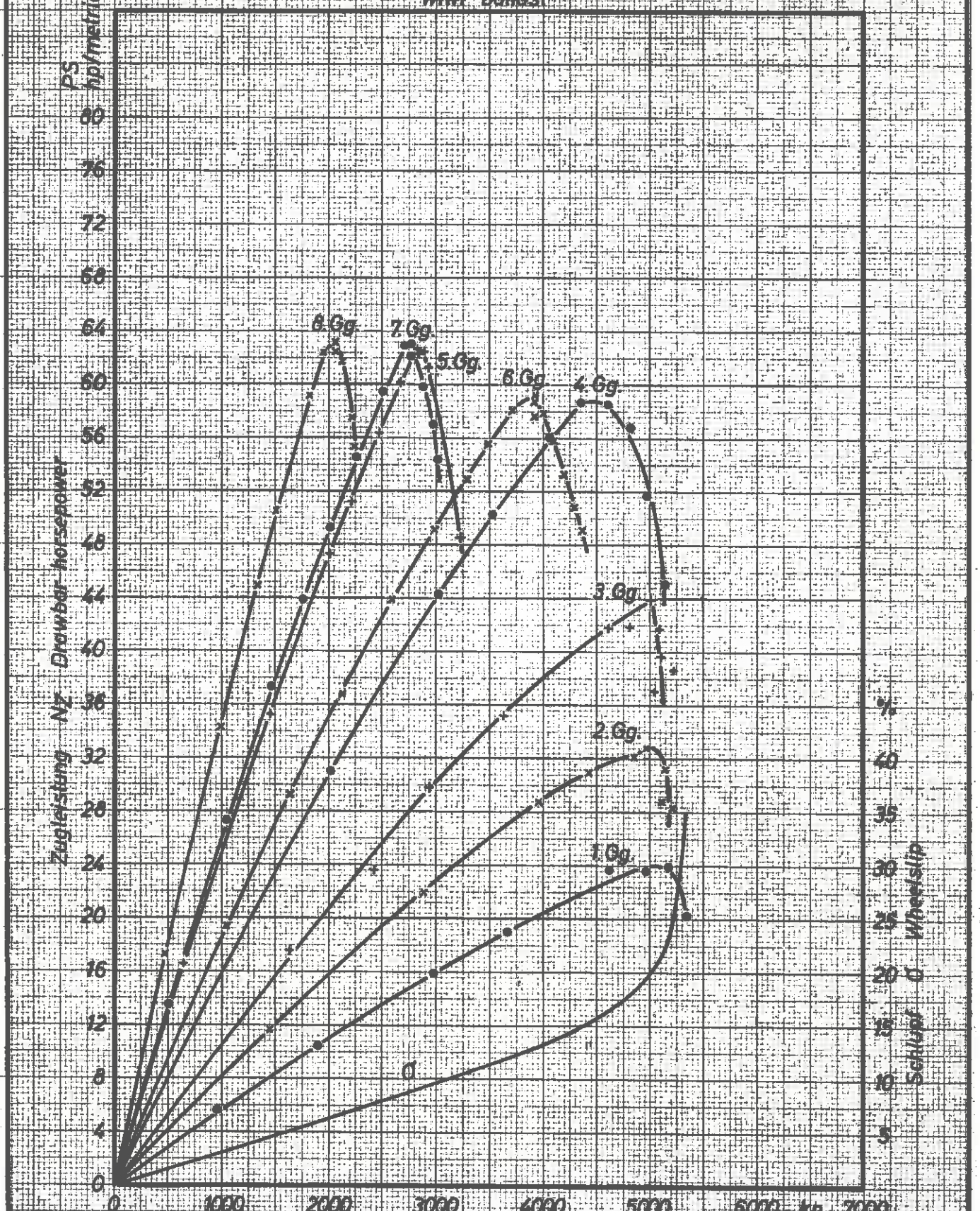
mit Ballast

Hanomag Dieselschlepper
Robust 600
Hanomag Dieselmotor D 941

Drawbar-test

with ballast

Test Nr. 4016



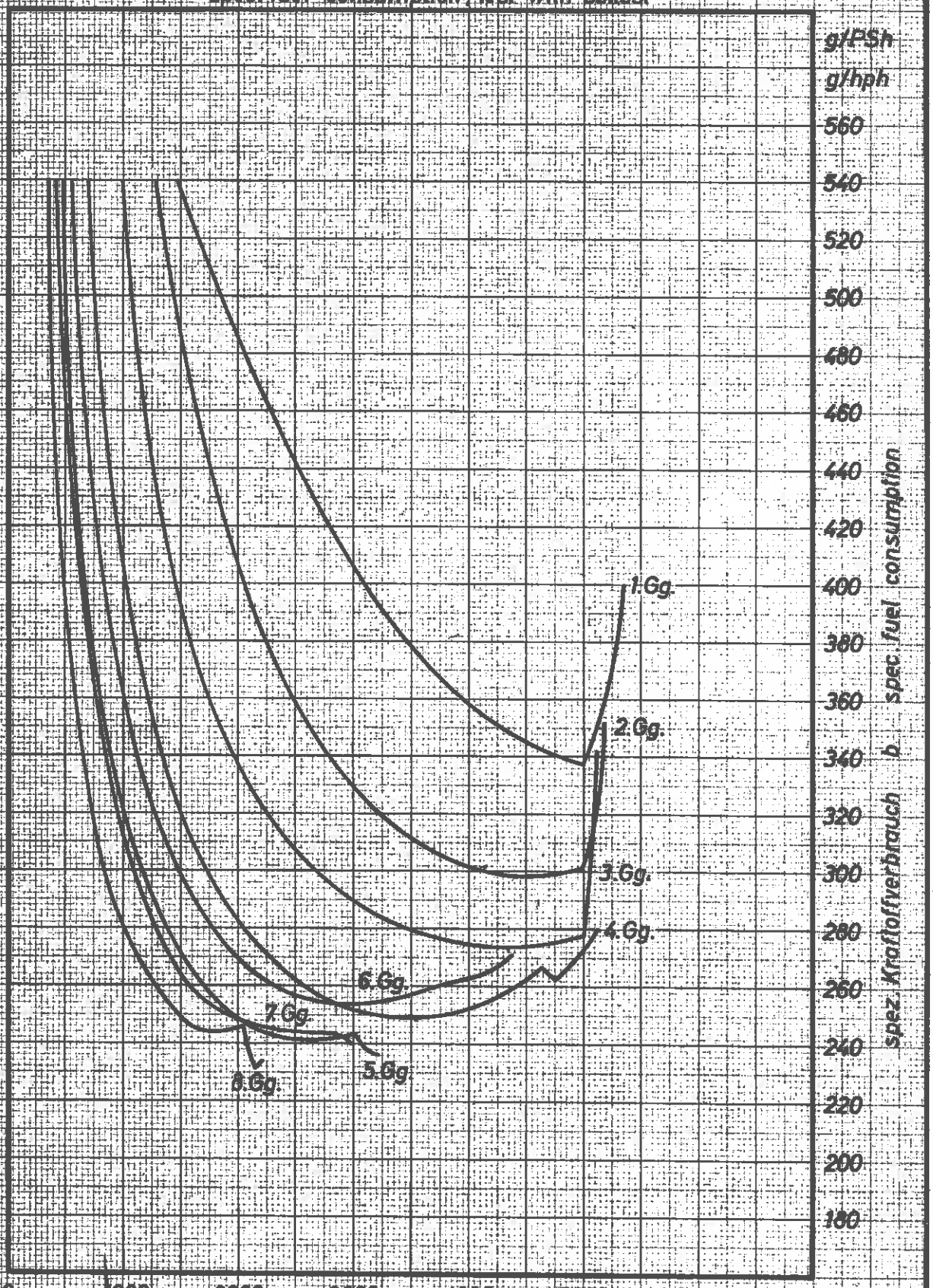
Motor Nr. 49999	Motoröl HD 20	Versuchstag: 3. 8. 1964	Versuchsstg.
Schlepper Nr.: 0549999	Lufttemperatur 23° C	Versuchs Nr.: 4016/065/64	
Kraftstoff: DK 0,834 / 15°C	Barometerstd. 752 mm QS	Kurvenblatt: 5	F1.

Schlepperprüffeld Darmstadt	Zugprüfung spez. Kraftstoffverbrauch mit Ballast	Hanomag Dieselschlepper Robust 800 Hanomag Dieselmotor D 941

Drawbar - test

spec. fuel consumption test with ballast

Test Nr: 4016



Motor Nr. 49999	Motoröl HD 20	Versuchstag: 3. 8. 1964	Versuchsltg.
Schlepper Nr. 0549999	Lufttemperatur: 23°C	Versuchs Nr: 4016/065/64	
Kraftstoff: DK 0,834 / 15°C	Barometerstd.: 752 mm QS	Kurvenblatt: 6	

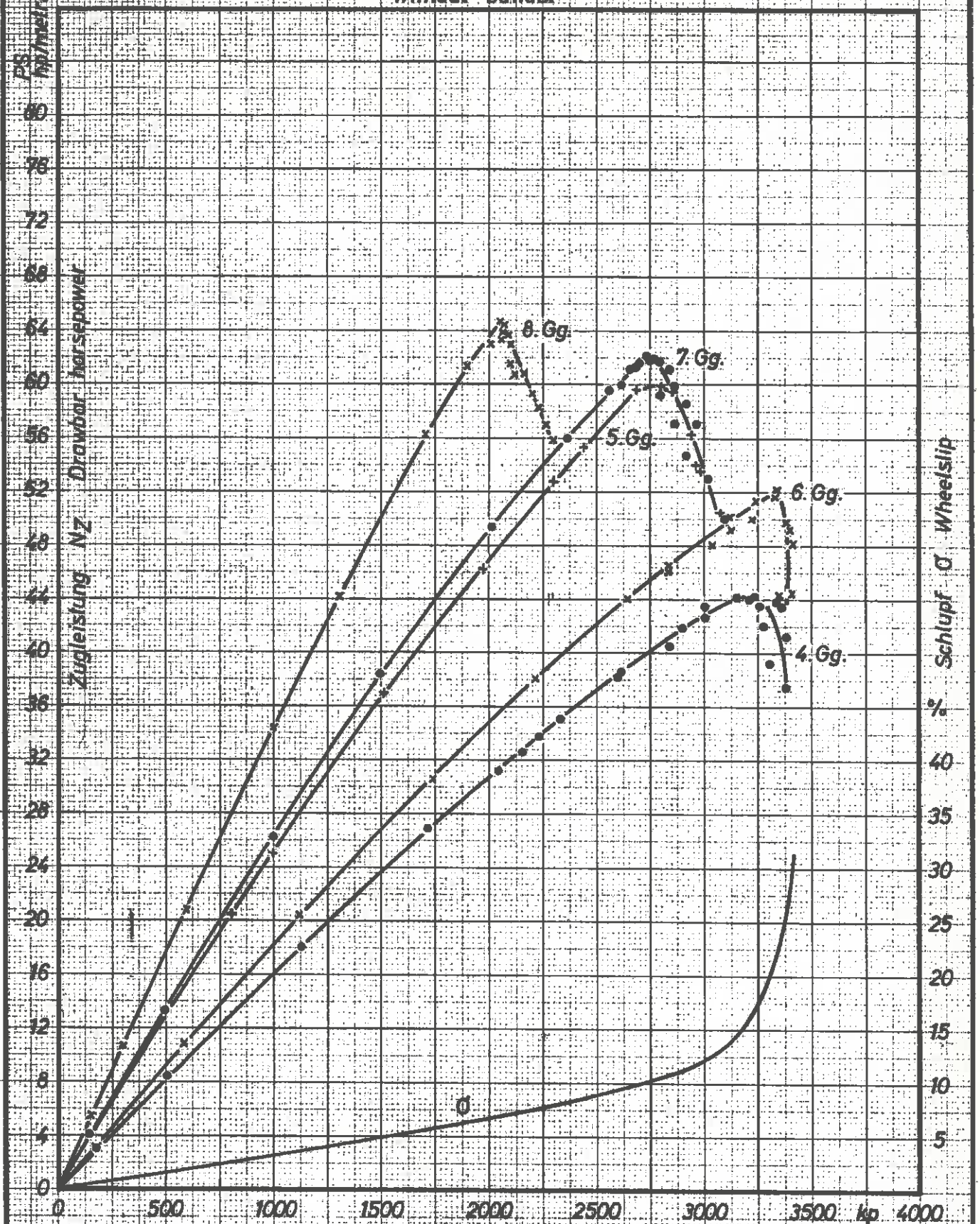
Schlepperprüffeld Darmstadt

Zugprüfung
ohne Ballast

Hanomag Dieselschlepper
Robust 800
Hanomag Dieselmotor D 941

Drawbar-test
without ballast

Test Nr: 4016



Motor Nr.: 49999	Motoröl: HD 20	Versuchstag: 30. 6. 1964	Versuchsltg.
Schlepper Nr. 0549999	Lufttemperatur: 24° C	Versuchs Nr.: 4016/048/64	
Kraftstoff: DK 0,834 / 15° C	Barometerstd.: 757 mm QS	Kurvenblatt: 7	Fl.

Schlepperprüffeld Darmstadt

Zugprüfung

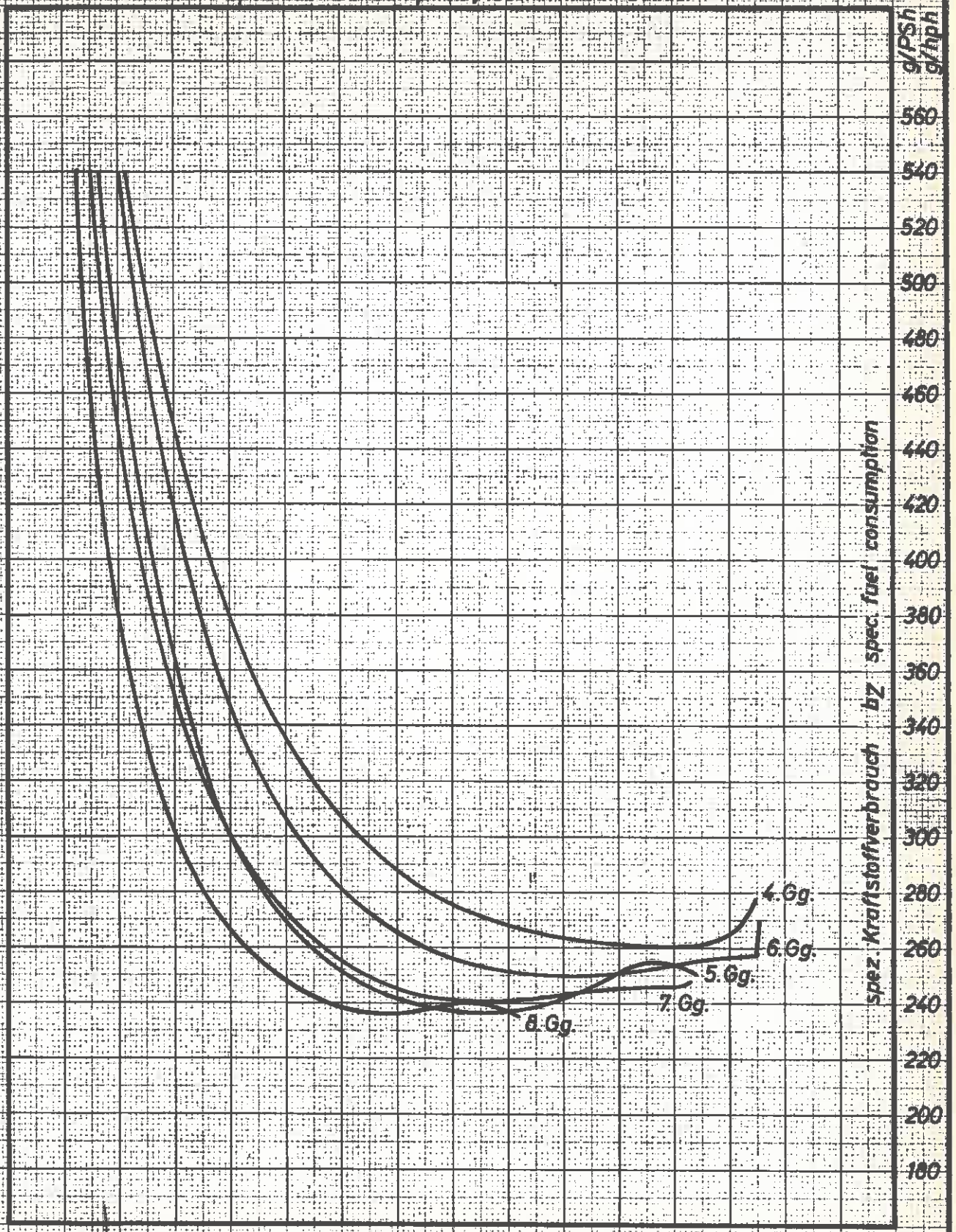
spez. Kraftstoffverbrauch ohne Ballast

Hanomag Dieselschlepper
Robust 900
Hanomag Dieselmotor D 941

Drawbar-test

spec. fuel consumption test without ballast

Test Nr: 4016



Motor Nr.: 49999	Motoröl: HD 20	Versuchstag: 30. 6. 1964	Versuchsltg.:
Schlepper Nr.: 0549999	Lufttemperatur: 24° C	Versuchs Nr.: 4016/048/64	
Kraftstoff: DK 0,834 / 15° C	Barometerstd.: 757 mm QS	Kurvenblatt: 8	